

Abstracts

Adult Presentation of Anomalous Left Coronary Artery Arising from P.A. - Translocation is still Possible with Local Flaps

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Background: Adult presentation of ALCAPA is extremely common. It has been treated surgically with ligation of LMCA and giving grafts to the LAD and O.M. branches as translocation is considered not possible especially if the LMCA is arising from left posterior sinus of pulmonary artery. Here we present a video of adult ALCAPA successfully translocated with local flaps.

Case History: 38 year lady was investigated for exertional angina. L.C.A. was found arising from the left posterior sinus of the P.A. No previous infarctions, and L.V. function was well preserved.

Methods: Midsternotomy. Pericardium harvested. ALCAPA mobilized. Standard CPB with Aortic & bicaval cannulation and myocardial protection using cold intermittent blood cardioplegia through both Aorta & PA. LMCA origin from PA is taken out as a trap door with a good cuff of the P.A. sinus as an extension flap. It is implanted in aorta, where another trap door flap is taken.

Result: Uneventful P.O. period. Angina disappeared with good exercise tolerance.

Conclusion: Adult presentation of ALCAPA can be successfully translocated using local flaps from P.A. and Aorta, yielding gratifying result.

How Safe is Multi-Vessel Off-Pump Coronary Artery Bypass Surgery?

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Aim: To evaluate safety of off-pump coronary artery bypass surgery (OPCAB).

Methods: Between January 15 and November 15, 2000, 437 (88.3%) patients out of 495 isolated CABG patients underwent OPCAB. Their age ranged between 35-80 (mean 60.6) years and 69 (15.8%) were females. Clinical profiles were diabetes 209 (47.7%) patients, hypertension-206 (47.1%) patients, smokers-86 (19.7%) patients, unstable angina- 89 (20.4%) patients and redo CABG-19 (4.3%) patients. Angiographically 330 (75.6%) patients had triple vessel disease, 55 (12.6%) LM stenosis >70% and 101 (23.1%) patients had EF<35%.

Results: Average of 3.54 anastomoses per patient were constructed of which 3.38 were arterial. Three hundred eighty seven (88.6%) had total arterial revascularisation. An average of 0.4 units of blood were transfused per patient and 371 (85%) did not require blood transfusion.

Postoperative complications were peri-op MI-5 (1.1%), AF-28 (6.4%), Re-exploration for bleeding-1 (0.2%), Pleural effusion-20 (4.1%), acute abdominal problems-4 (1%). Thirty patients (6.9%) required inotropes and IABP was used in 3 (0.7%) patients of which two had pre-op IABP. There were no strokes and only one patient died of renal failure 4 weeks after surgery. Even in the age group >70 (49 patients-12.5%), there was no significantly increased complication rate.

Conclusion: Multivessel OPCAB is a safe procedure but long term results needs to be evaluated.

Fast Tracking in Cardiac Surgery—Initial Experience from Dhaka

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Background: Fast tracking has been the trend in Cardiac Surgery all over the world and now we are proud to add this new cardiac centre in Dhaka to this handwagon. With the use of pharmacological agents available here we were able to accelerate through all the phases of cardiac surgery, starting from pre-op to post-op periods.

Methods and Materials: Over three hundred open-heart surgeries were performed successfully in our newly established cardiac centre since February 1999 up to October 2000, with very negligible morbidity and mortality (<1%). Since its commencement, this centre has been carrying out CABG with venous, combined arterial and venous, and total arterial revascularisation. We started surgeries on CPB using mild hypothermia and cold blood cardioplegic technique. Subsequently, we switched over to warm heart warm cardioplegia technique. At present, 20% of the CABGs are being done off-pump (OP CAB) with OCTOPUS.

Results: Our mean anesthetic time was 12 ± 1.5 h, mean by-pass time was 51.93 ± 2.5 min., mean cross-clamp time was 29 min., mean surgical time was 121 ± 25 min., mean extubation time was 7.5 ± 1.5 hrs. The mean ICU stay was 2 ± 0.5 days and mean hospital stay was 7 ± 2 days.

Conclusion: Although Cardiac Surgery started since the seventies in Bangladesh, the success rate was very low till two years ago in spite of charity assistance from abroad, and visits by foreign surgeons on locum basis. The lack of post-op care, ancillary and laboratory supports contributed largely to the high mortality and morbidity in this country. Cardiac anesthesia also could not attain necessary zenith, which obviously affected the results and developments of cardiac surgery. But in a short span of 20 months, we were able to achieve a good amount of success in terms of mortality and morbidity, which we definitely think was due to our fast tracking.

Ostium Secundum Atrial Septal Defect with Cyanosis – An Unusual Presentation

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Background: Cyanosis is unusual in secundum A.S.D. when P.A.H. is not significant. Mixing lesions are responsible which may be difficult to diagnose accurately preoperatively.

Case History: 10 year old child presented with cyanosis, breathlessness on exertion and recurrent respiratory infections. Clinical examination revealed ejection systolic murmur in 3rd space with loud fixed second heart sound. ECG revealed RBBB with right axis deviation. Chest X-ray demonstrated a pretricuspid left to right shunt. Echocardiogram revealed atrial septal defect of secundum type, with bidirectional shunt, with mild M.R. and moderate P.A.H. Cardiac cath demonstrated 85% femoral artery saturation with L.A. saturation of 95%, moderate P.A.H., no L SVC and M.R. of Grade 2. Unroofed coronary sinus was the working diagnosis with which she was referred for surgery.

At surgery large A.S.D. was present. Coronary sinus was normal. IVC drainage was normal. The upper margin of the defect was skirting the opening of SVC. The A.S.D. was closed with autologous pericardium. Saturation came back to normal.

Conclusion: In absence of any other mixing lesions and the defect was near the superior vena cava, it was concluded that the cause of desaturation was streaming effect of S.V.C. across the A.S.D. into the L.A., which was treated successfully by the closure of the defect. The video of the operation confirms the morphology.

Acute Coronary Syndromes: Is Off-Pump CABG a Safe and Effective Alternative?

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Objective: Off-pump coronary artery bypass grafting (OPCAB) has gained recognition as a valid technique for elective procedures but its role in acute coronary syndromes has not yet been fully established. Our study looks at the results in this group to assess its safety and effectiveness.

Methods: Between 1995 and July 2000, 71 patients underwent OPCAB and 284 patients underwent On-pump CABG for acute coronary syndromes by a single surgeon (WRD). 50 patients from each group were matched according to age, gender, parsonnet score, number of grafts, pre-operative renal and vascular status. McNemar and Wilcoxon's signed ranks tests were used for statistical analysis.

Results: There was one post-operative death in the OPCAB and two in the On-pump group. The length of stay in the ICU and hospital were significantly shorter in the OPCAB group. The ionotropic and blood transfusion requirements were lower as was the duration of ventilatory support post operatively.

	OPCAB	ON-PUMP CABG	'p' Value
Ionotropes	7	16	0.03
Blood usage (unit/pt)	1.57±0.24	2.63±0.36	0.01
Extubation post	8	1	0.01
Surgery (3 hrs)			
Extubated post	46	39	0.04
surgery (24 hrs.)			
ICU stay (days)	1.54±0.5	2.24±0.4	0.003
ICU stay (1 night)	45	36	0.02
Total Hospital stay	6.62±0.9	9.04±1.5	0.008
Discharge at 4 days	36%	16%	0.04

Conclusion: This study demonstrates that OPCAB procedure for an unstable coronary syndrome is a safe technique. In our group, these patients were extubated earlier, had a shorter ICU and hospital stay with fewer, although not statistically significant, renal, respiratory and CNS complications. In addition, the requirements for blood transfusion and ionotropes were much less making this an attractive clinical and cost effective alternative.

Acute Ischemia in Left Main Stenosis - Management with Retroperfusion

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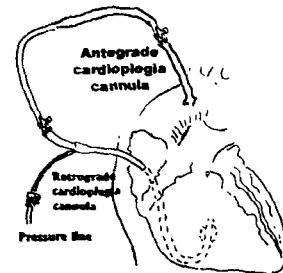
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Introduction: Patients with critical left main stenosis of severe CAD can become acutely unstable during induction of anesthesia or in early stages of the surgery before one has harvested the appropriate conduits or performed a planned concomitant procedure e.g. carotid endarterectomy (CEA). The standard options in these patients are either to go on emergency CPB or institute IABP. These have the obvious problems of a long pump time in the first option (time is needed for harvesting of conduits along with the probable exclusion

of the ITA) and the complications and cost of IABP.

Case Report: A 70 year old lady presented with unstable angina and TIA. Investigations revealed a critical left main stenosis along with a thrombus + a 95% stenosis of the right internal carotid artery. She was taken up for a combined CEA + CABG. On induction she became hemodynamically unstable with a rise of PAP and ST changes. Sternotomy and pericardiotomy were first done followed by retrograde perfusion of the coronary sinus with oxygenated blood from the ascending aorta. Standard antegrade and retrograde cannulae along with a connecting multiport were used and the coronary sinus pressure was continuously monitored. The patient stabilised with a rise of arterial pressure and a reduction of PAP and reversal of ST changes. This gave time for harvesting of conduit and performance of CEA before CABG.



The technique of retroperfusion has been used by us in over 500 cases of off-pump CABG. It was successfully used in 5 cases who became unstable. This gave us time to harvest the appropriate conduit including the ITA and radial artery.

Conclusion: This technique is a useful adjunct in the armamentarium of the cardiac surgeon and avoids the problems of a long CPB or complications/cost of IABP.

Total Arterial OPCAB in Critical Left main Stenosis

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Aim: To study results of off-pump coronary artery bypass surgery (OPCAB) in left main stenosis.

Method: Between January 15 and November 15 2000, 437 patients underwent off-pump coronary artery bypass surgery. Out of them, 55 had left main stenosis greater than 70%. Their age ranged between 43-76 (mean 62.0) years and 10 (18.2%) were females. Clinical profiles were diabetes 28 (50.9%) patients, hypertension-22 (40.0%) patients, smokers-8 (7.2%) patients, unstable angina-15 (27.3%) patients. Ten (18.2%) patients had EF<35%.

Results: An average of 3.54 anastomoses per patient were constructed of which 3.33 were arterial. LIMA was used in 52 (94.5%), RIMA was used in 16 (29.1%) and RA was used in 49 (89.1%) patients. Bilateral IMA were used in 16 (29.1%) patients. Forty five (81.8%) had total arterial revascularisation. An average of 0.42 units of blood were transfused per patient and 43 (78.2%) did not require blood transfusion.

Postoperative complications were peri-op MI-1 (1.8%), AF-3 (5.5%), pleural effusion-3 (5.5%), acute abdominal problems-2 (3.6%). No patient required inotropes or IABP post-operatively. There was no re-exploration for bleeding, no strokes and no mortality in this group of patients.

Conclusion: The benefits of OPCAB can be extended to patients with left main stenosis with good results. Total arterial grafting in this subset of patients does not increase risk of the procedure.

Combined Carotid and Coronary Revascularisation - Rationale, Technique & Results

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Introduction: The management of patients with coexisting severe carotid and coronary artery disease (CAD) continues to be controversial and fraught with danger. Patients for carotid end arterectomy (CEA) with significant CAD (33%) have a mortality of 18% from MI, while risk of peri-op stroke is 12% in pts with significant carotid stenosis (6-16%) undergoing CABG alone.

Material & Methods: The present study analyses our experience with 15 cases of combined CEA + CABG over a 5 year period. (30 isolated CEA during the same period). 10 pts were male, 8 had unstable angina (1 required preop IABP). The carotid symptoms were TIA in 12 with a previous stroke in 6. The carotid stenosis was 70-89% in 12 and > 90% in 3 (2 had bilateral stenosis). A sternotomy and pericardiotomy were done first. This was followed by CEA with a shunt in all and a patch (SVG or radial artery). The CABG was performed on CPB in 13 (off pump in 2). In 1 pt (on IABP) hypothermic CPB was first instituted followed by CEA and then CABG.

Results: There was no stroke or hospital mortality. One pt (with bilateral stenosis) developed a stroke related to the non operated side while waiting for a CEA.

Conclusions: The combined CEA+CABG procedure avoids the risk of MI or stroke in this high risk vasculopathy population.

Efficacy of Elective Aggressive Pre-op Use of IABP in High Risk Cases

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Introduction: Intra-aortic balloon pump (IABP) use in patients undergoing CABG is often associated with a high complication rate (due to unplanned, hurried and technically difficult insertion in a very sick patient) and adverse outcome (due to delay in institution of IABP and overuse of inotropes in heavy doses in an initial attempt to avoid IABP).

Material & Methods: We have used IABP electively pre-op in 100 high risk patients (poor LV function - EF < 0.25, PA pressure > 2/3 systemic, cardiac index < 2 l/min/sq m, unstable angina, cardiogenic shock, cath lab crash, post MI VSD or MR). All insertions were done in the cath lab under fluoroscopic control by the percutaneous sheathless technique. Patients underwent CABG 18±6.8 hrs after IABP institution. During aortic cross clamping the IABP was put on internal mode to give a pulsatile flow.

Initially a randomised study was planned with a similar group of high risk patients not receiving elective IABP. The study was stopped after the first 15 cases because of the significantly better results in the IABP group.

Results: 85% patients could be easily weaned off CPB with no or mild inotropic support. The IABP was weaned off over 28±8.6 hrs after transfer to ICU. The operative mortality was 2 from multiorgan failure and sepsis.

In the non preop IABP group, inotropes were required in all to wean off CPB. IABP was needed intraop in 6/15 (transaortic in 1). 2 patients developed limb ischemia. This group had a higher mortality (3/15) and a longer ICU and hospital stay.

Conclusions: Aggressive preop use of IABP in carefully selected patients improves survival, reduces hospital cost and is cost-effective. Complication rate can be reduced by use of small diameter balloons, improving the technique of insertion, insertion under flouro control and aggressive surveillance for complications.

Extra Cardiac Conduit Fontan Procedure:

Early and Mid-term Results

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Background: The extra cardiac Fontan procedure as compared with classical TCPC may have the potential for optimising ventricular and pulmonary vascular function by maximising the laminar flow principle by avoidance of intra atrial suture lines and cardiac manipulations and by minimising CPB time. In this study clinical results of this procedure were assessed.

Methods: Between 1995 and 2000, 12 patients with mean age of 14 yrs. (range 8-28 yrs.) underwent extra-cardiac Fontan procedure for univentricular physiology. The mean ejection fraction was 60%. In all the patients, the procedure was staged.

Results: Mean CPB time was 68 mins. The cross clamp was avoided. There was no early death and one late death not related to cardiac cause. In follow-up all the patients showed up. All are in sinus rhythm, 9 patients are in NYHA class I, one in class III. None of these patients are having chronic pleural effusions.

Conclusion: Extra cardiac Fontan procedure provides excellent early and mid-term results in terms of quality of life, maintenance of sinus rhythm and preservation of ventricular functions.

Role of Intra Operative Blood Donation in Coronary Artery Surgery

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Aim: Objective Evaluation of Intra Operative Blood Donation (I.A.D.) in patients undergoing Coronary Artery Surgery.

Method: From Nov 1998 to Aug., 99, 64 patients operated by a single surgeon received I.A.D. These patients were studied prospectively against matched control of 90 patients operated by the same surgeon, who did not receive I.A.D. in relation to post op drainage, PCV, platelet count, coagulation parameters & usage of blood products.

Result: There was no significant difference in post op PCV, platelet count & coagulation parameters in the two group. The post operative drainage was also not statistically significant in the two group. (Case=768±338. ml Vs Control 691±331 ml, P value >0.05) but there was a significant decrease in usage of blood and blood products in the study group.

Conclusion: I.A.D. is a safe & cost saving procedure. Though post op drainage is not affected, it decreases the need of transfusion in post operative period.

Does the Efficacy of Epsilon Aminocaproic Acid vary with the Duration of Cardiopulmonary Bypass?

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Background: Bleeding is one of the major complications associated with Open Heart Surgery. Several studies have shown the efficacy of epsilon Aminocaproic acid (EACA) in reducing the blood loss, the need for blood transfusions, and the operating room closure time. The purpose of this study is to assess whether the efficacy of EACA varies with the duration of cardiopulmonary bypass (CPB).

Methods: Forty patients were studied. These patients were

divided into 2 groups based on their CPB time. Group I with CPB time less than or equal to 120 minutes (16 patients) and group II with CPB time more than 120 minutes (24 patients). EACA (Hamostat) was administered in a dose of 175 mg/kg after systemic heparinization (300 µg/Kg) but just before cardiopulmonary bypass. The same dose was repeated for those patients whose CPB time exceeded 120 minutes. Intra operative, post operative (48 hrs. after surgery) blood loss, and operating room closure time was recorded. Blood transfusion triggers were predefined and transfusion amounts were recorded.

Results: No statistically significant difference was found between Group I and II in mean intra operative (620±155 ml vs 723±306 ml; P=NS), postoperative (315±77 ml vs 305 ± 78 ml; P=NS), total blood loss, (935±199 ml vs 1034±326 ml), operating room closure time (98±17 mts. 105±26 mts.; P=NS) and blood transfusion requirements (4.63±1.2 units vs 5±1.35 units P=NS).

Conclusion: The efficacy of EACA in reducing blood loss, blood transfusion requirement and operating room closure time was not found to vary with the duration of cardiopulmonary bypass.

Long Term Outcome of Mild Aortic Valve Disease Present at the Time of Initial Mitral Valve Intervention

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Background: The present study was performed to assess the long term outcome of untreated mild aortic valve disease, present at the time of initial mitral valve intervention.

Methods: A total of 248 patients with rheumatic heart disease, aged 7 to 62 years (mean 23.5±12.2 years) who underwent mitral valve intervention and had mild aortic valve disease initially, were followed up for 2 to 18 years (mean 10.8±3.7 years). At initial intervention 232 patients had pure mild aortic regurgitation (AR) and 52 patients had mild aortic stenosis (AS) (±AR).

Results: In patients with mild AR initially, 11 patients (5%) progressed to moderate (n=6) or severe (n=5) AR over an interval of 9 to 17 years (mean 12.1±2.8 years), and one patient developed moderate AS and severe AR after 10 years. Seventeen patients (35%) with initial mild AS (±AR) developed moderate or severe AS (±moderate/severe AR) after an interval of 4.9±3.8 years. Freedom from development of moderate/severe aortic valve disease in patient who initially had mild AS was 46±11.2% at 17 years. Ten patients required aortic valve replacement for aortic valve dysfunction.

Conclusions: Mild AR present at the time of mitral valve intervention progresses very slowly and less frequently requires reintervention. However, mild AS diagnosed initially, progresses more often and more rapidly and thus needs closer follow-up.

Surgical Anatomy of Internal Mammary Artery and Incidence of Atherosclerosis in it in Comparison to Coronary Vessels

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Background: Internal mammary artery (IMA) is considered as the conduit of choice for coronary revascularisation because of close proximity to heart and excellent long term patency. A study was conducted on surgical anatomy of IMA and incidence of atherosclerosis in it in comparison to coronary vessels.

Material and Methods: Fifty fresh cadavers (Age range 20 to 65 years) were examined, 38 were male while 12 were female. Anatomy of IMA was studied in detail after removing anterior sternocostal

wall of thorax. Segments of IMA and coronaries were also taken for histopathological examination after H & E staining to study the incidence of atherosclerosis.

Results: Anatomical variations were seen in origin of IMA, relationship with phrenic nerves, its branching pattern and the level as well as type of termination. Incidence of atherosclerosis was only 3% in IMA (2%-Grade I and 1%-Grade II) while Grade IV atherosclerosis was seen in the coronaries in 22%.

Conclusion: A thorough knowledge of surgical anatomy of IMA is essential while harvesting it as conduit for coronary revascularisation as large number of variations are seen in it. Incidence of atherosclerosis in IMA is negligible as it is an elastic artery and is therefore an ideal conduit for CABG.

Closure of Atrial Septal Defect Via Limited Right Anterolateral Thoracotomy as a Cosmetic Approach in Female Patients

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Background: Conventional trans-sternal atrial septal defect closure is a low risk procedure with poor cosmesis as its main detractor. Minimally invasive right anterolateral thoracotomy is an alternative approach with similar results with reduced morbidity and excellent cosmetic results.

Methods and Materials: Between 1995 and 2000, 15 female patients with mean age 16 yrs. (range 7-32 yrs.) were operated for all types of ASDs via limited right anterolateral thoracotomy and were analysed retrospectively. Salient features of surgical techniques were a limited skin incision, protection of mammary gland and prevention of phrenic nerve damage. All cannula and clamps were deployed through the same incision. There were no intraoperative complications. Postoperative complications occurred in 2/15 patients including one re-exploration for postoperative bleeding and one patient had wound related problem. Follow-up assessed by a survey obtained by the patients or their relatives. Echocardiography revealed no residual shunt or TR or MR. Cosmetic results were excellent in 93%. Reported morbidity in the form of breast asymmetry, scar pain and limitation of shoulder movements were not encountered.

Conclusion: Limited right anterolateral thoracotomy has become procedure of choice for all types of ASD closures in females with excellent cosmetic and clinical results. One has to be selective in young patients as the breast tissue is not well demarcated.

Right Atrial Free Patch for Closure of Atrial Septal Defect

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Background: The use of a prosthetic or pericardial patch has its own drawbacks. To eliminate these we used free right atrial patch for closure of septal defect.

Patients and Method: From Jan 1997 through Nov 2000, 15 patients (13 females) underwent atrial septal defect closure using the right atrial wall as a free graft. Age ranged from 7 to 54 years. Indications for a patch included significant mitral valve disease (n=7), primum atrial septal defect (n=1), sinus venosus defect (n=1), atrial septal defect with anomalous drainage of right pulmonary veins (n=1), and very large defect (n=4).

Results: All patients survived the operation and were in sinus rhythm postoperatively. Follow up ranged from 1 to 42 months. Follow up echocardiography performed after 1 week to 36 months

revealed no flow across the interatrial septum and echogenicity of the patch was similar to the rest of the atrial septum.

Conclusion: Right atrial wall patch is viable and suitable as a free patch for closure of atrial septal defects.

Controlled Randomized Study of Pulmonary Vein Isolation, Left Atrial Maze Procedure & Batrial Maze Procedure Using Intraoperative Radio Frequency Bipolar Coagulation in Chronic Atrial Fibrillation in Rheumatic Valvular Disease

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Background: Attempts have been made to modify the Cox's Maze III procedure by decreasing the number of incisions (ablations) or by using ablative modalities such as radiofrequency (RF); with a purpose to shorten the procedure.

Aim: This study compares the short term success of three intraoperative procedures against that of a control group undergoing only the valvular surgical procedure.

Materials & Method: 47 patients with documented chronic atrial fibrillation (AF) for at least 3 months undergoing valvular surgery were randomized to additional RF procedures viz: a) Pulmonary vein isolation (PVI), n=11; b) Left atrial Maze with Tricuspid valve - Inferior vena cava isthmus ablation (LAMIA), n=12; c) Batrial Maze (BAM), n=13; and Control (CON), n=11. Exclusion criteria were patients on antiarrhythmic drugs preoperatively, age <12 yrs & >60 yrs, pregnancy, previous median sternotomy and coronary artery disease needing surgery. Patients in AF postoperatively were electively cardioverted on 7th postoperative day.

Result: Restoration of normal sinus rhythm (NSR) was seen in 4/10 in PVI (40%, CL 22%-61%); in 10/12 in LAMIA (83.3%, CL 66%-96%); in 10/13 in BAM (76.9%, CL 60%, CL 60%-90%); 6/11 in CON (54.5%, CL 36%-74%) at a mean follow-up of 2 months.

Conclusion: The early NSR restoration rate of LAMIA and BAM is comparable. However, it does not reach statistical significance when compared to that of control group. The early NSR restoration rate of PVI is significantly less than that of LAMIA and BAM.

Minimally Invasive Approach for REDO Mitral Valve Surgery – A True Benefit for the Patient

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Objective: In the last 3 years minimally invasive mitral valve surgery has found wide spread clinical application with reproducible results. Aim of the study was to establish the technique for mitral valve redo-procedures.

Methods: Out of a series of 226 patients using the port access technique (PAT) or Chitwood technique for mitral valve repair or replacement, 32 patients underwent redo mitral valve surgery. Previous cardiac surgery comprised of mitral valve repair (12), mitral (1) and aortic valve replacement (2), DVR (1), CABG (1) and close mitral commissurotomy (15). In all cases surgery was performed via a right lateral minithoracotomy and using femoro-femoral cannulation. The PAT was applied in all the cases except in 8 post mitral commissurotomy cases in whom Chitwood technique was used.

Results: In all cases a sternotomy could be avoided. The mitral valve was replaced in 31 and in one case post MVR paravalvular leak was fixed. Time of surgery and cross clamp time were comparable to the overall series (162±72 (redo) vs 168±58 min and 62±21 (redo)

vs 68±18 min). There was no operative mortality. All the patients had uneventful outcomes and showed normal mitral valve function at the follow up.

Conclusion: Redo mitral valve surgery can be safely performed using a minimally invasive approach in patients with a previous cardiac surgery. The right lateral minithoracotomy offers excellent exposure. It minimizes the need for cardiac dissection and thus the risk for injury. Avoiding a re-sternotomy increases patients comfort of redo mitral valve surgery.

Intermediate Term Followup and Results of ttk Chitra Valve in Mitral Position

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Background: The early results of indigenous ttk Chitra valve are encouraging. We herewith present the intermediate term results of the ttk Chitra valve with noninvasive evaluation from NIMS.

Materials: From Jan 97 to Oct 2000, 37 ttk Chitra valve were implanted in mitral position ages ranged from 12 yrs. to 59 yrs. 13 valves of size 25 mm and 24 valves of size 27 mm were used.

Methods: The implantation is by using aortic and bicaval cannulation and standard CPB, antigrade and/or retrograde cold blood cardioplegia for myocardial protection and interrupted pledgeted evertting matress sutures of 2 '0' ethibond. Patients are anticoagulated using warfarin or coumadin to maintain an INR of 2.5 to 3.5. The patients are followed up initially monthly, thereafter every 3 months with monitoring of anticoagulation and echo evaluation of prosthetic function initially at 6 months and thereafter at yearly intervals.

Results: Gradients across the Chitra valve are less than 5 mm Hg in 29 patients. Effective valve orifice area is 1.8 to 2.8 in 25 mm sizes and 2.4 to 3.5 in 27 mm sizes. Valve thrombosis, anticoagulant related bleeding and para valvular leak are not observed in our patients. Improvement in NYHA functional class from III to II in 21 patients and II to I in 16 patients.

Conclusions: ttk Chitra valve performance is very satisfactory in mitral position in the intermediate term follow up by clinical performance and by haemodynamic performance by noninvasive methods.

Surgical Myocardial Revascularization in Patients with Poor LV Function

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Patients with poor LV function undergoing CABG were historically considered as high risk. From Jan. 96 to Jan. 2000 a total of 1086 patients underwent CABG out of which 157 patients (14.4%) had poor LV function (EF <35%). There were 136 (86.6%) males and 21 (13.3%) females with an age range of 32 to 85 years (mean 52 years). 98 (62.4%) patients had sustained one or more infarcts in the past, 43 (27.3%) having had a recent MI (<1 mo.) 12 (7.6%) had surgery within 24 hrs. of MI. 29 (18.4%) patients had unstable angina while 10 (6.3%) patients had VT preoperatively. CAG revealed TVD in 136 (86.6%) patients, DVD in 18(14%) and SVD in 3 (1.9%). Left Ventriculogram or 2D echo documented an EF below 20% in 35 (22.29%), between 20% to 30% in 63 (40.1%) and between 30% to 35% in 59 (37.5%) patients. LV aneurysms were encountered in 5 patients. Preoperatively a Dobutamine stress echo was done to assess myocardial viability in all patients, except ones with Left Main Disease. CPB with moderate systemic hypothermia was used and myocardial protection achieved with cold sanguinous potassium cardioplegia, delivered through the aortic root as well as individual grafts using "Octopus" device. Warm

induction and terminal "Hot Shot" was used in patients with recent MI. 3 patients were operated off pump. Post operatively majority required inotropic support and were electively given Amiodarone infusion. Five patients required IABP support to terminate CPB. Hospital mortality was 5.09% (8/157). There were 4 sudden late deaths (2.5%) presumably arrhythmic in nature. All contactd patients (87.3%) were angina free but 8 required antifailure therapy. Surgical myocardial revascularization in patients with poor LV function is gratifying and arrhythmia prophylaxis should be maintained for long term.

Off Pump Redo Coronary Artery Bypass Surgery

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Reoperative coronary artery bypass surgery data was analysed between 1st November 1998 till 31st October 2000 for 2 years. Totally 44 patients underwent redo CABG out of which 17 patients were done on pump and remaining 27 were done off pump. Age ranged between 45 to 78 years (mean 63 years) Forty were males and 4 were females.

The time duration between first and redo operation was between 2 years and 15 years. Number of anastomoses performed were between 1 and 4 with mean of 2.25 graft per patient. Off pump patients (27) had 2.11 graft/patient and on pump (17) patients had 2.47 graft/patient.

Perioperative mortality was 4 out of 17 patients in on pump group and 0 out of 27 patients in off pump group. Only 6 patients were studied postoperatively. Only in one patient, one saphenous vein graft to OM was blocked 3 months postoperatively and required PTCA to OM branch of Cx. Remaining 5 patients had all grafts patent.

A Prospective Controlled Study of Safety Performance of Arterial, Venous Cannulae & VAVD in Minimally Invasive Cardiac Surgery

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The recent use of minimally invasive approach has changed the landscape in the practice of cardiac surgery. One important issue inherent to this new technique is the safety and efficacy of changes required in perfusion technique during CPB bypass. The aim of this prospective study is to study the performance of various arterial, venous cannulae and vacuum assisted venous drainage (VAVD) in minimally invasive cardiac surgery.

Since October 1999 till October 2000 patients (n=25) undergoing minimally invasive cardiac surgery have been studied. 25 patients of open heart surgery with use of conventional size of arterial and venous cannulas have been studied as controlled cases. During bypass the haemodynamic parameters are studied which include pressure gradient, Reynold's number in arterial cannulas and adequacy of drainage; use of vacuum assist device to assist drainage in venous cannulas. The mechanical trauma incurred during bypass is studied by analyzing the investigation for intravascular haemolysis which include prebypass baseline and postbypass study of plasma hemoglobin, urine hemoglobin, serum LDH, peripheral smear, platelet and serum haptoglobin. In the MICS group average size arterial cannulas used was 17 biomedicus, whereas the SVC & IVC cannula size varied from 19-24 biomedicus. 21 patients (84%) had VVAD. During bypass there was no significant pressure gradient across arterial cannula and venous drainage was satisfactory in all

patients. Pre and post bypass blood and urine sample did not reveal significant change in plasma Hb, urine Hb, peripheral smear, serum LDH and haptoglobin to suggest significant intravascular haemolysis. The results of this prospective randomized controlled study shows that it has been safe to use the smaller size perfusion cannulas as per requirement of changing needs in minimally invasive cardiac surgery.

Beating Heart Surgery - A New Frontier in Cardiac Surgery

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Ischemic Heart Disease remains a major cause of morbidity and mortality to mankind. OPCAB surgery is a cardiac surgeon's latest response in this long drawn battle against coronary artery disease.

We prospectively studied 250 cases of OPCAB surgery for a period from Jan 1st 2000 to Oct. 31st 2000. Using multiple variable we aimed at assessing the advantages of OPCAB surgery over conventional CPB. In our group we had 220 male (88%) and 30 (12%) were females. The average mean EF was 55% and 65% of the patients had triple vessel disease. The average number of grafts per case were 3±1 barring 15 patients all others had a LIMA graft, 45% had an LRA graft. The mean surgery time was 150±45 mins. Octopus 2 tissue stabiliser was used in 60% and CTS stabiliser in 30% of the patients.

After carefully evaluating the variables taken, we arrived at the following conclusions. Low cardiac output was seen in 6% and the use of inotropes was very negligible. The mean post op drainage was 500 ml and the use of blood products was restricted to 10% of the study group. Low PO₂'s were seen in 10% and metabolic acidosis was found in 14% of the patients. 1% suffered from neurological complications and 2% had to be converted to CPB due to unavoidable reasons. The mean hospital stay was 7 days and mortality was only 2%.

In essence OPCAB with its diminished usage of blood products, inotropes, and decreased rate of complications is a very good alternative to conventional CPB. Careful assessment of the patients and their risk factors is the key to successful OPCAB surgery.

"OPCAB" Combats Incremental Risk Factors for CABG

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Between 15th March 2000 and 15th November 2000, 333 patients were subjected to Beating Heart Surgery. Except for specific contra indications like associated aortic stenosis necessitating AVR, associated VSD, papillary muscle rupture causing severe MR, or in the absence of effective heart beat (during or following CPR) OFF PUMP CORONARY ARTERY BYPASS is the current preference for myocardial revascularisation in our unit.

To assess the therapeutic efficacy and safety of the Beating Heart Technique, the following established incremental risk factors (IRF) for CABG were re-evaluated in the OPCAB era.

CARDIAC I.R.F	NON-CARDIAC I.R.F
Carcinogenic Shock	Advancing age (> 70 yrs)
Cath Lab emergency	Past history of CVA ± Carotid Stenosis
Severe LV dysfunction (EF<0.25)	Renal dysfunction
Critical LMCA disease	Blood dyscrasias (also recent thrombolysis)
Acute Myocardial Infarction setting	Severe obesity
Redo CABG	Female Gender
Ischemic Mitral incompetence	Hypothyroidism with USA

Each of the above factors were encountered and handled in the OPCAB era (2000) in a number of cases. The clinical outcomes were tabulated and compared with near similar situations in the CABG era (1999).

On careful scrutiny of the observations it appears that patients with above mentioned incremental risk factors had a better outcome in the OPCAB era.

Off Pump Coronary Artery Surgery: Are all Patients Suitable

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We analysed our data of Minimally Invasive Coronary Artery Surgery (MICAS) from 1st January 1996 to 30th April 2000. During this period a total of 1024 patients underwent MICA (off pump). Nine hundred and three patients were males and 121 were females. The age ranges between 25 to 88 years (mean of 55 years).

We further analysed our data on 256 patients all operated for coronary artery surgery between 1st January 2000 till 30th April 2000, out of which 230 patients were done off pump and 26 patients required use of cardiopulmonary bypass. Twenty-six patients, those who were done on pump has associated procedures like valve replacements (12), ruptured ventricular septum (2), redo CABG (1), LV aneurysm (2) and remaining 7 were intended to be done off pump but converted to on pump CABG. Out of 230 off pump patients, many patients like critical left main (> 90%) (23), Redo CABG (8), LV aneurysm with CABG (2) and large heart with LV dysfunction (28) were not suitable for off pump surgery but still were done. Seventy seven patients had composit 'Y' grafts. In this category, number of grafts performed averaged to 3.57 patient. One patient died during perioperative period, who had severe LV dysfunction giving as a mortality of 0.43%. Fifty eight patients were studied immediate postoperatively and had 100% widely patent anastomosis. One patient had string sign of radial artery 'Y' limb between distal anastomoses.

We feel most of the patients can be done off pump, but one must not hesitate to convert off pump case to on pump whenever a situation arises.

Early Results with Bilateral & Single Internal Mammary Grafts - Are They Different?

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Between June 1991 and June 2000, 1185 patients underwent isolated myocardial revascularization using bilateral internal mammary artery. Eight hundred and sixty five of these patients could be matched retrospectively on the basis of preoperative characteristic with 965 patients operated on during some period who had left internal mammary artery as a single or sequential graft with additional vein grafts. The cardiopulmonary bypass times and aortic cross-clamp times were similar in both groups. There were no statistically significant differences in the term of operative mortality (0.81% vs 0.795), per-operative myocardial infarction (2.3% vs 1.82%), low cardiac output (1.87% vs 2.08%), re-exploration (1.4 vs 1.62%), wound complication (1.60% vs 1.56%) and length of hospital stay. The incidence of respiratory, central nervous system and renal complications showed no difference between the two groups. Logistic regression analysis showed that the number of internal mammary grafts was not a predictor for preoperative complications. If better long-term event free survival is associated with the use of bilateral internal mammary artery, it should be used wherever possible.

Total Arterial Revascularisation Using Bilateral Internal Mammary Arteries Joined in a "Y" Manner on a Beating Heart Our Experience in 250 cases.

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Total Arterial Revascularisation (TAR) using bilateral Internal Mammary Arteries in a "Y" manner is an accepted mode of conduit strategy in terms of long term freedom from repeat procedures. On the other hand, operating on a "Beating Heart" does away with all the deleterious effects of cardiopulmonary bypass. Total Arterial bypass on beating heart encompasses the advantages of both.

From November 1997 onwards we have performed 250 cases of TAR on a beating heart. The age of the patients ranged between 39 and 87 years. There were 227 males and 23 females. 156 were diabetics, 123 were hypertensives, 180 were smokers, 107 had a deranged lipid profile. 56 were having crescendo angina of which 7 patients had mild rise in CPK-MB. 24 patients had recent onset Q wave MI. 45 patients had previous cardiological interventions. 6 were Re-do procedures who had received only vein grafts in the first operation. 22 patients had ejection fraction of <30%. 126 patients between 31-50%, whereas 102 had a normal ejection fraction.

Number of grafts performed per patient were 3.6 (Range 1-7). There were 31 non LAD endarterectomies and 4 LAD endarterectomies. Aneurysmorrhaphy was done in 11 cases, and associated carotid endarterectomies in 2 patients. Peri operative MI occurred in 2 cases who had undergone endarterectomies in D1 with a Internal Mammary vein patch upon whom LIMA was anastomosed.

The average drainage per patient was 195 ml. 0.8 units of blood was transfused per patient on an average. Average post operative ventilation was 3.8 hrs, ICU stay was 25 hours, post operative hospital stay being 5.8 days. 64 patients required post-operative inotropic support, 56 requiring antiarrhythmics. Incidence of post-operative lung, renal, neurological complications were minimal. There was only one superficial wound infection (0.4%) Two patients died (mortality 0.8%) the causes being resistant tachyarrhythmias and low cardiac output respectively.

Thus, combining TAR which is an established strategy for long term graft patency with beating heart surgery ensures, fast tracking, less requirement for blood, lesser post operative complications. Long term results of this strategy are awaited.

Noninvasive Diagnosis and Management of Congenital Coronary Cameral Fistula : A Case Report

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Congenital coronary fistulas are rare anomalies resulting in abnormal communication between the coronary artery and any chamber of the heart. They form very minor percentage of congenital heart disease.

An asymptomatic 2½ years old child was referred for evaluation of his atypical continuous murmur. Two-dimensional and colour Doppler echocardiographic evaluation revealed an enlarged right coronary artery with fistulous track in right atrium. The diagnosis was confirmed by cardiac catheterization and angiography. Although our case was asymptomatic the decision to perform surgical closure was made because of the aneurysmatic appearance of the right coronary artery.

After sevoflurane induction, child was maintained on oxygen+sevo+vecuronium. Preoperative monitoring done with 12

lead ECG, SPO_2 , ETCO_2 and right radial and internal jugular vein cannulation.

On surgical exposure fistulous track was found separate from distal coronary artery. Trial clamping of fistulous track was done and child was monitored for ischemic changes followed by external ligation of fistula without extracorporeal circulation and bypass graft to distal coronary artery. Child was extubated in the recovery room successfully without any complications.

In summary early elective ligation of CAVF is indicated in even asymptomatic patient because of low perioperative morbidity in present scenario and high incidence of late symptoms and complications and the increased morbidity and mortality associated with ligation in older patient.

Noninvasive diagnosis of congenital coronary cameral fistula by two-dimensional echocardiography and angiography followed by surgical view, after closure view along preoperative monitoring record and postoperative echocardiographic view have been displayed in our poster.

Our Experience with Total Correction of Adult Tetralogy of Fallot (TOF)

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Since 1989 till June, 2000 we have operated 86 cases of adult TOF with age group of 18-32 years with mean age of 21.5 years. There were 52 male and 34 female. They presented with dyspnoea, cyanosis and neurological events. None of our patient had previous palliative surgery. All patient were operated through transventricular route. Eight patient had associated atrial septal defect, 15 patients had large bronchial collateral, two patient had partial anomalous pulmonary venous connection, one patient had patent ductus arteriosus. All except six patients who died, required transannular patch. Post-operatively 11 patients had low cardiac output and 6 died because of this complication. Six patient had excessive bleeding in years 1989-91 and we lost four patients. Seven patients had ventricular arrhythmias out of which two were lost. Seven patients had congestive heart failure and were put on mechanical support for 3-4 days. Four patients had small residual ventricular septal defect but patient tolerated well. Analysis of our results shared that patients poorly tolerated right ventricular outflow tract obstruction and bleeding can well be managed if we use Trasylol during surgery and adequate amount of platelets, fresh blood & fresh frozen plasma post operatively. All surviving patients were in NYHA class of I or II and lead normal life after total correction. So total correction of TOF is very beneficial to adult patient also.

Evolutionary Trends in Univentricular Heart Repair: Experience with Over Five Hundred Cases

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518 patients with functionally univentricular heart (tricuspid atresia, n=194 and non tricuspid atresia, n=324) underwent univentricular repair at All India Institute of Medical Sciences, New Delhi since January 1988. Since 1992, nearly all Fontan procedures have been performed using the total cavopulmonary connection technique (n=405) and, since 1994, routine fenestration of the atrial baffle was performed in all of them (n=296). Total cavopulmonary connections were performed by creating an intracardiac lateral tunnel (n=387), an extracardiac Gore-Tex tube (n=15) and a viable extracardiac lateral tunnel, using *in situ* pericardium (n=3).

Preoperative risk factors and operative results were analysed by multivariate techniques.

The overall Fontan failure rate was 14% and significant pleural effusion was present in 27% of patients. Fenestration of the atrial baffle appeared to decrease the Fontan failure ($P=0.002$) and significant pleural effusion ($p<0.001$).

Follow-up ranged from 6 months to 154 months (mean 47 ± 17.0 months). There were 12 late deaths. Actuarial survival at 150 months was $82\pm4\%$.

Modalities of RVOT Reconstruction

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During the last five year period, 138 patients had required RVOT reconstruction during surgical repair at MH (CTC) Pune. The majority consisted of TOF (120 pts), while the other patients had DORV - PS (10), TGA VSD PS (03), VSD - pulmonary atresia (03) and pulmonary stenosis (02). Simple pericardial patch enlargement was done in 128 patients. While the other procedures undertaken were pericardial monocusp (05), knitted/woven dacron conduit with or without a valve (03) and use of a composite bovine conduit (BICOR) (02). All cases were evaluated with 2D Echo in the immediate post operative period and in those patients reporting for review after six months (54%). Various degrees of pulmonary regurgitation was observed, it was maximum when only a pericardial patch repair was undertaken in the immediate post operative period and at six months. Antifailure therapy could be discontinued in 80% of these children. Though the PR was less with a monocusp in the immediate post op period, but was no different at six months. These patients had a higher residual gradient. Best results were seen in cases in which composite bovine conduit was used. There was no PR and required minimum antifailure medication.

Mid Term Results of Subaortic Membrane Excision

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The hospital records of 45 patients operated for subaortic membrane (SAM) between 1990 and 1998 were analyzed.

Out of 45 patients, 29 were male. Median age was 8 years (range 2-23 years). Gradient ranged from 50 to 154 mm Hg (mean 86.5 ± 33.2 mm Hg). Nine patients had trivial aortic regurgitation, 2 had mild and six had moderate to severe aortic regurgitation. Left ventricular ejection fraction (LVEF) ranged from 20 to 68% (mean $48\pm15\%$). Tansaoctic resection of the SAM was performed in all patients. Of the four patients with severe aortic regurgitation. One underwent aortic valve repair and three underwent aortic valve replacement with a St Jude mechanical aortic valve prosthesis.

All patients survived the operation. It was possible to excise the membrane completely in all the patients. There was no incidence of heart block or surgically induced mitral valve dysfunction. Follow-up ranged from 18 months to 113 months. There were no late deaths. In the immediate post-operative period, there was a significant reduction in LVOT gradients in these patients. Only four patients had significant residual gradients. Early post-operative gradients correlated significantly with late postoperative gradient. LVEF improved to 45 to 70% (mean $58\pm7.7\%$) at follow-up. Aortic regurgitation reduced to mild in three and trivial in four patients and did not progress further. New aortic regurgitation did not develop in any patient. We conclude that SAM resection is a gratifying procedure with no recurrence in the majority of the patients.

Right Heart Homograft Valved Conduits for Congenital Heart Lesions: Mid Term Results

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Hospital records of patients with complex congenital cardiac malformations requiring an extra cardiac conduit from Right Ventricle to pulmonary artery for their correction were studied from Feb. 1993 to June 1999. There were, in all 113 patients and the primary operation was performed with either aortic or pulmonary valved homograft conduits, sterilized and cryopreserved in our hospital. There were 79 male and 29 female patients. Age of the patient ranged from 1 month to 46 years (mean 14.2 years). Primary diagnosis of these patients were as follows: Truncus arteriosus (N=28) VSD with PA (N=48) TOF with abnormal coronaries (N=10), TOF with LPA stenosis (N=2) DORV, VSD, PS (N=11), DTGA, VSD, PS, (N=8) & LTGA VSD (N=9).

There were 10 early deaths. Hospital survivors were followed up from 1 months to 6 years. Follow up included clinical examination & echocardiographic examination for evidence of conduit obstruction, and right ventricular function. 12 patients were re-operated for conduit obstruction. There were no hospital deaths related to reoperation.

These preliminary results lead us to conclude that RV to PA homograft conduit can effectively treat some of the complex congenital cardiac malformations. Subsequent conduit replacement has proved to be a low risk procedure in our experience.

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Fate of Anatomical Left Ventricular Outflow Obstruction After Arterial Switch Operation

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All patients of D-Transposition of the great arteries (D-TGA) with anatomical left ventricular outflow tract obstruction (LVOTO) who were unsuitable for a Rastelli type operation and who underwent an arterial switch operation (ASO) after 1991 are included. Those with dynamic LVOTO were excluded. 36 underwent the arterial switch operation and one underwent the Nikaidoh-Bex operation. 26 of the 37 patients had an associated ventricular septal defect and 8 had Taussig Bing anomaly. 35 of the 37 had a significant subvalvular gradient as detected preoperatively and two had isolated abnormalities of the pulmonary valve.

Hospital mortality in this cohort was 2/37 (5.4%). 2 patients required pacemaker implantation. Total follow-up is from 8 months to 9 years (mean 6 years) with median post-operative gradient being 5 mmHg (0-20 mmHg). 12 (34.28%) patients had neoaortic regurgitation detected immediately postoperatively, that showed progression to moderate aortic regurgitation in 2 and to severe aortic regurgitation in 2. Immediate post-operative echocardiography had revealed mild mitral regurgitation in 3 patients of which 1 showed progression to severe mitral regurgitation of follow-up. Late mortality noted in 2 patients was due to left ventricular dysfunction in one and pacemaker malfunction in the other. Resectability of obstruction and possibility of neoaortic valve incompetence are to be weighed before proceeding with the arterial switch operation in patients of TGA with important LVOTO. In patients where the obstruction is valvar, the Nikaidoh Bex procedure may have a definite role.

Ten Years Experience with the Arterial Switch Operation

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299 patients underwent the arterial switch operation (ASO) for DTGA (IVS or VSD) or Tausing Bing Anomaly since 1991, 82% being males and 18% being females. Group I, (intact ventricular septum) comprised of 169 (56, 52%) patients. Group II (with VSD) comprised 130 patients (43,47%). This included 28 patients of double outlet right ventricle and subpulmonic ventricular septal defect.

Mortality in group-I was 15/169 (8.8%) and in group-II was 44/130 (33%), with the overall mortality being 19% (59/299). In the rapid two stage switch group, there were 22 successful converts out of 28. Mortality in this group was 3/28 (10.9%). Incremental risk factors identified in univariate analysis include low birth weight, older age at presentation, coexisting anomalies of the arch, longer circulatory arrest time, multiple ventricular septal defects and coronary pattern with intramural course of the left coronary artery. Incremental risk factors identified on multivariate analysis include co-existing anomalies of the arch, coronary pattern with an intramural course of left coronary artery inadequate or borderline left ventricle as identified on preoperative echocardiography and late presentation in group II. Follow-up has been gratifying in hospital survivors. Excellent long term results support the ASO as treatment of choice for DTGA.

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Ventricular Septal Defect with Biventricular Out flow Obstruction - A Rare Association

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Gupta SR, et al reported a rare case of VSD associated with subaortic membrane and right ventricular out flow obstruction in Indian Heart Journal 1989. We are sharing our experience in another case.

A 14 year female presented with 'Palpitations and shortness of breath class II since one year. Cardiovascular examination revealed forceful Apex in 5th ICS, pansystolic murmur of VSD, 3/6 Ejection systolic murmur of pulmonary stenosis & End diastolic murmur of aortic regurgitation. Trans thoracic and transoesophageal echo cardiogram revealed large sub aortic VSD with Left to right and sub aortic membrane with 61 mm peak gradient and infundibular and valvular pulmonary stenosis. Resection of sub aortic membrane, pulmonary valvotomy infundibular resection and Dacron patch closure of VSD done. Post operative echo showed small residual VSD with no gradient across LVOT.

VSD associated with either right ventricular or left ventricular obstruction and mitral and aortic valve abnormalities are common but biventricular obstruction is very rare and only few cases were reported.

In conclusion VSD with biventricular obstruction poses neither any difficulty for repair nor affects on post operative outcome.

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Clot on ASD Occlusion Device : A Rare Complication

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Atrial septal defect (ASD) closure through transcatheter occlusion device is a relatively new modality in the management of ASD.

We report a rare complication of a clot on the ASD occlusion device. A 32 year female underwent ASD device closure in 1993 at G.B. Pant Hospital. On routine follow-up of the patient, a $1'' \times 1\frac{1}{2}''$ sized clot attached to the device and extending on the posterior wall of left atrium (LA) and LA appendage was detected. The patient was in normal sinus rhythm.

She underwent explantation of the device with removal of LA clot and pericardial patch closure of ASD under Cardio-pulmonary bypass. Patient recovered uneventfully. This is an extremely rare complication of occluder device for ASD and at present there is no similar complication reported in english literature. This case is presented for its rarity and discussion whether anticoagulation should be routinely used for a limited period in patients with transcatheter prosthetic devices.

Atrial Septal Defect and Unroofed Coronary Sinus-Case Report

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Three cases of atrial septal defect (ASD) with unroofed coronary sinus are reported. Case 1: A 9-year old girl presented with recurrent respiratory tract infection and exertional dyspnoea since birth. On examination, she had features of Ellis Van Creveld syndrome and wide fixed split of S2 with pansystolic murmur at the apex. Chest X-ray showed cardiomegaly with prominent Main Pulmonary Artery and pulmonary plethora. Echocardiography revealed an Ostium primum ASD and severe Mitral regurgitation. At operation, large ostium primum ASD with LSVC, unroofed coronary sinus and cleft AML. Repair of AML with pericardial patch closure of ASD with rerouting of coronary sinus into RA was done. Post-operative course was uneventful.

Case 2: A 11-year old girl with recurrent respiratory tract infection since birth and exertional dyspnoea and chest pain for 5 months. On examination, there was fixed wide splitting of S2 and ESM in pulmonary area. Chest X-ray showed similar finding as case. Echocardiography showed OS-ASD. At operation via Modified Brom's incision, Fossa Ovalis ASD, PAPVC, LSVC and unroofed Coronary sinus (cribriform pattern). Pericardial patch closure of ASD, rerouting of pulmonary vein and Cooley's cut-back procedure for unroofed coronary sinus was done in the form of L-shaped patch. Post-op course was uneventful.

Case 3: A 22-years old male presented with recurrent respiratory tract infection since childhood. Ostium primum ASD, Moderate mitral regurgitation and LSVC was made out in Echocardiography. Repair of cleft anterior mitral leaflet, GORETEX patch to reroute LSVC and Unroofed coronary sinus and pericardial patch closure of ASD was done. Postop course was Uneventful.

A New Surgical Method to Treat Anterior Mitral Prolapse due to Elongated Chordae

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Valve repair procedures have been established as the preferred methods of managing mitral regurgitation. The results of surgery are better than prosthetic replacement, with regard to operative mortality, survival, thromboembolic complications, avoidance of anticoagulation and preservation of left ventricular function.

When tackling the annular dilation and posterior cusp prolapse, there are definitive, foolproof and reproducible techniques available (annuloplasty ring placement, quadrangular resection techniques). But, when tackling anterior mitral leaflet prolapse, the surgical

methods are technically demanding (Carpentier's sliding plasty and shortening plasty and chordal replacement with neochordae). Triangular resection and plication procedures have been found unsatisfactory. Alfieri had described his edge to edge technique which had proved good results.

We describe a new method of tackling this difficult subset of anterior cusp prolapse. In our method we place two parallel sutures of prolene from anterior annulus to posterior annulus across the prolapsing portion of the anterior leaflet. This checks the upward movement of the cusp and maintains the cusp edge coaptation (also facilitated by annuloplasty ring). These parallel sutures do not affect the movement of the cusps during diastole. This method is reproducible and simple. This method will be useful only where there is prolapse due to elongated chordae but not for ruptured chordae.

Quadracuspid Aortic Valve with Ruptured Sinus of Valsalva into RA: A Case Report

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Only two cases of quadracuspid aortic valve with ruptured sinus of Valsalva have been reported in the literature, both of them opened into the right ventricle. We report the first case of quadracuspid aortic valve with ruptured sinus of Valsalva into the right atrium. A 28 years old gorkha male presented with progressive dyspnoea on exertion for 6 months. He was admitted in congestive heart failure. There was a continuous murmur in left parasternal region. Massive ascitis and hepatomegaly were present. Chest x-ray showed cardiomegaly with predominant right atrial enlargement with bilateral pleural effusion. quadracuspid aortic valve was noted on transthoracic echocardiography with ruptured sinus of Valsalva-from anterior part of noncoronary cusp to the right atrium with left ventricular dilatation and dysfunction. After preoperative medical stabilisation and drainage of pleural effusion, repair of the ruptured sinus of valsalva was performed using a bicameral approach. Aortic valve had four equal sized cusps; right, left, & 2 noncoronary cusps. Communication was found between anterior noncoronary cusp and right atrium. At 7 months follow-up patient is in NYHA class 1 with normal left ventricular size and function without evidence of aortic regurgitation.

Perioperative Requirement of Blood Products in OPCAB with and without Shed Mediastinal Blood (SMB) Transfusion

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Cardiac Surgery utilizes a large proportion of homologous blood products One technique to reduce this is perioperative SMB transfusion.

We studied 90 patients undergoing OPCAB surgery. Thirty patients (Group A) received SMB transfusion during and upto six hours after surgery. We used auto transfusion reservoir having 40 micron filter for this purpose. The same reservoir was used for postoperative SMB transfusion. Thirty patients (Group B) received SMB transfusion same as Group A but were subjected to strict guidelines for homologous blood transfusion. Thirty patients (Group C) did not receive any SMB and served as control. The groups were demographically comparable.

Perioperative blood loss was significantly less in Group A ($p<0.05$) as compared to Groups B and C. Homologous RBC requirement was

significantly less in Group B and A ($p<0.05$) as compared to Group C. The drop in hemoglobin was marginally less in Group A and B as compared to Group C. The rise in WBC count postoperatively was less in Group A as compared to Group C.

The rise in CPK and CDH levels was higher in Group A as compared to Group C but there was no significant difference in the ratio of CPK: CK-MB.

Conclusions: Transfusion of SMB in perioperative period is a safe, easy and cost effective technique towards reducing the requirement of homologous blood products in OPCAB surgery.

Mitral Valve Repair in Rheumatic Heart Disease A Useful Alternative in Young Patients

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Comprehensive valve repairs have undergone several modifications since the 1960s and this has contributed to making it more reproducible and predictable. Mitral valve disease of rheumatic origin has a multifactorial pathogenesis as all components of valve apparatus are usually involved. Thus, repair requires a combination of multiple techniques, each one directed at correcting each affected component.

42 patients (19 males and 23 females) with a mean age of 19 (Range 9 to 35 years) were operated for Mitral Valve repair from December 1997 onwards. 88% were in Functional class NYHA III-IV, pure MR in 68%, and the rest having mixed mitral valve lesions. 35% of patients were in Atrial Fibrillation, 19% were with active Rheumatic Carditis. The surgical techniques included annuloplasty, chordal shortening, chordal transfer, quadrangular resection, PML augmentation, and commissurotomy.

Per operative repair was assessed by TEE/Yacoub's technique. 2 patients had to undergo MVR after unsuccessful repair, 3 patients underwent repeat repair procedure at the same sitting. Of these 3, two had dehiscence of chordal entrenchment, and one required asymmetrical annuloplasty stitch.

3 patients were lost in follow up. 35 patients were in NYHA class I - II. Follow up echocardiography showed no MR in 18 cases, Grade I in 14 cases, Grade II MR in one. Residual MR of Grade III - IV was present in 4 cases, who were in NYHA class III - IV. 2 of these patients have already undergone MVR while the other two are awaiting operation. All these 4 patients were having active rheumatic carditis. All the patients were free from thromboembolic episodes and endocarditis. There were no early or late mortality.

Mitral Valve repair in the young group has a small but significant (10%) rate of unsuccessful attempt and re operation. But the disadvantages of a mechanical prosthesis is avoided in the majority of patients, and the good short term results makes this strategy useful.

Left Ventricular Functions-15 Years Follow up of Mitral Valve Surgery

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Left ventricular functions remain the most important single determinant of the outcome after mitral valve surgery. 215 patients of isolated mitral valve surgery at our centre during the last 15 years were taken up for this study. This group of patients comprised of 190 (88.3%) mitral replacements and 25 (11.6%) of mitral valve repairs.

Mitral valve prosthesis implanted included Starr-Edward, Bjork-Shiley, Medtronic-Hall, ATS and St. Jude valves while Mitral Valve repairs included commissurotomy, Leaflet plication, decalcification,

chordal shortening, chordal separation, Papillary muscle bisection and annuloplasty. The hospital mortality (20 days) was 8.2%. The patients with valve prostheses were put on Acitrom to maintain their prothrombin time twice the control value.

Follow up revealed thromboembolic events in 0.5 per 100 patient years, anticoagulant related haemorrhage in 0.3 per 100 patient years, late death in 1.5 per 100 patient years. Left ventricular functions were assessed within one month, 3 months, 6 months and yearly after surgery. There was a significant reduction in left ventricular dimensions (LVESD and LVEDD) postoperatively in 90% of patients while 8% did not have any significant change. 2% of these patients (all from repair group) showed progressive deterioration who needed mitral valve replacement.

We conclude that MVR is a better option than Mitral Valve repair because of the unpredictable results after mitral valve repair.

Pulmonary Hypertension (PAH) in Ostium Secundum ASDs-A 10 yr. Experience

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Patients with atrial septal defects (ASD) with pulmonary hypertension (PAH) are a subset of pts, who need a different management. We made a retrospective study of this problem from 1990-1999. There were 1460 pts. of Ostium Secundum ASD who are operated. 58 (4%) had severe PAH. 53 pts. were treated surgically. Mean age was 22.4 yrs, range 3.5-58 years. 32 pts. were females.

All the pts. underwent Cardiac Catheterization 42 pts. were in FC III & IV. Majority had bidirectional shunt. The cardiac cath. mean values were PA systolic pressure 68 ± 14 . 2mm Hg PVRI 5.4 ± 1.6 IU, and ratio of PVR/SVR 0.16-0.42. All the patients had medical regimen with diuretic, bronchodilators, nefidipine, oxygen therapy. Salt restriction and antibiotics when infection was present. Favourable response was assessed by repeated pulmonary function tests.

ASD was closed in all patients with a patch, with or without fenestration and few pts. with a flap valve (PFO) like patch. Associated defects like PDA 2 pts., mitral valve disease 4 pts, Tricuspid Regurgitation 3 pts, were corrected, all pts. needed vasodilators, nefidipine and inotropes. There were 2 deaths.

All patients were followed from 0.5 to 10 yrs for 115 pt. yrs. Majority were in FC I.

Total Anamalous Pulmonary Venous Connection Repair-A Retrospective Analysis of 10 yrs

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Forty one (41) patients underwent surgical correction of TAPVC between Jan. 1990 to Dec. 1999 by single surgical unit Age ranging between 3 months to 22 years, ave. 7.5 yrs, three patients were infants, wt. ranged from 2.8-48 kg (Mean 12.5 Kg). 20 were males. The pulmonary hypertension (PAH) was severe in 12 pts. 1 pt had to undergo redo-operation. In 3 pts the operation was urgent and diagnosis is done by Echocardiogram. In 38 pts. cardiac Cath study and elective surgery was done. In 20 pts TAPVC was Supracardiac, coronary sinus type-12, mixed type-6 and infracardiac type-2. CPB, Hypothermia, cold Cardioplegia protection of myocardium was adopted in 35 pts and deep hypothermia low flow in six pts.

Results: There were 4 postoperative deaths, Mean hospital stay was 13.5 days. 37 pts were followed over 52 pt. yrs. 29 pts. were in

FCI. We discuss and analyse the pts. data, cardiac cath. data, operative technique and results.

Conclusion: Various standard approaches of preoperative management and operative techniques adopted in the management have resulted in acceptable results. The outcome is influenced by riskfactors such as too small age, late referral, and severe pulmonary hypertension.

Sinus of Valsalva Aneurysm (SOVA) : 10 Years Experience

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Aneurysms of sinus of valsalva (SVA) are rare. We have analysed retrospectively 27 patients of congenital aneurysm of sinus of valsalva operated between October 1989 to September 2000. These include 18 males and 9 females with a mean age of 25.14 yrs. (range 3-42 yrs). Twenty Six (96%) were ruptured SVA; one (4%) was unruptured. Site of origin of these aneurysms were the RCS (=20), NCS (n=7). In fifteen patients SOVA ruptured into RV, nine into RA and one in LV. Associated findings included AR (n=8), VSD (n=6), PDA (n=2), LSVC (n=1), bicuspid AV (n=1) and quadruplicus AV (n=1). Dyspnoea and palpitation were commonest symptoms (46%). Three patients had Infective endocarditis (IE) at the time of initial presentation. Majority were in NYHA class IV (n=13) (48%). Operative procedures included simple plication (n=3), bicameral dacron patch repair (n=24), VSD closure (n=6) and AVR (n=2), PDA ligation (n=2)

Results: There were two hospital deaths (7.4%). One patient was in NYHA class IV and IE, he died of fulminant septicemia, another patient died of coagulopathy and haemorrhage. The mean follow-up period was 4.8 yrs. (range 6mo - 10 yrs). Majority of the patients are in NYHA class I (n=17) and NYHA class II (n=5). One patient had a small residual shunt into RA and one patient underwent AVR for progressive AR. No patient had residual VSD.

IE is a serious complication of RSOV and hence surgery must be undertaken at the earliest in these patients.

Neonatal Aortic Interruption and Coarctation Repair with Failing Ventricle-Surgical Issues

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Neonatal aortic interruption and coarctation are one of the Neonatal Emergencies and if not treated in time may lead to prolonged morbidity and mortality. We operated on these neonates as soon as they were diagnosed and hemodynamic stability optimised to undertake an operation.

From April 1999 to November 2000 a total of 11, neonates underwent a corrective operation for either an aortic interruption or severe aortic coarctation. All these patients had severe low cardiac output on admission with grossly compromised Left ventricular function. They were directly admitted to the ITU and all the monitoring lines were placed, preferably in the groin. If there was respiratory distress they were intubated and ventilated. For compromised Cardiac output Dopamine, Dobutamine or a combination of the two were started. These inotropes were then continued peri, intra and post operatively.

The surgical technique comprised of ligation of the duct, resection and end to end anastomosis, at times associated with sliding

aortoplasty. Post correction the gradient achieved in all these cases had been 10+/- 5 mm of Hg. Ventilation had to be continued upto 36 +/- 12 hrs and inotropes were usually weaned off by 5th +/- 1 day. The average drain from the chest had been 19-20 ml and there was no re-exploration or lung complication. The gradient across the repaired segment remained the same at the time of discharge. There was a single non cardiac death.

All the survivors are doing well with progressive improvement in their cardiac functions.

Beating Heart No Cross Clamp - An Alternative Approach in CABG Surgery for Bad Ventricles

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The functional status of the ventricles has always been a very important prognostic indicator and severely depressed ventricular function is a conditioned associated with grave prognosis.

This study evaluates the role of beating heart surgery with the help of conventional CPB in the management of such patients. From 1999 to 2000 we studied 25 patients with severely depressed LV function. The mean EF was less than or equal to 25%. One was a female and the rest were males. All patients were put on conventional CPB and the rest of the procedure was done on a Beating heart maintaining normothermia throughout. CTS stabiliser was used in 20(80%).

Operative mortality was 12%. Low cardiac output was the most common postoperative complication and required the prolonged use of inotropes in 24% of the cases. IABP was required in 20% of the cases and the patients were easily weaned off the balloon in 48 hrs. The average number of grafts were 3+/- 2 per patient. Of the 25 patients studied 6 (24%) were taken up as emergencies. All the surviving patients showed both symptomatic and echocardiography evidence of improvement in ventricular functional status. The most important risk factors affecting prognosis were acute presentation, time of cardiopulmonary bypass and depressed cardiac index. The mean postoperative hospital stay in the study group was 16 days.

These data prove beyond doubt that patients with coronary artery disease and severely depressed ejection fraction benefit from surgery and especially from this technique which has shown that the postop course in the hospital and the use of IABP / inotropes is dramatically reduced.

Arterial Grafting in Moderate to Severe LV Dysfunction

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From our extensive experience of coronary bypass operations we have analyzed 731 patients with moderate to severe LV dysfunction we operated in last 5 years between January 1996 to October 2000. 42% had EF less than 25% while 58% had EF between 25-40%. This is a male dominant series (97% vs 3%). Age ranged from 43 to 72 years with mean age of presentation of 58.6 years. Majority (66%) were in angina functional class III. While 22% were in class II and 12% in class IV. 45% diabetic, 54% hypertensive, 48% smokers and 29% obese. 32% had high cholesterol with or without triglycerides. Majority (94%) had previous MI. Angiography revealed triple vessel disease in 67% while double vessel in 33%. We used electrical fibrillation with or without brief aortic cross clamping at moderate hypothermia and venting (LV venting 66% aortic root venting 34%). 52% received 3 grafts; 28% had 4 grafts while 16% had 2 grafts. Average number of

arterial grafts was 2.1%. Arterial grafting was done for viable myocardium while venous grafts were directed at scarred, previously infarcted myocardium. Associated procedures were LV aneurysm repair in 42 patients (5.7%) and MVR in 7 patients (0.9%). 2% required IABP support in preoperative period while 9% required IABP in post operative period. Average duration of IABP 36 hours. 56% required inotropes in first 24 hours while 13% required it beyond 24 hours. Mortality in this series was 3.8% the major causes for which were low cardiac output syndrome, intractable ventricular arrhythmias and renal failure. In conclusion we believe that benefits of long term patency of arterial grafts can be safely extended to patients with moderate to severely impaired ventricular function with gratifying results contrary to accepted notion.

Clinical Profile and Surgical Outcome of Combined Aortic and mitral Valve Disease- JIPMER Experience

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A retrospective study of patients having combined aortic and mitral valve disease who had undergone double valve replacement between May'94 to Nov'2000 has been carried out. 48 patients had double valve replacement with range of 16-57 years. Male to female ratio 2.13:1. 28 (58.3%) were in sinus rhythm and 20 (41.6%) in atrial fibrillation. 6 (12.5%) in NYHA Class IV, 36 (75%) in Class III and 6 (12.5%) in Class II. The valve lesions are predominantly regurgitation at both valves in 14 (24.16%), stenosis and regurgitation in 12 (25%), mitral stenosis and/or regurgitation and aortic regurgitation in 11 (22.9%), mitral stenosis with aortic stenosis and/or regurgitation in 7 (14.58%), associated tricuspid regurgitation in 4 (8.33%). Calcification of mitral valve in 20 (41.6%), aortic valve in 3 (6.25%) and both in 6 (12.5%). Patients had previous surgery of TVMC in 6 (12.5%), CCF in 2 (4.16%) and infective endocarditis in 4 (8.32%). Gross cardiomegaly was in 15 (31.25%). All patients diagnosed based on echocardiography. Catheterisation and angiography done in patients with elderly age and to establish Severity of aortic regurgitation. All patients have undergone aortic and mitral valve Replacements with 3 (6.25%) tricuspid annuloplasty. Reexploration in 10 (20.83%) and Neurological complications in 5 (10.45%) were seen. Early mortality was seven (14.5%) and late Mortality 4(8.33%). Predictors of early mortality were NYHA Class IV, atrial fibrillation, Previous surgery, CCF and associated tricuspid valve disease and of late mortality were left ventricular dysfunction and infective endocarditis.

Off Pump Complete Multivessel Redo CABG

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Background: With the onset of graft attrition and progress of native atherosclerosis leading to a return of symptoms more and more patients are coming for a re-do CABG. This cohort is of an older age group with various co-morbid age related problems and a much higher Parsonnet score than at their first operation. Such patients may not tolerate the deleterious effects of CPB and would benefit greatly by an off pump procedure but without compromising on the completeness of the revascularisation.

Material & Methods: We present our technique (video) of performing multivessel off pump re-do CABG in this highly fragile group of elderly patients. A special technique of retrograde coronary sinus perfusion is used to avoid ischemia during the period of grafting.

The adhesions of the previous operation are used to create a relatively motionless field without the need for any cumbersome and expensive stabilisers. This technique was used in 6 patients with the average number of grafts being 3.2 with no mortality. 1 patient needed preop stabilisation with IABP for unstable angina.

Conclusions: Multivessel off-pump re-do CABG can be safely carried out with less morbidity and mortality than would be possible on pump.

Emergency CABG-Apollo Experience

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Despite aggression in medical stabilization or primary PTCA, there is still a group a patient where either these modalities are not feasible, available or have failed in which case rescue CABG can salvage a number of patients. From January 1996 to October 2000, we have operated on 153 patients in emergency. Majority (92%) were male. On risk factor evaluation, we found 45% to be hypertensive, 42% diabetic, 60% smokers, 43% having high cholesterol with or without triglycerides. 85% were in NYHA class III OR IV preoperatively. 62% had previous MI. 55% had moderate to severe LV dysfunction. Indication for emergency CABG were, left mainstem critical stenosis with symptoms (27%) unstable angina with prolonged ongoing rest pain or angina with hypotension or pulmonary oedema with or without MR or rest angina with ST depression more than or equal to Imm, not responding to maximum medical therapy (65%). 6% had cardiogenic shock or post MI complications while 2% had vessel dissection or rupture during PTCA. 12% required preoperative IABP along with NTG and Heparin. Angiography revealed either acutely occluded major coronary artery or severe subtotal occlusion of a culprit vessel or severe multivessel disease with LV dysfunction. We utilize technique of electrical fibrillation without cross clamping at moderate hypothermia with or without local stabilization of target vessels 64% received 3 grafts, 32% had 2 grafts while 4% had single graft. LIMA was used in 78% of patients. 13% required IABP support in post operative period average duration of which was 36 hours. Hospital mortality was 11.6 majority due to persistent low cardiac output failure, intractable arrhythmias, unresolved pulmonary oedema or renal failure. 8% required hemofiltration per operatively. 37% required inotropic support. We conclude that there is a definite strata of patients who if properly selected and timely intervened with emergency CABG surgery can be benefitted tremendously.

Case of Right Atrial Aneurysm - Cause of Paroxysmal Artery Tachycardia Successful Surgical Treatment During CABG

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Introduction: Right atrial aneurysm is a rare clinical entity. We describe a case found incidentally during CABG in patient with symptomatic paroxysmal atrial tachycardia.

Clinical Summary: A 56 year old gentleman presented with NYHA Class III angina and palpitations. He had suffered an inferior myocardial infarction prior to presentation. Palpitations were diagnosed as paroxysmal atrial tachycardia.

Coronary angiography showed severe disease in the mid LAD and occluded dominant RCA. Left ventricular function was preserved. He had a failed angioplasty in the past and was referred for surgical revascularization.

He underwent CABGx2 with LITA graft to LAD and vein graft to

PLV branch of RCA under cardiopulmonary bypass.

At surgery pericardium was intact and an incidental finding of thin walled right atrial aneurysm measuring $4 \times 3 \times 2$ cms was found. This was excised and the defect in the right atrium closed. Post operative recovery was uneventful except for episode of supraventricular tachycardia requiring amiodarone and conversion to sinus rhythm prior to discharge on the 5th day after surgery. Follow up at two years, he remains in sinus rhythm with no symptom of palpitation.

Discussion: Both left and right atrial aneurysms are very rare abnormalities. Some occur with an intact pericardium and others with an associated pericardial defect. Majority are asymptomatic but dysrhythmia and embolism may occur. Angina with congestive cardiac failure is also reported. Surgical management of treatment of choice.

Valve Replacements Surgeries in Children Below 12 Years of Age

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Sixty-one children of ages between 3 to 12 years, who underwent valve replacement surgery in this institution between the years 1990 and 2000 are reviewed. There were 32 males (54.5%) and 29 females (44.5%). 22(36%) were congenital defects and 39 (63%) were of rheumatic etiology. 32(52.4%) had MVR, 18 (29.5%) had AVR and 9 (14.7%) children had DVR. 19 children (31%) had other concomitant procedures: 1 tricuspid commissurotomy with left atrial thrombectomy, 12 tricuspid annuloplasties, 1 infundibular resections, 5 Atrial septal defect closures, 8 Ventricular septal defect closures, 2 aortoplasties and 3 patent ductus arteriosus ligations. One child had a mitral valve repair along with an Aortic valve replacement. Almost all surgeries were done by median sternotomy and conventional bypass procedures with crystalloid or blood cardioplegia. One child had a mitral valve replaced through a thoracotomy and 2 children had direct access partial sternotomy. We were able to implant adult size prosthesis in all the patients. There was 1 postoperative hospital mortality due to a low cardiac output. There were no bleeding, thromboembolic or infective complications. 48 children (78.6%) were treated with low dose of oral anticoagulants (Tab. Actirom or Tab. Warfarin) and 13 children (21.4%) were put on Tab. Asprin alone. 3 children were switched over from Asprin to Actirom when they grew up. The period of follow up ranged from 6 months to 98 months with an average of 38 months.

Minimally Invasive Valve Replacement Surgery

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From July 1997 to November 2000 we have performed 153 minimally invasive valve replacement surgery, comprising mitral valve replacement 59 (38.5%), aortic valve replacement 53 (34.6%), double valve replacement (combined aortic and mitral) 41 (26.7%) cases. Right parasternal approach was utilized in initial 58 (38%) cases and direct access via J shaped partial sternotomy in 95 (62%) patients. Vacuum assisted venous drainage was used in all those patients who underwent surgery by direct access partial sternotomy. Myocardial preservation was achieved utilizing combination of antegrade and or retrograde cold blood cardioplegia in patients of parasternal approach while antegrade cold blood cardioplegia alone was used in direct access group.

The mean total pump time for mitral valve replacement was 88.1 minute ($SD \pm 20.7$ minute), aortic valve replacement was 88.6 minute ($SD \pm 38.8$ minute) and double valve replacement was 154 minute ($SD \pm 69.6$ minute). The mean total aortic cross clamp time for mitral valve replacement was 43.5 minute ($SD \pm 13.7$ minute), aortic valve replacement was 47.5 minute ($SD \pm 12.7$ minute) and double valve replacement was 87.6 minute ($SD \pm 18.9$ minute). All patients were electively ventilated. The mean total ventilatory time was 447.5 ± 262.7 minute (180 to 1080 minute). There were 5 patients with excessive hemorrhage, three required reexploration. Two patients had right pleural effusion. One patient had transient brachial plexus neuropraxia, which recovered completely at the time of discharge. There were 7 (4.5%) perioperative deaths, one in aortic valve replacement group, 2 in mitral valve replacement group and 3 in double valve replacement group due to low cardiac output. One patient in DVR group succumbed to intractable arrhythmia.

We conclude that minimally invasive surgery by direct access partial stenotomy approach is quite safe for a variety of valve replacement procedures and the exposure is excellent and effective in reducing surgical trauma and helps faster postoperative recovery.

Acute Prosthetic Valve Malfunction - "Stuck Valve"

Clinical Profile and Management

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Acute prosthetic valve malfunction is a feared complication of valve replacement procedures. Despite adequate anticoagulation the reported incidence of prosthetic valve thrombosis ranges from 4-8.6%. Critical evaluation of symptoms and high index of suspicion are important for prompt diagnosis.

This paper presents our experience of seventeen (17) patients of prosthetic valve thrombosis between April 1997 and December 1999 most salient finding was the absence or attenuation of prosthesis related sounds-valve clicks". Combined application of echocardiography (both transthoracic and transesophageal) and Doppler studies could clinch the diagnosis in most of patients. Presence of gradients across the valve was uniform finding. Thirteen (13) patients underwent surgery. Routine cardiopulmonary bypass with moderate hypothermia and cold blood cardioplegia was used in all patients. Four (4) patients required initiation of bypass through femoral artery. Right pleura was opened electively and left atrium approached extra pericardially. Thrombectomy was done in four (4) patients, nine (9) required valve replacement, five (5) patients died post operatively.

It was concluded that emergent surgical intervention before hemodynamic deterioration is the key for better outcome in these patients.

A New Incision for Minimally Invasive Approacher Open-Heart Surgery

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Skin incision along the Lines of Langer results in faster healing and gives a better Cosmetic scar. Median Sternotomy has its drawbacks because of its hypertrophic scar and keloid, and sternal instability if it should occur. Hence, we have developed an "Inverted U-shaped incision" starting in the sternal midline at the level of the 4th costal cartilage and extended down 2 cm on either side along the sub-mammary crease. The upper flap is raised to the level of the 2nd intercostal space. The lower skin-flap is raised upto the tip of the xiphisternum. Manubrium-sparing sternotomy was then done. Eleven cases have been done by this approach from Aug'99 upto Nov'2000.

All patients were female aged between 3 and 25 years. Nine were cases of Atrial Septal Defect, one a Ventricular Septal Defect, and one a case of Right Atrial thrombus. The patient with RA thrombus had undergone ASD closure by Mid Sternotomy incision on the full earlier. All cases were done by standard Cardio-Pulmonary Bypass except the one the RA thrombus which was done by the Inflow Occlusion Technique. The CPB time and the Aortic Cross Clamp time compared well with the standard approach. No subcutaneous drain was inserted. Skin necrosis at the tip of the flap occurred in two patients which resolved over time. Post-operative recovery was good and the scar was well accepted cosmetically.

Cardiac Tumours: 15-Year Experience

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Cardiac tumours are uncommon but important group of lesions that have significant morbidity and mortality if not dealt-with in-time. During 1985-2000 period we have operated 12 patients of cardiac tumours of whom 10 were myxomas and one each was fibroma and fibrosarcoma. 8 of these patients presented with cardiac symptoms, two were picked up incidentally while two had features of peripheral embolism. The only patient of fibrosarcoma, (a child of 8 years) presented with haemothorax. All these patients were diagnosed on Echocardiography. Spiral C.T. Scan chest was contributory in one patient (fibrosarcoma).

All but one of them were operated upon and the tumours removed, 8 from left atrium, 2 from right atrium, one from right ventricle. Tumours removed from left atrium and right atrium were Myxomas while the one removed from right ventricle was fibroma. One patient who had fibrosarcoma left heart (on open biopsy) was unresectable. There was one hospital death due to hepatorenal syndrome. All others on the follow up did not reveal recurrence till date and are leading an active social life.

We conclude that these tumours constitute an important group of treatable cardiac anomalies in whom timely resection is mandatory and life saving.

Experience with Natural Course of Concomitant Aortic Regurgitation After Mitral Valve Surgery

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Association of aortic valve disease with mitral valve (MV) is a common phenomenon in rheumatic heart disease. However the natural course of aortic regurgitation after MV surgery is little known.

Between October 1989 and September 1998, 825 patients underwent various kinds of MV operation (MV replacement and repair) at our center. One hundred and eighty four (22.3%) had aortic regurgitation (I & II) were followed-up. Sixty seven among one hundred eighty four patients turned-up for the followup, constitute the study group. There were 33 males & 34 females and their age ranged from 11 to 68 years (mean 33.2 years). Preoperatively 24 (35.82%) had grade I and 43 (64.98%) had grade II AR.

At the mean follow-up of 58.6 months (range 12-122 months), twenty six (38.8%) showed progression of aortic regurgitation and one of them require aortic valve replacement.

On further analysis of the 26 patients with progression of AR, no factor was found to be a predictive of AR progression. Regular follow-up of the patients of MV surgery with concomitant AR is required.

Primary Cardiac Tumours: 10 Years

SGPGI Experience

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Primary cardiac tumours are rare. Of the benign tumour, Atrial myxomas are the commonest. Though Sarcomas are the commonest primary malignant tumours, one will rarely come across this tumour. We present our experience of 31 cases of cardiac tumours and their follow-up over a span of 10 years.

Between December 1989 to October 2000, we studied 31 primary cardiac tumours and in addition, a case of Left Ventricular clot mimicking a primary cardiac tumour. The tumours were divided into two groups comprising of 27 cases of myxomas and 4 cases of non myxomas, of which 2 were Sarcomas. Breathlessness and cardiac failure were the most common mode of presentation. Two cases presented with peripheral embolism which require emergency embolectomy. Echocardiography was unable to differentiate between myxoma and malignancy.

All myxomas excised showed no recurrence in a follow-up period of 3 months to 108 months. Of the 2 sarcomas, one patient died after 3 months following uncontrolled distant metastasis.

Primary cardiac tumours may have non specific presentation however, the diagnosis of myxomas should be critically analysed in sites other than the Left Atrium. The results of surgery are gratifying for benign tumours but sarcomas have a dismal prognosis.

A Modified Mini Maze by Electrodiatheromy

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Prolonged cross clamp time and troublesome bleeding are two major disadvantages of classical Cox-maze procedure. We describe a technique of pulmonary venous isolation with electrodiathermy and ligation of biatrial appendages as an effective, rapid and reproducible "Mini-Maze" for chronic atrial fibrillation with a satisfying aim of restoring sinus rhythm and atrial transport function and preventing thromboembolism.

19 Patients underwent mini-maze with mitral valve replacement for AF more than 6 months duration on normothermic bypass, following left atriotomy, electro diathermy was used to individually encircle the right and left sided Pulmonary veins and the mouth of Left atrial appendage the encircled Pulmonary veins were joined by another cautery lesion. In 4 patients Radiofrequency current was used. 6 patients had associated Left atrial thrombectomy 17 patients converted to Sinus rhythm on table, of these 3 patients went into Atrial fibrillation again. At follow up of 12 months, 14 patients are in sinus rhythm. Modified mini-maze demonstrated a high sinus conversion rate with acceptable operative risk with negligible attrition rate.

Results of Coronary Artery Bypass Surgery with Concomitant Valve Replacements

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Introduction: This study highlights our experiences of patients who underwent coronary artery bypass surgery and simultaneous

valve replacements. The aim of this study was to determine the risk factors and follow-up.

Methods: Between April 1997 to October 2000, 26 patients underwent valve replacement for rheumatic heart disease and simultaneous coronary artery bypass grafting. Majority of these patients had stenotic lesion in either aortic or mitral, or both valves, along with significant coronary artery disease.

17 patients (65.5%) required aortic valve replacement, 6 patients (23%) required mitral valve replacement and 3 patient (11.5%) required double valve replacement. Group I consisted of 16 patients (61.5%) who underwent valve replacement with only single vessel coronary artery bypass grafting. Group II consisted of 10 patients (38.5%) who underwent valve replacement with double or triple vessel coronary artery bypass grafting.

Results: Early hospital mortality in group I was one (3.8%) while in group II was three (11.5%). Of the 3 patients in group II, two had significant triple vessel disease with left ventricular dysfunction. Mean follow-up of hospital survivors averaged 18 months. There were 2 late deaths. Symptomatic improvement was found to be excellent in rest of the patients.

Conclusion: Simultaneously performed myocardial revascularisation and valve replacement does not substantially increase the risk of surgery and yields excellent results in single vessel coronary artery disease. However, though multi-vessel subset with depressed ventricular function definitely imposes a higher risk for early hospital mortality but results in survivors are gratifying.

Combined Carotid Endarterectomy and Coronary Artery Bypass Grafting the Apollo Experience

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We encountered significant carotid artery disease in 57 of our patients undergoing coronary artery bypass grafting from 1996 to 2000 necessitating carotid endarterectomy accounting for 0.81%. 78% of them were males and 21.1% females. 42.1% had right sided disease, 56.1% had left sided disease and 1.8% bilateral. Most of our patients had a history of cerebrovascular event and a clinical bruit.

They were evaluated by a preliminary doppler study and then the pathoanatomy was delineated by angiography. Systemic cooling to 20°C on cardiopulmonary bypass was done prior to interrupting the carotid vessel. A longitudinal arteriotomy was made endarterectomy carried out. In some patients the arteriotomy was closed directly and in the rest a patch (vein or gore-Tex) was used.

The incidence of transient ischaemia in the post operative period was 3.5% permanent residual ischaemia was 3.5% and mortality was 1.8%. Combining carotid endarterectomy with coronary artery bypass grafting is a safe and effective procedure.

Small Size Valves in the Small Aortic Root - Our Initial Experience

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Valve replacement in the small aortic root has always been a surgical problem, because root enlargement is not only demanding but has its own problems. To overcome this problem, we evaluated our early experience with the smaller size aortic valve in the small aortic roots (23 MM).

From Jan. 1990 to Sept. 2000, 18 pts out of a total of 221 cases of

valve replacement underwent aortic valve replacement with the smaller size aortic valves. 6 pts had a 19 mm size valve (carbomedics in 4 pts St. Jude in 2 pts) and 12 pts had 20 mm med. valve implanted in them. 11 pts comprised the D.V.R. group.

Immediate post operative problems were ventricular arrhythmias in 2 pts and low cardiac output in 1 pt. There were no hospital deaths.

All patients were followed up by doppler echo study post operatively after 6 months, one year and then every year following. Thereafter, though most of the patients were in N.Y.H.A. Class-I, regression of I.T. ventricular mass index, thickness of I.V.S. took significant time and was dependent upon the severity of the pre-operative problem. There were 2 late post operative deaths following intractable ventricular arrhythmias.

We conclude that proper matching of valve size in terms of body surface area is mandatory, regression of I.V. mass takes time and hence proper follow up is mandatory for early detection of post operative problems to ensure the survival of these patients.

Early Exp. With Carbomedics "Tophat" Supraannular Valve in Narrow Aortic Root

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Over a three year period, 55 patients underwent Aortic Valve Replacement out of which 12 (21.8%) were Double Valve Replacements while 43 (78.2%) were isolated Aortic Valve Replacement. 22 (40%) patients had a size 21 or less St. Jude's H.P. or size 19 HallMedtronic valve implanted. Postoperative echo was done in all the patients at discharge which showed peak resting gradients of more than 30 mmHg in all patients receiving valves under size 21. In an effort, not to insert a valve under size 21 we have resorted to implantation of carbomedics "Top Hat" prosthesis in six patients. All 6 were male patients with an age range of 32 yrs. to 77 yrs. (56.8 yrs mean). Size 21 or smaller standard Carbomedics valve sizers could pass through these annuli and since the coronary ostial anatomy was suitable, the "TopHat" model of size 21 was used in one patient, size 23 in four patients and size 25 in one patient. All did well in the post operative period. The peak and mean gradients were 19.2 mmHg and 8.8 mmHg for size 25, and an average of peak 20.3 and mean 10.0 mmHg gradients for patients with size 23 valve. The peak gradients were 25.5 and mean 13.0 mmHg for the patient with prosthesis size 21. The values were within normal range for the respective prostheses. There was a substantial regression in the LV mass. We concluded that 'Top Hat' model of Aortic Valve is a technically easier and patient as well as surgeon friendly approach to the problem of small aortic root in the adult population.

Intra-Aortic Balloon Pump-Does Early Application Improve Survival?

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Intra-aortic balloon pump is a life saving device, which has contributed significantly in improving survival in cases of post-pump cardiac dysfunction especially after CABG. With increasing familiarity we have tended to use IABP much early in patients who are difficult to wean off the pump after CABG. Whether this policy translates to better early and late survival is analysed in this paper.

Material and Methods: Between Jan 1994 to Nov 2000, 112 Intra-aortic balloons were applied in patients who failed to wean off bypass after elective CABG. Criteria for IABP insertion - maximal inotropic support prior to balloon insertion, time to support on CPB after initial attempt at weaning off pump failed were studied. Preoperative variables such as age, sex, LV function, renal function was studied as also intra-op variables such as number of grafts, CPB time and cross clamp time. All these variables were subjected to statistical analysis.

Results: Known risk factors such as advanced age, female sex, renal dysfunction, were associated with a decreased early and late survival. Early insertion of IABP (time elapsed between the first attempt at weaning off the pump to the insertion of IABP), lesser ionotropes before IABP insertion were associated with a statistically significant increase in early and late survival.

Conclusion: Early insertion of IABP improves early and late survival in patients who experience difficulty in weaning off bypass after CABG.

Insertion of IABP: Percutaneous Vs Side Arm Graft

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The most commonly used route of insertion of an Intra Aortic Balloon Pump (IABP) catheter is the femoral artery. A variety of complications due to balloon insertion have been reported. This study compares the various techniques of insertion of IABP. A total of 74 patients received IABP - 54 patients by the percutaneous technique and 20 patients through the open technique by a side arm Goretex 4mm graft using recycled balloon after ETO sterilization. Of the percutaneous group 25 patients received sheathless IABP and remaining 29 patients had IABP insertion with sheath.

11 patients received IABP preoperatively out of which 9 were of the percutaneous group and 2 by the open technique. Post operatively 63 patients received IABP - 45 percutaneously and 18 with the open technique. Indications of insertion of IABP pre-operatively were unstable angina - 7 patients, severe LV dysfunction with critical anatomy - 2 patients, evolving MI - 1 patients and intractable failure in one patient. Post operative indications for IABP insertion were inability to come off bypass in 59 patients, persistent ST changes - 2 patients and intractable ventricular arrhythmias in 2 patients. In the group who received IABP by open technique, there were 2 patients who had IABP pre-operatively (both patients had associated peripheral vascular disease). Of the 18 patients who received post operative balloon by the open technique, 4 had PVD and 14 patients were economically weak.

The complications encountered were lower limb ischaemia in 2 (6.9%) patients of IABP with sheath group, both subsequently requiring femoral embolectomy. Minor wound infection occurred in 3 patients, 2 (10%) in whom a side arm graft was used and 1 (3.4%) patient of IABP with sheath group. Significant groin haematoma after removal of catheter occurred in 2 patients (6.9%) of IABP with sheath and one (4%) without sheath. To conclude we recommend the use of the side arm graft technique in patients with peripheral vascular disease involving the femoral artery. The advantage of cost containment using this technique would help the economically weaker section of patients.

Surgical Treatment of the Dilated Ascending Aorta: Our Experience at Escorts Heart Institute

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Introduction: A total of 73 patients have undergone various surgical procedures for ascending aortic aneurysms and aortic dissections at Escorts Heart Institute and Research Centre between November 1989 upto October 2000.

Material & Methods: The medical records were reviewed. Age group ranged from 23 years to 70 years (Mean 44.9 years) 66 were males and 7 females.

Etiology wise 30 cases were ascending aortic aneurysms with annulo aortic ectasia, 21 had type 1 aortic dissection, 17 had rheumatic heart disease with dilated aorta, 4 had type 2 aortic dissection and one had saccular aneurysms of a previous composite valved graft conduit.

The classic Bentall procedure was done in 35 cases (47.9%), button Bentall 9 cases (12.3%), isolated ascending aortic replacement 19 cases (26%), supracoronary aortic root replacement with AVR 6 cases (8.2%), Cabrol modification 3 cases (4.1%) and one case of hemiarch replacement with Bentall procedure.

Associated procedure were done in 4 cases.

There were 7 deaths (9.5%) in hospital of which 4 cases had poor LVEF (less than 30%), stroke 3 cases malignant arrhythmias 3 cases, acute renal failure 2 cases, inability to wean off bypass 2 cases, prolonged ventilation one case and perioperative MI 2 cases and re-exploration for bleeding in 5 cases.

Conclusion: Surgery for ascending aortic dilatations is relatively safe. Poor LVEF (less than 30%) is a major risk factor. Associated procedures did not increase risk.

Off Pump Coronary Artery Revascularization-Our Experience at Escorts Heart Institute

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Aim: Short term experience with off pump coronary artery revascularization in multivessel disease.

Method: Between the period Oct 1995 to Oct 2000, 2495 off pump revascularization were performed. Mean age was 58.42 ± 9.82 years. 2127 number of males and 368 females. Main indication was unstable angina 73%.

Surgeries were performed through a median sternotomy, left anterior thoracotomy, mini thoracotomy, mini sternotomy, lateral thoracotomy with mechanical stabilisation and a least "Verticalizing" technique to enable access to circumflex artery.

Result: An average of 2.60 ± 0.72 grafts/patient was achieved with 82% of cases being triple or quadruple bypasses.

Single or double internal mammary arteries was utilised in 95% of cases. Complete revascularization was achieved in 98.5% of cases. Total ischaemic time average 26 ± 9 (range 6 to 58) minutes.

Myocardial infarction incidence was 1.8% with no patient requiring postoperative intra aortic balloon counter pulsation assistance. 1.2% hospital mortality resulted. Conversion to cardiopulmonary bypass was required in 2.6% cases.

A transfusion rate of 30% was observed (60% in conventional CABG) at our institute.

Conclusions: With experience, proper operative technique and surgical apparatus, beating heart bypass surgery may be used systematically as a suitable, safe alternative to conventional on pump. Coronary artery bypass grafting permitting complete revascularization in a majority of patients with excellent short term results.

Emergency CABG in Acute Evolving MI

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Background: CABG in acute myocardial infarction (AMI) is reserved for those cases where medical therapy (thrombolysis) and angioplasty fail or are contraindicated.

Material & Methods: Emergency CABG was performed in 32 patients with evolving AMI. The indications were cardiogenic shock despite intensive medical therapy with IABP, continuous chest pain with ECG changes, difficulty or failure of PTCA, left main or severe triple vessel disease or development of a VSD or MR with hemodynamic compromise. The location of the AMI was anteroseptal in 18, inferior in 6, posterolateral in 6 and global in 2. Preoperative IABP was used in all cases. 8 patients had a critical left main stenosis.

Results: The mean interval between onset of AMI and CABG was 25.2 ± 24.6 hours (2 to 90 hours). 11 patients underwent CABG within 12 hrs of AMI. The mean number of grafts was 2.8 ± 1.1 . Arterial grafts were used in only 5 cases. All patients needed blood transfusions. There were 3 operative deaths - from multiorgan failure with sepsis, stroke and acute renal failure. All mortalities were in patients who had preop cardiogenic shock, age > 60 yrs, left main disease and pre op VSD. Major complications (renal failure, CVA and wound dehiscence) were observed in 3 patients. 1 patients with critical left main stenosis, cardiogenic shock, pulmonary edema, preop ventilation and preop fixed dilated pupils survived CABG with no neurologic deficit. Retrospectively the cause of the dilated pupils was presumed to be from the high doses of epinephrine being used. During a 3.2 ± 1.2 years follow-up there was 1 sudden death and 2 non cardiac deaths.

Conclusions: CABG in evolving AMI should be performed urgently if aggressive medical therapy is not successful. Preop shock, advanced age, critical left main disease and VSD are risk factors for peri-op death. Our single case of survival from preop doubtful CNS status (fixed dilated pupils) may call for a relook at the indication for surgery in these seemingly hopeless cases. Mid-term results for survivors are good.

Experience of Coronary Artery Bypass Surgery at the National Institute of Cardiovascular Disease, Dhaka

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258 coronary artery bypass graft surgery were performed at NICVD, Dhaka, Bangladesh from 1984 to November 2000, 230 cases were male and 28 cases were female. Age ranged from 32 to 83 years with Mean \pm SD of 50 ± 4.15 . 150 patients were hypertensive and 80 were diabetic. 218 patients had effort angina and 40 had unstable angina. 170 patients had triple vessel disease, 60 had double and 28 had single vessel disease. Median sternotomy approach was used in 252 patients, posterolateral approach in 2 patients and MIDCAB in 4 patients. CABG on beating heart was performed in 16 patients and on fibrillating heart in 10 patients. Arterial graft were used in 130 patients and venous grafts in 254 patients. Relief of pain was obtained in 91% of the patients and peri-operative mortality was 8%.

Early Mobilization After Open Heart Surgery - Nursing Aspects

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The very thought of having a surgery is frightening for any patient. When the surgery is open-heart surgery, the fear is naturally more. After surgery most of the patients find it difficult to believe that the surgery is over, as they could not have felt any frightening experience or pain as they had expected before surgery. Still they do not restart their physical activities on their own, even within the limits of their physical strength and residual pain. This is because of the fear and the lack of confidence the patients generally have after surgery. This could be overcome by active motivation and physical mobilization.

We have adopted a protocol of early mobilization of patients after surgery and have found that this helps them regain their confidence and overcome the fear early. This helps in a smoother recovery and convalescence.

We analyzed the first 3000 cases of CABGs done at our centre since February 1999. All patients had a pre-operative counselling regarding the environment, pain management, mobilization and diet in the ICU. All patients were started on incentive spirometry within one hour of extubation. 90% of the patients were made to sit in a chair on the morning after surgery, i.e. within 2 hours of removal of chest drainage tubes. The remaining patients had a delayed mobilization due to various reasons like raised cardiac enzymes, inotropic support, drowsiness and patients hesitation. 86% of the patients had started walking with support within 4 hours after sitting in a chair. 80% of the patients started walking on their own by the evening of the first postoperative day.

Early mobilization is important and very useful in instilling confidence into the patient and also helps in reducing the morbidity following the open-heart surgery.

Left Atrial Reduction and Pulmonary Vein Isolation for Mitral Valve Disease with Chronic Atrial Fibrillation

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Chronic atrial fibrillation in mitral valve disease leads to a decrease in cardiac output and increases functional disability, despite treating the valvular lesion and is not controlled often by medical management. We present our experience with the surgical management of chronic atrial fibrillation by left atrial reduction and pulmonary vein isolation along with mitral valve replacement.

A 40 year old lady presented with palpitations and shortness of breath NYHA Class III for 1 year. 2D Echo Cardiogram revealed severe mitral stenosis, moderate regurgitation and a dilated left atrium (7cm). At surgery, the vena cava were cannulated directly. The superior vena cava was divided. A 5mm wide strip of left atrial wall was excised along with the entire circumference, while isolating all the pulmonary veins. Half of the posterior left atrial wall is resutured; the mitral valve is replaced with a 27 Omni Science valve and remaining left atrium is closed. The SVC is re-anastomosed. The heart spontaneously picked up in normal sinus rhythm and recovered well. One year after surgery, she is in normal sinus rhythm and NYHA Class I with medication.

We feel that this method is reproducible and can be offered to selected patients with mitral valve disease and chronic atrial fibrillation and a large left atrium (more than 6cm).

Non-Hodgkin's Lymphoma of The Heart - An Unusual Cause for Superior Vena Caval Syndrome

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Background: Superior Vena Caval Syndrome in a patient with hypernephroma is usually due to a propagating thrombus in IVC, RA and SVC. Non-hodgins lymphoma presenting as a R.A. mass with concomitant abdominal tumour is rare.

Case History: A 56 years male patient with hypernephroma was found to have S.V.C. Syndrome. Echo-reported RA mass, clot or tumour. MRI diagnosed the mass as clot. At operation, after aortic cannulation, the RA was found to be full to the mass. Hence Bypass instituted with cannulation of pulmonary artery. Right atrium was opened. It was full of tumour infiltrating the SVC-RA junction. Tumour was debulked and SVC, IVC cannulated. Cold blood C.P. was given and tumour could be debulked about 90% except the portion infiltrating the RA free wall and SVC, RA junction. Patient could be weaned off CPB and had uneventful post operative course. Histology demonstrated it, to be non-hodgins lymphoma, which melted away with chemotherapy.

Conclusion: Non-Hodgins lymphoma can present as RA tumour with S.V.C. syndrome. Before complete CPB is instituted, cannulation of PA can help to go on CPB and debulking can be done. If the mechanical component is treated, the residual tumour melts with Chemotherapy.

Post-op Pain Relief After Open Heart Surgery - Nursing Perspective

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Background: Fear of pain following open-heart surgery is significantly more than that of other surgeries. Cardiac Surgery in Bangladesh is still in its infancy. Our hospital is the first private cardiac centre, performing routine cardiac surgeries. We have completed more than 300 open-heart surgeries successfully in one year and nine months. Our postoperative nursing staff had played a major role in the successful early recovery of our patients. We present here a simple and effective method of postoperative analgesia used in our Cardiac Intensive Care.

Materials and Methods: 300 patients underwent CABG in our institution since February 1999. After extubation, they were given a combination of oral paracetamol and tramadol alternately at regular intervals. The efficacy of analgesia was assessed by a four grade pain score (0=no pain, 3=severe pain). If the patient complained of severe/moderate pain, morphine was given intravenously in incremental doses of 3 mg. The patient's alertness was assessed by a four grade sedation score (0=unconsciousness, 3=fully awake).

Results: 88% of the patients had good pain relief with pain score 0 to 1 and their mean sedation score was 2.7. 12% of the patients had pain, which required additional morphine injections to bring down the pain score to 0 to 1. Their mean sedation score was 2.2. 10% of the patients who received morphine had vomiting, which was controlled with metoclopramide or ondansetron.

Conclusion: Pain management with oral paracetamol and tramadol is effective and has many advantages. It is safe and simple. It keeps the patients more alert and helps in early mobilization. It has minimal side effects. There is no respiratory depression. The analgesic administration should be pre-emptive; i.e. it should be given before the onset of the pain.

Gortex Chordal Reconstruction for Mitral Valve Surgery

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The importance of preserving the subvalvular apparatus for Mitral Valve replacement is well documented. In patients with Severe subvalvular pathology, Chordal preservation may not be technically possible. In some of these patients chordae can be artificially reconstructed by using Gortex sutures.

From August 91 to November 2000, 866 patients underwent Mitral Valve surgery procedures, 790 MVR and 76 Mitral Valve Repair. Out of 790 MVR patients, chordal preservation was done for 441 patients and 56 patients had artificial Gortex Chordal Reconstruction to maintain L.V. geometry. Remaining 293 patients underwent MVR without any attempt to preserve or reconstruct the subvalvular apparatus. Out of 56 patients undergoing Gortex Chordal Reconstruction. Majority of them has St. Jude's Valve (43 patients) other valves used were Medtronic Hall, 7 Hancock Tissue valve (4) and Chitra Valve in 2 patients. There was only one hospital death. In short and intermediate term follow up, LV function did not deteriorate in any of these patients.

The technique of reconstruction with gortex chordae is simple and results gratifying, we recommend use of this technique for patients undergoing MVR in whom native chordal preservation is not possible.

Surgical Management of Valvular Infective Endocarditis -5 years Experience

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Infective endocarditis of native and prosthetic heart valves constitutes one of the major causes of morbidity and mortality in cardiac surgery. 36 patients suffering from infective endocarditis underwent valve replacement procedures over a period of 5 years i.e., between June 1994 to May 1999. Surgical details, various reconstructive procedures to repair damaged paravalvular structures. Perioperative antibiotic protocols and 5 year follow-up data are presented.

17 patients had active infective endocarditis with paravalvular involvement at the time of surgery. 4 patients had emergency valve replacement due to haemodynamic instability. At the time of valve replacement destroyed para valvular structures i.e., sub annular inter ventricular septum, aortico mitral septum, aortico atrial fistulas and destroyed anterior mitral leaflet were repaired using various reconstructive procedure. Aggressive control of infection with antibiotics in the pre operative period extending up to 4-6 weeks post operatively was followed in almost all patients. Operative mortality was 3% in this group of patients. 4 patients had recurrence of infection within 6 months of follow-up period. Late mortality was 11% in the follow-up period extending up to 5 years.

Operative and late mortality rate was correlated to preoperative uncontrolled sepsis and the presence of extensive annular destruction. We conclude that operation for valvular infective endocarditis requires radical and individualised techniques and aggressive antibiotic usage in perioperative period and results in an acceptable operative and long term risk.

Endocardial Radiofrequency Catheter Ablation of Chronic Atrial Fibrillation in Patients Undergoing Mitral Valve Surgery

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Atrial fibrillations (AF) a common & troublesome arrhythmias that often has adverse prognosis due to fast ventricular rate & loss of atrial systole leads to thrombo-embolism. In the present study, we attempted ablation of AF, using only left atrial lesion created with new temperature controlled surgical (Radio Frequency) RF Probe.

Objectives: is to demonstrate efficacy of RF catheter ablation of chronic AF in patient undergoing mitral valve surgery and also long term efficacy of the RF ablation in maintaining sinus rhythm.

Material & Methods: In this series of 20 patient who underwent RF ablation since December 99. The age ranges from 20-60 years. The male to female ratio was 1:1 i.e. (10 males and 10 females). Twelve patients were class IV and 8 patients were in class III NYHA, Who had LA size raning from 5-7 cm. with clot in LA in 6 patients.

These patients who underwent mitral valve surgery using conventional CPB moderate hypothermia and simultaneous RF ablation of AF. The RF lesion was delivered at the base of LA appendage encircling left and right pulsing vein along with inter connecting lesion using thermaline surgical ablation catheter. EPT is a RF power generator and design to maintain a preset lamp of 70° by adjusting the delivered RF energy as necessary. The ablation time on an average was 20-25 minutes.

Results: All 20 patients who had chronic AF, 18 were successfully ablated. Both PV and LAA lesion were demonstrated to be necessary to ablate AF.

Conclusion: This technique of RF ablation is simple, safe and useful for patient with chronic AF undergoing mitral valve surgery. The intial results are encouraging. The three months follow up of these patients would be discussed.

Clinical and Hemodynamic Evaluation of Patients Undergoing Double Valve Replacement

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Valve replacement is the established mode of treatment for the severely damaged heart valves, especially where attempts have failed to preserve the native valve. The most important factor determining the morbidity and the mortality depends upon the smooth functioning of the prostheses well as the left ventricular performance. The present study aims to highlight the effect of preservation of the posterior mitral leaflet (PML) and its subvalvular apparatus in patients undergoing DVR.

492 mechanical prostheses were replaced in 427 patients 273 MVR, 77 AVR, 66 DVR) between October '93 and July '2000. The present study involves 66 patients who underwent mitral and aortic valve replacement for mixed mitral and aortic valve disease with Rheumatic etiology. The age range was between 11 years and 56 years with a M:F ratio of 49:17. These patients were divided into 2 groups: group A (n=38) without the PML preservation and group B (n=28) with PML preservation. M mode and doppler echocardiography were done preoperatively, postoperatively and at 3-6 months, in addition to the clinical evaluation of the patients.

The overall hospital mortality was 7.5%. At 3 months 84.24% of the patients in group B reached NYHA class I as compared to 24.24% in group A. There was no valve related complications like thrombosis,

embolism, bleeding etc. Echocardiographically, patients who underwent preservation of the PML showed decreased in the left ventricular systolic and diastolic dimensions with improvement in the left ventricular ejection fraction. None of the patients had any evidence of left ventricular outflow tract obstruction. We conclude that preservation of PML has a beneficial effect on the left ventricular performance also in patients undergoing multiple valve procedures.

Early Results with Use of Right Gastro-Epiploic Artery

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Introduction: There have been report of good long term patency with the use of right gastro-epiploic artery. We present our experience with use of right gastro epiploic artery.

Material & Methods: Out of 9457 cases of coronary artery bypass grafting performed between January 1997 to October 2000 right gastro-epiploic artery (RGEA) was used as a conduit in 876 patients. There were 76% males and the mean age was 41-50 years. 5.3% of the cases were off pump (OPCAB). Redo surgeries were done in 12.6% of cases. LVEF below 40% was present 3.9% cases, left main stenosis in 8.1%, the mean number of arteries bypassed were 3 (57.9%). IABP was used 2.4% of cases.

Results: Early mortality occurred in one case, the incidence of low cardiac output was 1.2%, respiratory complications in 0.8% cases, CNS problems in one case, renal impairment in 1.4% cases and chest wound complications in 0.8% cases.

Conclusions: Considering the advantages stated in the literature with arterial conduits, RGEA is a safe conduit and easy to harvest.

Quality Assessment for Beating Heart Surgery

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Since its revival in early 90s beating heart surgery has seen a major resurgence. The procedure has substantial advantage if the results are equivalent to conventional surgery. We have undertaken this study to assess the quality of beating heart surgery.

From July '99 till July '00 53 consecutive patients who underwent LIMA to LAD were entered into this study. The first group of 21 patients was followed up with TMT three months after surgery. The second group of 32 patients had angiographic follow up in the early post-operative period.

In group I, two patients had positive TMT test and both had repeat angiogram done. One patient had progression of disease in a non-grafted vessel, where as the other patient had proximal LIMA stenosis, which was dilated. In group II, there was 100% anastomotic patency. Two patients had 50% LIMA stenosis, one near the distal end and the other in the mid segment. In both patients the anastomosis was not involved. In all these cases repeat angiogram is planned after six months. There was no early mortality in the entire series.

Quality assessment for beating heart surgery is essential since it is a relatively new procedure. Though angiography is the best method for follow up, early angiographic abnormality is quite common which usually disappears after a few months. Early patency without anastomotic narrowing predicts a good long term result. Our study indicates that the results of beating heart surgery for LIMA to LAD are at least as good as conventional surgery.

Hemodynamic Changes in the Ischemic Displaced Human Heart-Implications in Circulatory Management During Off-Pump CABG

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Background: One of the key problems during off pump CABG is the hemodynamic instability caused by the displacement of the heart which is necessary for access to the target coronary arteries. This instability is especially marked when the heart is lifted and rotated to access the lateral wall (circumflex area). Regional myocardial ischemia produced by snaring the target artery will theoretically increase the instability. The aim of this study was to evaluate the changes which occur in the hemodynamics during the manoeuvres required during off pump CABG.

Material & Methods: 50 patients with severe TVD for elective CABG via mid-sternotomy were studied. 20 of these were patients where CPB was planned-in these pts after aortic (but before venous) cannulation the changes in hemodynamics were noted. The parameters noted were- heart rate, ST segment changes, mean AP, CVP, PA (S,D and M), RVEDP, CO, LA, LVEDP, mixed venous oxygen saturation and coronary sinus pressure. The readings were taken at baseline, 5 and 10 min after displacement, 5 and 10 mins after coronary snaring, 5 and 10 mins after start of coronary sinus perfusion and 5 and 10 mins after return to normal position.

Results: A rise in RVEDP and LVEDP was noted along with a fall in AP and in CO which was most marked during manoeuvres to expose the vessels in the lateral wall. These changes responded well to a head down position, volume loading and to coronary sinus perfusion. The changes resolved spontaneously upon returning the heart to its pristine position. Some of the changes which exacerbated on snaring of a coronary artery reverted on commencement of retrograde coronary sinus perfusion.

Conclusions: Major hemodynamic changes occur during off pump CABG. Any technique/pharmacological therapy which can control these changes will be a major step in making off pump CABG safe and will take away the sense of urgency which can compromise accuracy of anastomosis.

Right Thoracotomy Approach for Correction of Cardiac Lesions

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Background: Right anterolateral thoracotomy approach is used quite infrequently for correction of cardiac lesions in present scenario. We used this approach for cosmetic reasons.

Patients and Methods: From Sept. 1991 through Nov. 2000, 221 patients (205 female) underwent open heart surgical procedure via a right anterolateral thoracotomy. Age ranged from 7 to 46 years (mean 19.2 ± 8.4 years). Surgical procedures included mitral valve repair (n=138), mitral valve replacement (n=26), open mitral commissurotomy (n=13), closure of secundum atrial septal defect (n=39), closure of primum atrial septal defect (n=2), aortic valve replacement (n=2) and repair of supraventricular type of total anomalous pulmonary venous connection (n=1).

Results: In all the patients, it was possible to cannulate the ascending aorta. There was no operative mortality. Seven patients required re-exploration for haemorrhage. There was no lung related complication. Average postoperative stay was 5 days. Follow up ranged from 1 to 110 months (mean 48.6 ± 12.4 months). Patients were happy with the cosmetic results.

Conclusion: Right thoracotomy approach is suitable in selected patients with good cosmetic results.

Carotid Endarterectomy in Patient with Carotid Artery Stenosis Undergoing CABG-Reduces the Incidence of Preoperative & Post Operative Stroke

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Introduction: Stroke occurring during open heart surgery is a devastating complication. About 5-7% of patient undergoing open heart surgery suffer neurological injury.

Methods: From October 1988 to October 2000 total 239 patients have had the combined carotid endarterectomy and coronary artery bypass surgery at Escorts Heart Institute And Research Centre. The mean age of patients were 60.9% and 49.4% of the patients were above 60 years. 75.3% of patients were operated on CPB and 24.7% of patients were operated without CPB. Carotid endarterectomy was done before coronary artery bypass grafting in all cases. In 119 patients left carotid endarterectomy was performed and right carotid endarterectomy was done in 120 patients.

Results: All patients was operated successfully. Three patients (1.25%) expired in the postoperative period due to poor LV function. Local hematoma developed in two patients which was managed successfully. Minor and major neurological problems were seen in three patients (1.25%) which is significantly lower than the 5-7% anticipated stroke rate in patient with carotid stenosis more than 80% undergoing coronary artery bypass surgery.

Conclusion: According to our reports combined carotid endarterectomy and coronary artery bypass surgery is safe and can significantly reduce the risk of perioperative stroke and long term neurological events.

Quest for an Alternate Arterial Conduit - A Cadaveric Study

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Radial artery has been used more routinely as an additional arterial conduit along with bilateral IMAs for total arterial coronary revascularization. But as the hand needs to be pulled out to harvest them, we were looking for an alternate arterial conduit with a similar anatomy; when we found this anterior Tibial artery.

The anterior Tibial artery was dissected in 10 cadaver legs to assess its length, caliber, technique of harvesting, variation in anatomy and its feasibility as an alternate arterial conduit.

The anterior Tibial artery begins 2.5 cm distal to the medial side of the fibular head and ends midway between the malleoli. The mean length of the anterior Tibial artery harvested were 25 ± 2 cm. It lies on the interosseous membrane and continues as Dorsalis Pedis artery. It lies between the muscle planes like the Radial artery. But the course of the deep Peroneal nerve does make the dissection a bit tricky.

The histology, embryology and reactivity of this artery is the same as that of the Radial artery. Hence we are proposing that this artery could be spared with impunity as the posterior Tibial and Peroneal artery would take care of the blood supply of the leg, so as to use it as an alternate arterial conduit.

Aortic Valve Replacement Using Stentless Bioprosthetic Valve

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Aortic valve replacement using a stentless bioprosthetic is fast emerging as a very good option in the older patient with severe aortic valve disease. The advantages of a stentless design are- 1) Very low gradients across the valve. 2) May have greater durability due to lack of commissural stresses seen with stented valves. 3) Rapid regression of left ventricular hypertrophy. 4) No anti coagulation needed. 5) Newer anti-mineralisation method may benefit in improving durability.

We have used the stentless aortic valve in 31 cases with severe Aortic valve disease. The indications were severe aortic stenosis in 29 cases and severe aortic regurgitation in 2 patients. One patient had healed endocarditis. Modified sub-coronary techniques were used in 24 cases and complete sub-coronary techniques in 7 patients. One patient had complete heart block needing pace maker implantation. The same patient had TIA which was later detected to be due to carotid disease. There was no other morbidity in the entire series of patients. All patients had an echo cardiogram on 10th Post operative day. The mean gradient was 8 mm. The peak gradient was 13 mm Hg (Mean). Eight patients have had 6 months follow-up. The mean and peak gradients were 7.37 mm Hg and 12.25 mm Hg (Mean) respectively. These compared favourably with results published by Dr. Tirone David from Toronto and Mr. Westaby from Oxford. The follow-up is 100% complete to date. At six months there has been a trend to further fall in mean and peak gradients. The early results are very encouraging with very low gradients which will eventually translate into regression of left ventricular hypertrophy.

Clinical Evaluation of TTK Chitra Mechanical Heart Valves

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Background: TTK Chitra valve is a tilting disc mechanical prosthetic heart valve conceived at Sree Chitra Tirunal Institute of Medical Science and Technology. We present the analysis of our experience with the valves implanted in our department.

Patients and Methods: In group A-50 patients undergoing mechanical prosthetic valve replacement with TTK chitra valve were included while patients undergoing valve replacement with St. Jude valve were included in Group B. Detailed pre-operative evaluation of patients was done clinically as well as on echocardiography. All intra-operative and post operative events were recorded. Echo cardiography was repeated at the time of discharge and subsequently six monthly or in case when a patient developed valve related complications.

Results: Post operative mortality was 2% in Group A and 4% in Group B. In follow-up of 1 year, incidence of bleeding events and embolic events were comparable in both groups. No incidence of prosthetic valve endocarditis, valve thrombosis or dysfunction were encountered. The hemodynamic performance of the prosthetic valves were also comparable in both groups.

Conclusion: In short term follow-up of TTK chitra valve exhibited excellent hemodynamics and low incidence of valve related complications comparable to St. Judes valve.

Bentall Procedure: An Early Experience

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Between January, 1999 and August, 2000, 3 patients underwent composite replacement of the ascending aorta and aortic valve (Bentall Procedure). The mean age was 40 years and all patients were male. All the 3 had Annulo aortic ectasia with marfanoid features in 2 patients. None of them had aortic dissection. In all the cases aortic valve and ascending aorta were replaced using a prosthetic valved conduit (Haemashield, Medtronic) of approximate size employing the inclusion technique. 1 patient underwent re-exploration due to bleeding 1 patient developed pericardial effusion in late postoperative period, which was drained with a pigtail catheter. All the patients are on regular follow-up and are doing well.

Simultaneous Fungal Infection of LA Myxoma & Anterior Mitral Leaflet: An Unusual Combination

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Cardiac tumors are amongst the least common (incidence - 0.03%) forms of cardiac disease encountered in clinical practice, having variety of clinical presentations. Myxomas account for 50% of all benign tumors, most of which are located in left atrium (LA).

We are presenting a 30 year old male presenting with features of congestive heart failure. He had fever lasting three months and right hemiparesis sustained 2½ months earlier, 2D-Echocardiography showed large LA Myxoma with severe mitral regurgitation. C.T. scan Head revealed left parietal infarct. Under cardiopulmonary bypass Myxoma was excised, but on weaning from bypass patient had persistent hypotension and LA pressures were high. Trans-esophageal Echo showed severe mitral regurgitation. Patient put on bypass again and mitral valve replaced. On Histopathological examination, Fungal hyphae were seen on myxomatous tissue as well as anterior mitral leaflet.

In rare circumstances, Myxomas may become infected and only 2 of 12 such cases have been diagnosed before death and none has shown secondary involvement of mitral leaflet necessitating mitral valve replacement.

Pump Induced Haemolysis: A Comparison of Short-Term Ventricular Assist Devices

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Background: The Royal Children's Hospital have utilized the centrifugal pump as a short term Ventricular assist Device (VAD) for 75 procedures since May 1989. During this period the average duration of support has been 79 hours. The majority of these procedures were performed using the Biomedicus (BP) BP50 and BP80 constrained vortex centrifugal pump but recently we have also used the Josta Rota Flow (JRF) shrouded impeller centrifugal pump.

Aim: To assess the suitability of the JRF for our VAD program we performed an in vitro evaluation of the JRF and compared it to the BP 50 and a standard Cobe roller pump (RP).

Methods: The chosen indicator of pump performance was changes in Plasma Free Haemoglobin (Hb) levels. We constructed similar circuits for each of the three pumps simulating VAD conditions with

respect to pressure, flow and duration of support, and then subjected each circuit to a predetermined set of stress conditions. Fresh human blood was recirculated through the circuit and blood sample to measure FHB taken in regular intervals. At the end of each trial period a new circuit was constructed for each of the three pumps and new stress conditions set.

Results: Results for the Index of Haemolysis (IH) for each of the three trials are summarised as follow.

IH (grams of free Hb per 100 litres of blood pumped)

Median (lower, upper 95% Confidence Interval)

	Rotaflow	Biomedicus	Roller Pump
Trial 1	0.0112 (0.0053 - 0.0662)	0.0216 (0.0054 - 0.0654)	0.0161 (0.0084 - 0.0746)
Trial 2	0.0099 (0.0085 - 0.013)	0.011 (0.0060 - 0.0213)	0.0144 (0.0081 - 0.0163)
Trial 3	0.0036 (0.0024 - 0.0051)	0.0044 (0.0037 - 0.0010)	0.021 (0.0091 - 0.0307)

Conclusion: In this preliminary study we have found the JRF to be equal or superior to the BP and RP under each of the three trial conditions in terms of blood handling as indicated by changes in FHB and Indices of Haemolysis.

Atrial Myxoma-8 Years JIPMER Experience

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Since December 1992, 18 patients have been operated for intracardiac myxoma. Fourteen (77.7%). In left atrium, two in right atrium (5.5%), one bilateral (5.5%), one multiple chamber (left atrium, right atrium, right ventricle). There were 9 male and 9 female (1:1) with age range of 17 to 65 years. Fifteen patients had constitutional symptoms, twelve had tumour plop, mid diastolic murmur in five patients and syncope in five patients. TEE was done in all patients to diagnose location, size and number of tumour. Excision of myxoma done under cardiopulmonary bypass with most cases being done by biatrial approach (85.7%). The advantage of this approach being minimal handling to tumour, other chambers well seen and low incidence of tumour recurrence. Two patients had conduction disturbance and two postoperative deaths. All the patients were followed up for 6 months to 8 years and found to be symptomfree without any recurrence.

Surgical Management of Aortic Root Pathology

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Objective: To evaluate our experience in the surgical management of the aortic root pathology.

Material and Method: Between January 1982 and November 2000, 22 patients were operated with aortic root pathology. Thirteen (59%) of them had Bentall's procedure using Hemashield graft with mechanical valve, 4 (18%) had supracoronary graft replacement of a segment of ascending aorta and 5 (23%) had the ascending aortic aneurysm repair and aortic valve replacement with separate graft and valve. The mean age of the patients at operation was 45 ± 13.7 (range: 17 to 67 years). Sixteen (72%) patients were male. Four (18.2%) were with Marfan syndrome. Annuloaortic ectasia was the most common indication of surgical intervention, occurred in 12 (54.5%)

patients followed by dissection of the aorta (Type 1-4 and Type II - 6) in ten (45.5%). Infective endocarditis was the cause of aneurysm in 3 patients.

Result: Early (30 day mortality was 18.2%) (4/22 death). The causes of death were intraoperative uncontrolled bleeding in one, unable to wean off bypass in one and low cardiac output, septicaemia and multiorgan failure in two patients. The mean duration of follow-up of the survivor was 59 ± 30.7 months. There was a late death due to redissection. Last follow-up had been completed with 10 patients and all of them returned to NYHA functional class I to II.

Conclusion: Early high mortality was related with late surgical intervention in few cases. Satisfactory late result indicate that surgical procedures related with correction of aortic root pathology are low risk procedure in spite of their mechanical complexity if the intervention could be done at proper time

Role of Auto Trasfusion of Shed Mediastinal Blood in Open Heart Surgery

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Background: Current trend is to avoid the use of homologous blood transfusion during open heart surgery because of the associated risks of transfusion reactions, transmission of blood borne infections and paucity of resources. Several studies have been conducted but the role of autotransfusion is still controversial. We present here our own experience from a study conducted at our institute.

Methods: Between January 1999 to November 2000, a prospective randomized study was conducted on 45 patients (M:F 32:13) who underwent open heart operations. They were divided into 2 groups: Group A (20 patients) had autotransfusion of shed mediastinal blood during first 16 hours after surgery. Group B (25 patients) were used as control group for comparison in whom no autotransfusion was given. The amount of blood loss and autotransfused, the number of homologous blood products transfused and haematological, coagulation, microbiological and biochemical parameters were monitored.

Results: Amount of blood collected postoperatively in group A was $(1034.37 \pm 183$ ml) than group B (1108.50 ± 168 ml). Requirement of homologous blood transfusion was less in group A (693.75 ± 155 ml) than group B (1210.2 ± 211 ml), also requirement of homologous plasma and other blood components was less in group A than group B (287.5 ± 128 ml Vs 582 ± 162 ml). The baseline and postoperative haematological, coagulation, microbiological & biochemical parameters were similar in both groups.

Conclusion: Autotransfusion of shed mediastinal blood reduces the need for homologous blood products in patients undergoing open heart surgery.

Critical Values for SVO₂ and Hematocrit During Open Heart Surgery: An Experimental Study

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Objective: The purpose of this study was to determine parameters for safe performance of cardiopulmonary bypass (CPB) surgery without blood transfusion based on the mixed venous oxygen saturation (SvO₂) and hematocrit (Hct).

Method Study 1: To evaluate the general hemodynamic status at the time of weaning from CPB, normovolemic hemodilution with Dextran 40 (10%) without CPE was performed in 14 rabbits under general anesthesia. Svo₂ was monitored from the right atrium. Hemodilution was continued until cardiac arrest, and hemodynamics were continuously recorded.

Study 2: To evaluate blood oxygen saturation and hemodynamics during CPB, normothermic and moderately hypothermic CPB under the at low Hct 20% was performed for 2 hours in 13 rabbits under general anesthesia.

Results Study 1: Significant correlations were noted between Svo₂ and Hct. Svo₂ and lactate concentration, and Hct and lactate concentration during normovolemic hemodilution. Physiologically important changes in hemodynamics occurred when Svo₂ was 40%, or Hct was 12%. Significant increases in lactate concentration occurred when Svo₂ was 40%.

Study 2: Physiologically important changes in hemodynamics occurred when Svo₂ was 40%. A critical value for Hct of 10% identified animals which could be weaned from CPB.

Conclusions: The critical values for Svo₂ and Hct during CPB include: Svo₂ of 40% and Hct of 12% at the time of weaning from CPB, and Svo₂ of 40% and Hct of 10% during CPB. When Hct is 10%, it is a very critical situation irrespective of Svo₂.

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Valve Surgery on the Beating Heart

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Background: Myocardial ischemia, myocardial hypoxia and reperfusion injury are unavoidable features of aortic cross clamping and myocardial 'protection' with cardioplegia during conventional valve surgery. With the aim of maintaining aerobic metabolism, electrolyte and acid-base state of the myocardium to as physiological as possible we performed aortic and mitral valve surgery with avoidance of cardioplegic arrest and maintaining myocardial metabolism by coronary perfusion (retrograde ± antegrade).

Material & Methods: After standard normothermic CPB and aortic cross clamping the heart is kept beating by continuous warm oxygenated unmodified blood coronary sinus perfusion with intermittent antegrade (aortic root or direct ostial) perfusion. If CABG is required it is performed first on the beating heart (off pump). retrograde flow rate was kept at 75-150 ml/min and perfusion pressure at 40-50 mm Hg. The patient's temperature was maintained at 32-34°C. This technique has been used in 10 patients - MVR:7 (+CABG: 1, + TVR: 3), MV repair: 1, AVR: 2. we began this protocol by first performing it in 6 ASD repairs.

Results: Slow sinus rhythm was maintained in all patients. The CPB time was 65±15.1 min and the ACC time was 45.5±16.7 min. The need for inotropes was minimal and all patients could be easily weaned off CPB. There was no operative mortality.

Conclusions: Beating heart valve surgery avoids the deleterious effects of cardioplegia and may be especially useful in high risk cases (dilated LV, low LVEF, high PA). However we need a larger series and intermediate/long term results before it can be said to be the procedure of choice.

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Prosthetic Implantation with Total Preservation of Native Mitral Valve on a Beating Heart

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Background: The preservation of annulo-ventricular continuity through chordae tendineae helps in maintaining left ventricular geometry. This is accepted as an important determinant of improved operative results as well as long-term survival. It has also been shown that maintaining the natural direction of chordae affords better outcome. The relative tension on the chordae to ensure that they are neither redundant nor excessively shortened are important for optimal prosthetic function. This study is based on these objective.

Material & Methods: Fourteen patients (eight males) aged 14 to 56 years underwent prosthetic implantation for rheumatic mitral regurgitation on a beating heart with total preservation of the native valve. Continuous coronary perfusion was maintained with infusion of normothermic blood through the cardioplegia delivery site in a cross-clamped aorta. In all cases, the prosthesis implanted was St. Jude Medical on account of its minimal excursion into the ventricular cavity and greater wall clearance. The leaflets were circumferentially plicated using multiple everted pledgetted mattress sutures. Special care was taken to ensure optimal chordal tension. Two patients underwent concomitant tricuspid annuloplasty.

Result: All the patients could be weaned off cardiopulmonary bypass without any inotropic support of rhythm-related problems. The bypass time was somewhat longer (54 to 108 minutes) but there was no myocardial ischaemia. Two patients developed ventricular fibrillation due to excessive retraction but were promptly cardioverted. Subsequent 2-D echocardiograph confirmed good prosthetic and left ventricular function. All patients returned to NYHA functional class I.

Conclusion: Prosthetic implantation on beating heart could prove to be an interesting option for rheumatic mitral regurgitation.

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Restoration of Sinus Rhythm and Attrition Rate in Patients Undergoing Valvular Surgery and Modified Maze Procedure for Chronic Atrial Fibrillation

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Background: Cox's Maze procedure is effective in restoring sinus rhythm in patients with atrial fibrillation (AF). However, it is a time consuming procedure.

Aim: To study the restoration of normal sinus rhythm (NSR) and attrition rate in patients undergoing valvular surgery and Modified Maze procedure for chronic atrial fibrillation.

Material & Methods: We modified the procedure using radiofrequency micro bipolar coagulation to replace Cox's incisions. The additional CPB time and the cross clamp time for performing the procedure were 12 mins and 8 mins in 85 patients operated between Aug 96 and July 2000, aged 9-55 years.

Result: Early results showed that of the 76 survivors, 62 (81.58%) were in normal sinus rhythm (NSR), 1(1.3%) in junctional and 13 (17.1%) in AF. There were six late deaths. 70 patients were followed up for a period of 23.6±12.5 months. Out of these, 13 (18.58%) are in AF, 1 (1.4%) in junctional rhythm, 56 (80%) were in NSR in the short

term, while 5(9%) patients initially in NSR went into AF over the follow-up period.

Conclusion: Modified maze procedure is effective in restoring NSR in 73% patients over a two year period with a definite advantage of brief additional operative time. However, we have observed an attrition rate of 9%. Yet, the benefit of restoration of NSR with this procedure should be offered to all patients in chronic AF requiring valve surgery.

Risk Factors for Sternal Dehiscence After Coronary Artery Bypass Grafting

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Aim: To identify risk factors for development of Sternal Dehiscence (SD) after Coronary Artery Bypass Grafting (CABG) using Intermittant Fibrillatory Arrest (IFA) as method of Myocardial Protection.

Methods: We retrospectively reviewed the case records of 73 patients who developed SD after first time CABG between January 98' to December 99 in relation to risk factors (Variables) as mentioned in appendix. We analysed these variable for development of SD using multivariate analysis with 146 matched controls who were operated during the same period and who did not develop SD.

Results: Sternal Dehiscence developed in 73 (2.8%) cases following CABG. Use of bilateral IMA, bleeding more than 500 ml in first 24 hours, uncontrolled blood sugar for more than 12 hours and ventilation more than 24 hours are risk for SD. Obesity, reexploration, long operating time and long cardio pulmonary bypass (CPB) time are not significant predictors of SD. *Staphylococcus aureus* is the commonest infective associated with SD.

Conclusion: Absolute haemostasis control of blood sugar, and early extubation should be aimed for, to decrease the incidence of SD after CABG. Bilateral IMA should be used selectively on clinician discretion.

Off Pump. Total Arterial Revascularization for Redo CABG

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Arterial grafts are promising to fare better than venous grafts and the off pump surgery is proving to reduce morbidity. Combination of both, is then a better deal to offer to a patient requiring CABG.

Between Oct. 99 & Nov. 2000, we have performed 52 total arterial revascularization on beating heart for redo CABG using composite arterial 'Y' conduits of LIMA + RIMA or LIMA + Radial. Number of anastomoses were 2 to 6 and the age ranged between 52 to 80 years. There were 4 females. In one patient LIMA was recycled from the previous operation. There was no mortality and only two patients required donor blood transfusions. One patient had ECG changes of perioperative M.I., but with normal enzymes.

Off pump total arterial revascularization is a feasible proposition for Redo CABG.

Cardiac Transplantation in Scotland - 8 Year Experience

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Introduction: The programme began January 1st 1992 at the Glasgow Royal Infirmary. We reviewed the operations up to 1st January 2000 and follow-up until October 31st 2000.

Methods: There were 216 transplants (1 heterotopic); M:F - 176:40. 115 (53%) were for ischaemic heart disease, 88 (41%) for cardiomyopathy, 4 (2%) for congenital defects, 5 (2%) for previous valve operation, 3 for miscellaneous causes, 1 was a re-transplantation. Average age was 51.3 ± 10.4 (range 12-16) years. Follow up is complete.

Results: Operative (30 day) mortality was 25 (11.6%); 9 more died in the rest of that year. Thus 1 year survival was 84.3 [95% CI 78.6-88.8%], 3 and 8 year survival were 76.3 [69.7-81.5%], 74. [68.2-80.2%] and 71.2 [64.6-77.1%]. Postoperative hospital stay averaged 18.2 ± 15.4 days. 40 patients had no rejection episodes which otherwise averaged 1.99 ± 1.89 (range 0-9) episodes per patient. 62 patients suffered infective complications necessitating readmission. 47 are diagnosed as having osteoporosis. Blood urea averaged 10.2 ± 3.9 (range 4.4-27.9, mean creatinine was 144 ± 47 (range 55-220).

Conclusion: Cardiac transplantation is an established treatment for end-stage heart failure and after initial mortality patients have a good event-free life expectancy after the first year.

Constrictive Pericarditis - Surgical Management

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Between 1996 and October, 2000, 35 patients of Constrictive Pericarditis underwent surgery (Male 26, Female 9). The average age of the patients was 30 years (range 14-55 years). 15 patients were in NYHA Class II, 15 in class III and 5 were in NYHA Class IV. Ascites was present in 14 patients. All the patients were on antituberculous treatment for at least 4-6 weeks. 5 patients underwent pericardectomy through left anterolateral thoracotomy and remaining 30 through median sternotomy. The surgical time and incidence of intra operative complications were less in the effusive stage compared to the chronic constrictive stage. There was no mortality and all the patients were discharged with anti TB treatment for 3-6 months. The results of pericardectomy for constrictive pericarditis are excellent and it can be accomplished with minimum morbidity in the effusive stage than in the chronic constrictive stage.

OPCAB Versus Standard CABG - A Balanced View

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OPCAB technique for Coronary Bypass has gained widespread popularity in recent years. Although there is no multicentric comparative trials for the two procedures OPCAB is considered safer. We have tried retrospectively to compare the results of the two procedures done at our centre.

Since January 96 to November 2000 total of 2432 patient have undergone isolated Coronary Bypass Surgery. Our of this only 164 (7%) patients underwent OPCAB and remaining 2268 (93%) patients underwent standard on pump CABG. All on pump patients had intermittent cross clamp for myocardial protection with mild

hypothermia. OPCAB procedure includes median sternotomy and thoracotomy. OCTOPUS was the most commonly used stabilizer, but many other types of stabilizing devices were also tried. The hospital mortality in OPCAB group was nil. (0%) and 18 (0.6%) in standard group, but 6 months mortality in OPCAB patient was higher. 2.4% on OPACB group and 0.5% in standard CABG group. Beside comparing the results, we have tried to compare the ease of two procedures.

It is concluded that OPCAB, though safe, has morbidity not very different from on pump CABG. OPCAB is certainly a useful addition & has a definite place in the surgical revascularization of Coronary Artery Disease but cannot replace the standard technique.

Perioperative Management of Long QT Interval Syndrome

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Long QT interval syndrome (LQTS) is a syndrome with the triad of features viz long QT interval in electrocardiogram (ECG), sudden syncopal episode and malignant ventricular arrhythmias. During cardiac catheterization a 2½ year old boy with congenital heart disease developed sudden cardiac arrest. The presence of prolonged QT interval in ECG along with ventricular arrhythmia and syncope at that moment enabled to diagnose as a case of LQTS. Immediate defibrillation and betablocker (metoprolol) therapy saved the child's life. Because of high RA (Right Atrial) and RV (Right ventricular) pressure in cardiac catheterization, Fontan operation was decided. Betablocker coverage, prevention of sympathetic stimulation and avoiding the agents which prolong the QT interval; the induction and maintenance of anaesthesia were devoid of serious problems. Immediate successful treatment of ventricular arrhythmias in postoperative period with defibrillation, ventricular pacing, betablockers, magnesium and esmolol helped to manage the dysrhythmias.

Onlay Patch for Diffuse Disease of LAD

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Background: Occasionally the LAD contains such diffuse calcific atherosclerosis that an area suitable for distal anastomosis with IMA is hard to find. Most of the LAD has multiple diffuse atherosclerosis, which hindered the free flow of IMA graft. This pattern of diffuse CAD is very high in this part of the world. And to state that this occurs in the age group around 45 years prompted us to perform this procedure. In such young patient, in order to graft the IMA to LAD, we are performing an on-lay patch on these vessels. This would revascularise the whole IVS and the Ant. Wall and has prevented peri-operative infarcts in our group.

Methods: 25 reconstruction with on-lay patch was performed in patients with a mean age of 47 ± 2 years. In 10 patients saphenous vein was used and in 15 patients LIMA was used for on-lay patch on LAD. Stable angina was present in 10 patients and unstable angina in 15 patients, 19 had HTN, and 15 had DM. A long arteriotomy ($> 2\text{cm}$), IMA or SVG patch, inclusion of the atheromatous plaque

from coronary lumen are the basis of the technique. The wall of the newly reconstructed LAD consists of 60% of on-lay patch and 40% of the native LAD. We make it a point that no endarterectomy is done on LAD.

Results: Aortic cross-clamp time was 29 min., mean bypass time was 51.93 ± 2.5 min., mean surgical time was 121 ± 25 min. Operative mortality was 0%, peri-operative infarction rate was 0%, mean follow up was 6 months. All the patients were free from angina and had no cardiac events. Only one patient had been re-studied in our follow-up and that graft was patent.

Conclusion: The technology allows revascularisation of diffusely diseased LAD, which is very common entity in the population we are dealing with. The encouraging results have pushed us to perform more of these procedures hoping to attain long term patency.

Histopathology of Radial Artery

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105

Background: A bypass conduit should be free of disease before its implantation. We studied the incidence, types and degree of pathology in Radial Artery (RA) being used for CABG.

Methods: Excess RA segment after CABG in 100 patients were histologically analysed.

Result: Three arterial abnormalities were found: Intimal hyperplasia 30%. Atherosclerosis 5%, and Medial Calcification 15%. Patients undergoing Redo CABG had higher incidence of disease in their RA grafts.

Conclusion: Pre and Intra-operative assessment of RA should be done prior to harvesting of RA as a bypass conduit.

Removal of Tumour Thrombus from Rt. Atrium and IVC in a Case of Renal Sarcoma

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45 year old male presented with progressively increasing left loin lump with anorexia, marked loss of weight and painless haematuria. Investigations including CT Scan and Echo Cardiography revealed left renal tumour with extension of tumour thrombus into inferior venacava and Rt. Atrium.

Left radical nephrectomy along with removal of tumour thrombus from IVC and Rt. Atrium was done through simultaneous Sternotomy and Laparotomy using hypothermic Cardio Pulmonary bypass and Total Circulatory Arrest. TCA time was 45 minutes, protamine was used for reversal of heparinization. Post operative period was uneventful and the patient was discharged after two weeks. Patient though advised L-interferon could not afford and is still alive and asymptomatic nine month following surgery without any systemic therapy.

Partial Left Ventriculectomy (PLV) for End Stage Dilated Cardiomyopathy (DCM) in Pediatric Patients

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Recent survey on pediatric cardiomyopathy in Japan (N=135) revealed that 48% of the patients had died during follow-up. 45% of them were indicated for a heart transplantation and among them 74% had died during follow-up. We performed PLV in four end-stage DCM patients between May 1998 and April 2000.

Case I was an 8-month-old female who underwent PLV semi-urgently. Ejection Fraction (EF) increased from 10 to 25% with a marked clinical improvement. But heart failure recurred as she grew up and a heart transplantation was done at 14 months of age. Case II was a 3 year and 5 month old boy who developed a severe heart failure 2 months after a Ventricular Septal Defect (VSD) repair. Since medical therapy was unsuccessful. PLV was done electively. EF increased from 15 to 35%. He is now stable 2 years after the procedure. Case III was a 2 year and 2 month old female with chromosomal anomaly who had undergone a VSD repair, who developed a heart failure which gradually worsened in a course of 1 year, and her condition warranted large doses of Catecholamines and ventilator support. She underwent an emergency PLV but died two weeks after PLV due to hemoptysis. Case IV was a 2 year and 5 month old female, whose onset of heart failure was at 10 months of age and recovered with medical therapy. Due to the gradual worsening of her heart failure, PLV was done electively and now 7 months after PLV her condition is stable. From our experience we recommend PLV for pediatric end-stage DCM patients, in a situation where a heart transplantation is not feasible.

Result of Revascularisation in Patients with Severe Left Ventricular Dysfunction

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In patients with coronary artery disease and severe left ventricular dysfunction bypass grafting remains a surgical challenge. This study evaluates experience in 64 consecutive patients with ejection fraction <30% who underwent isolated myocardial revascularisation. The average age of the patient was 61.6+12.8 years and 52 (81.2%) were males. Fifty five patients (85.9%) were in NYHA class III or IV. Main indication for surgery included angina in 34 (53.1%), heart failure and angina in 12 (18.8%), heart failure 8 (12.5%) and critical coronary anatomy in 10 (15.6%). Mild to moderate mitral regurgitation was present in 24 (37.5%) and distal vessel were poorly visualised in 13 (20.3%) patients. Nine patients required emergency surgery due to their unstable symptomatology. IABP was inserted pre operatively in 14 (21.8%) patients for control of angina or failure. All surgeries were performed on CPB with centrifugal pump under cardioplegic arrest. Complete myocardial revascularisation was achieved in 61 (95.3%) patients with 3.6+0.7 grafts per patient, including LIMA in 58 (90.6%), left radial in 12 (18.7%) and endarterectomy in 9 (14%).

In hospital mortality was 4 (6.3%). Morbidity included use of post operative IABP in 24%, prolonged ventilation >24 hrs in 7.8%, inotropes >48 hrs in 21.8%, stroke in (1.6%), significant arrhythmias in 23.4% and pulmonary complications in 9.4%. During follow up of 1.6 years there were no deaths, angina was improved in 86.9% and heart failure was improved in 62.5% of patients. Six months post op. echo data was available in 38 patients which revealed that 81.5% of the patients had improvement in LVEF and 15.8% patients maintained

their pre operative LVEF following myocardial revascularisation.

These results support the use of coronary artery bypass grafting in patients with severe left ventricular dysfunction. Short term survival is encouraging with good relief of symptoms in most patients. Echo data supports that revascularisation maintains or improves LVEF in these subset of patients.

The Pulmonary Autograft in Infants and Children

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Objective: To review the experience with Ross operation in infants & children in Royal Children's Hospital, Melbourne, Australia.

Methods: A retrospective review was performed from 1995 to August 2000. The clinical details, aortic valve findings, operative details and postoperative course was recorded.

Results: Thirty three infants, children and teenagers underwent surgery (21 males, 12 females), with a median age 8.6 years (18 days-18 years), including two neonatal patients. The pathological lesions included congenital aortic stenosis (21 patients), pure aortic regurgitation (AR) (5 patients), aortic valve endocarditis (3 patients), complex LVOTO (3) and combined aortic & mitral valve stenosis (1). 20 of these (60%) had undergone previous balloon valvuloplasty procedures. Surgery was performed as a root replacement in 32 patients and subcoronary placement in one patient, with an associated Konno's procedure to enlarge the LVOT in 9 patients and associated mitral repair in one patient. The cross clamp time was 118 minutes and mean bypass time was 192 minutes. There have been no early and no late deaths (100% early & late survival). But there was important morbidity-LVAD support in 2 patients (neonates), hemorrhage requiring re-commencement of bypass or reoperation (5), significant early sternal infection (2) and late false aneurysm requiring reoperation (1). The median postoperative stay was 7 days. Aortic valve function has been good in all patients, with no more than trivial AR. However, for the pulmonary homograft, 7 patients have Doppler gradients on echocardiography of over 15 mmHg and 6 patients have asymptomatic pulmonary regurgitation.

Conclusion: The Ross procedure provides good functional outcome, and can be done with low mortality, but the important morbidity related to the procedure mandates care at every level of surgical management. The long-term fate of the neo-aortic valve and the pulmonary valve homograft remains to be seen.

CABG in Patients with Severe Dysfunctions - AIMS Experience

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Severe left ventricular dysfunction is associated with increased risk for coronary revascularisation and accordingly the morbidity and mortality become incremental in patients undergoing surgery. Ejection fraction less than 30% are considered to be indicative of severe LV dysfunction.

In our series of 850 cases of CABG performed between Sep. 1998 and Nov. 2000, 53 cases were having Ejection Fraction less than 30%. Patients belonged to the age group varying from 36 years to 75 years with a mean age of 56. 44 cases had severe triple vessel disease. There were 4 emergency operations and one redo CABG. CABG was done under CPB with hypothermic fibrillatory arrest. RCA was grafted on beating heart while LAD and OMs under intermittent cross clamping of the aorta. LIMA was used in 7 cases. 10 cases needed endarterectomies. Elective IABP insertion was done in 7 cases. Mean CPB time was 50 mins.

Major postoperative complications included prolonged ventilation with need of tracheostomy in 3 cases. Acute renal shut down requiring dialysis in 2, wound infection 1 case. Most of the patients were discharged on the 8th day. Only 2 cases needed 30 days stay in the hospital. There were 2 postoperative hospital deaths accounting for 3.8% mortality. At short-team follow up of 2 years, 50 patients are alive and have shown improvement in their NYHA class of angina and dyspnoea. Ejection fraction has improved to more than 40% in 35 cases.

This paper is intended to highlight the excellent result obtained by our method of myocardial protection as well as the beneficial role of CABG in patients with low Ejection Fraction. It is our opinion that elective IABP is proactive approach to avoid perioperative myocardial insult.

Acute Haemoconcentration During Anaphylactic Shock - Case Report

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45 years old euglycemic male with triple vessel disease and unstable angina was scheduled for elective CABG. His biochemical parameters all were within normal limits. He had no known history of allergy. His pre-CPB period including anaesthetic induction was uneventful. He received four grafts (LIMA-LAD, SVG x3) on CPB using warm heart, warm blood cardioplegia technique. He came off CPB and heparin reversal was done with protamine as usual. Half an hour later, during skin closure, patient developed sudden hypotension, which did not respond to vasopressor, volume replacement and inotropes. Hence the chest was reopened immediately. The heart was contracting well and the grafts were functioning normally. There was no sign of myocardial ischemia and the heart was empty (RV-kissing sign). Simultaneously the airway pressure went up and O₂ saturation came below 90%. Anaphylactic reaction was suspected and Adrenaline infusion was started. ABG during this period revealed low PO₂, high PCO₂, no metabolic acidosis and haematocrit of 59% with haemoglobin value of 20 gms%. Corticosteroids were given and heparin 5000 IU was administered intravenously. 500 ml of blood was withdrawn and volume replaced with colloids. Patient responded well with this management and became haemodynamically stable. Except for skin rashes on his body, in the ICU, rest of his postoperative course was uneventful.

We conclude that this acute haemoconcentration was due to capillary leakage and sudden shift of intravascular fluid into interstitial space, probably as a result of delayed anaphylactic reaction to protamine.

Modified Ross Procedure: The Aortic Valve Procedure for the Young

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The disadvantages of mechanical and bioprostheses for Aortic valve replacement prompted our interest in the Ross procedure for young patients. We report our results in 32 cases of the Modified Ross Operation since June 1997. The Male to Female ratio was 9:23, age ranging from 4 months to 35 yrs. There were 25 cases of rheumatic pathology, 4 cases had Congenital AR and 3 patients had AR due to Endocarditis. The hemodynamic lesions were AR in 22, AS in 10,

associated MR in 5 and one of them had GR IV TR, and 2 patients had associated VSDs. 27 cases were of the Autograft procedure alone, 5 patients had associated Mitral Valve Procedures-3 repairs and 2 replacements, and one patient had Tricuspid Valve repair. The RVOT was reconstructed with Gore-Tex tube Graft in the initial 6 cases, Gore-Tex tube with implanted Autologous Pericardial Valve in 11 cases, Gore-Tex tube with re-implanted patient's own Aortic Valve cusps in 14 patients, and BIOCOR Valves in 1 patients.

There was one early mortality (a four month old infant with endocarditis). There was an average improvement of one NYHA class postoperatively. Post op echocardiography showed no AR in 22 patients, Grade I 7 patients and Grade II in 2 patients. We conclude that the Modified Ross procedure is an useful alternative for Aortic Valve replacement of the young.

Omentoplasty or Continuous Irrigation for Post OP Mediastinitis

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Over the past 5 years. A total of 18 patients have required management for mediastinitis in the immediate post op period. Of these, 10 patients underwent omentoplasty as a primary procedure, 4 underwent omentoplasty following continuous irrigation with 0.5% betadine for a period of 3-5 days and 4 cases were managed with continuous irrigation alone.

Of these 18 cases, 8 were CABG cases and 10 were valve replacement cases. 2 CABG cases and 2 valve replacement cases died due to septicemia. None of the patients who underwent omentoplasty for the management of postop mediastinitis died.

Wound healing, duration of antibiotic therapy and other complications were significantly less in the group that underwent omentoplasty as a primary procedure for postop mediastinitis.

Superiority of Mitral Valve Replacement with Preservation Subvalvular Structure to Conventional Replacement in Mitral Valve Disease: Our Experience with Modified Technique

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Mitral valve replacement with preservation (MVRP) of the subvalvular apparatus has been proven to be superior to conventional mitral valve replacement. We devised a simple modified MVRP method. In this prospective, a randomized study to investigate the clinical effects and follow up with echocardiography results of MVRP compared with MVR in patients with severe mitral insufficiency (MI).

Between 1992 to 1999, 220 patients with severe MI (196 rheumatic, 24 congenital) with or without stenosis underwent MVRP. They compared with 300 patients who underwent MVR during the same period: In MVRP patients the anterior and the posterior leaflets were imbricate between the annulus and the sewing ring of the prosthesis. Clinical data were collected. Echocardiography examination were performed before and 10 days, 6 months and 1 year after surgery.

There were no preoperative differences in patient data, the cross clamp time was 5 min longer in MVRP patients, the various parameters like ejection fraction, postoperative haemodynamics and inotropic requirements, arrhythmias were assessed. We found that the results of MVRP were quite superior to MVR without the risk of LVOT obstruction.

This modified MVRP technique is simple, effective without the risk of LVOT obstruction. In severe rheumatic MI the outcome of

MVRP is superior to that of conventional, MVR in terms of mortality, postoperative care needs, LV function and heart dimensions.

"Danielson's Repair for Ebsteins's Anomaly:

A Report of Three Adult Case

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Ebstein's anomaly of the tricuspid valve is a fairly uncommon congenital. Patients present at various stages of their natural history. This paper examines three cases of Ebstein's anomaly operated by the authors in two major teaching hospitals of Calcutta. All the patients were adults (ages 23, 24 and 37). Two were males and one female. All the patients presented in adult life (mean age 28 years) and reported to the hospital with cyanosis and congestive heart failure. All the patients suffered from supra-ventricular tachycardia, though WPW syndrome could not be documented in any case. Mean atrialised RV was 3.0 cm. All patients had a fairly large PFO. The anterior cusp was displaced in all cases with an atrialised Right ventricle. Gross TR (gr IV) was present in all cases.

All the cases underwent Danielsons repair of the TV. The PFO was closed with a patch. There was no hospital mortality and all patients were asymptomatic in 2 years, 6m and 8m of follow up.

Follow up echo has shown that gr I TR has persisted in all the cases.

The study concludes that modified Danielsons repair can be done for adult Ebsteins anomaly with excellent short term results.

Surgical Treatment for Ebstein's Malformation

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Patients suffering from Ebstein's anomaly and severely impaired right ventricular (RV) function present with difficult postoperative course. Surgical experience of 59 cases with Ebstein's malformation was analysed retrospectively from January 1985 to December 2000. Huge right atrium, thin atrialised portion of right ventricular wall were the pathologic character. Septal and posterior leaflet were absent in almost all cases. Anterior leaflet was hypoplastic in 9 cases. Chordal and papillary muscles were hypoplastic. Our initial method of repair was that described by Hardy and Roe with refinement and advancement of surgical technique we started using Mayo clinic repair (G.K. Danielson) from 1993 onwards. Reconstruction of tricuspid valve which consisted of plication of the atrialised ventricle and tricuspid valve annuloplasty was done in 47 patients. Tricuspid replacement done in 3 cases was indicated when there was a seriously maldeveloped anterior leaflet. A Bidirectional Cavopulmonary anastomosis (Glenn) was added in 16 patients. The hospital mortality was 7%. The main cause of death were low cardiac output, arrhythmias and right heart failure. Early surgical intervention is recommended for all Ebsteins who have symptoms and cardiac enlargement.

Ebstein's Anomaly of the Tricuspid Valve - A Single Centre Experience

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Ebstein's anomaly of the tricuspid valve is not an uncommon condition. Between April 1986 to October 2000, 10 cases of Ebstein's

anomaly were operated upon at G. Kuppuswamy Naidu Memorial Hospital, Coimbatore. 40% of the patients were operated in the third decade of life with an age range between 7 - 32 years and a mean of 21 years. Six out of the ten patients were females. Seven patients had tricuspid regurgitation as the predominant lesion and one had tricuspid stenosis. One patient had both tricuspid stenosis and regurgitation. Five patients had preoperative tachyarrhythmias and one had evidence of heart block. Remaining four patients were in sinus rhythm. None of them had any evidence of cardiac decompensation. Two patients had tricuspid valve replacements with mechanical valves early in our experience and the remaining eight had Danielson's repair of the tricuspid valve. The average CPB time and the ACC time were 68 min and 41 min respectively for repair and 54 min and 35 min respectively for replacement. There was no operative mortality. Three patients had persistence of tachyarrhythmias and one continued to have evidence of bundle branch block. Two patients had moderate TR on follow-up echocardiography but without any clinical evidence of cardiac failure. Follow-up period ranged from 4 months to 8 years (with a mean of 4.2 years). There was no incidence of valve thrombosis or new arrhythmias in any of these patients nor was any kind of cardiac decompensation seen. Results confirm that repair of the tricuspid valve for Ebstein's anomaly had low morbidity and judging by our experience, if repair is not possible, a valve replacement is a viable alternative.

Diffuse Disease Not a Contraindication for Off-Pump CABG

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Background: Off pump CABG is probably the most physiologic way to achieve coronary revascularisation. Diffuse disease has been cited as one of the contraindications for beating heart surgery. We however have found that an endarterectomy is actually technically easier on a beating heart as the regular constrictions of the heart help greatly in the traction-counter traction which is essential for the closed technique.

Material & Methods: We have performed endarterectomy on the RCA in 20 patients off pump. This is done only if there is no bypassable distal vessel or if there is a calcified plaque which will not take suturing. An arteriotomy 3-4 cm long is made just above the crux cordis. A plane of cleavage is now developed using specially designed endarterectomy instruments. The atheroma is first gently pulled from the proximal artery and chamfered. Distally the core is gently everted and peeled using the regular beat of the heart to give a gentle countertraction. Care is taken to ensure that all branches are removed cleanly with a feathered tip one at a time. A video of the technique will be shown. CABG is then carried out.

Results: 15 male and 5 female patients underwent uneventful endarterectomy on a beating heart. Angiography in 5 showed a good distal run-off.

Conclusions: Diffuse disease requiring endarterectomy is not a contraindication for off pump CABG.

Lessons Learnt During Development of Off Pump CABG

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Introduction: There has been a surge of interest for beating heart CABG. We have over the years developed a programme for off pump CABG which began with performance of simple' single anastomosis

off-pump with the patient cannulated and the other grafts performed in a conventional way.

Material & Methods: 500 patients have undergone off pump CABG-250 of these have been multivessel global CABG and the rest single and double grafts. We have tried all the current mechanical stabilisers but have opted for the physiological and cheap pericardial stabilisation technique. For avoidance of ischemia retroperfusion of the coronary sinus with oxygenated blood is used. We have used intraluminal shunts very selectively for large right coronary arteries. We have found that diffuse disease requiring endarterectomy is not a contraindication for off pump surgery - in fact endarterectomy is facilitated by the beating heart itself. Similarly we utilise the pericardial adhesions to give stabilisation in re-do cases. In high risk cases we would prefer to use an IABP and avoid CPB.

Results: 500 patients underwent off pump CABG. There was no compromise on the degree of revascularisation, use of arterial grafts or tackling of diffuse disease. Postoperative morbidity in terms of neurological, pulmonary, renal, inflammatory and cardiac parameters was much less in the off-pump as compared to the on pump cases. ICU and hospital stay was significantly reduced with an overall cost saving of US\$ 1,000 per patient. Angiography showed a 97% patency rate.

Conclusion: Off pump CABG can be safely carried out without compromising the safety, completeness and efficacy of the revascularisation.

Thoracic Trauma : Analysis of 1000 Patients

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Background: Study was conducted to assess the incidence, presentation and outcome of thoracic trauma with or without associated injuries in 1000 consecutive cases of PGIMER, Chandigarh, between Jan 98 to Sept 2000.

Methods: All patients were admitted to emergency surgery department of PGIMER. They were divided into different age groups. Injuries were classified as either blunt or penetrating and further defined according to mode of injury. Associated injuries were noted. Indications for surgical interventions, mechanical ventilation were studied.

Results: Age ranged from 3 to 84 years with 825 male and 175 females. 75 patients were less than 20 years, 375 patients were 21-40 years, 315 patients 41-60 years and 135 were more than 60 years. Blunt thoracic trauma was present in 762 patients, remaining had penetrating injuries. The road side accidents were the most common mode of injury seen in 758 patients, assault and fall in others. Isolated chest trauma occurred in 530 patients, others had associated injuries. Most common finding was haemothorax seen in 275 patients. 788 were managed conservatively and 122 patients required surgical intervention, out of which 85 had immediate surgical intervention. 97 patients with flail chest required mechanical ventilation.

Conclusions: Young male population is more vulnerable to thoracic trauma and majority of them can be managed conservatively (Tube thoracostomy). In flail chest, selective use of ventilatory support is required. Careful allocation of emergency services with proper back up of ICU and appropriate surgical intervention can save many valuable young lives.

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Intra Cardiac Repair for Ventricular Septal Defects with Right Ventricular Outflow Tract Obstruction Significance of PRV/PLV in the Early and Late Post Operative Outcome

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Ventricular Septal Defect with Right Ventricular outflow obstruction is a common Congenital Heart Disease.

55 cases were operated (Jan. 1999 to Dec. 2000) in our institution in which TOF consists of 39 cases, DCRV with VSD 9 cases, DORV with PS 2 cases, TOF with absent pulmonary valve 5 cases. The mean age of the patients is 10.6 (range 1 year to 27 years). Post bypass PRV/PLV measured immediately after discontinuation of CPB.

Results: 41 out of 55 patients needed transannular path. The PRV/PLV ratio 0.7 to 1.0 in 14 cases and more than 1 in 7 cases. Resection and revision of patch done in 6 cases. After re-correction PRV/PLV came down operative period due to low output. Only one case expired in a group 0.7 to (14 cases).

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Two Cases of Billiopysis

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Background: To diagnose and treat billiopysis due to bronchobiliary fistula a rare disorder.

Methods: Two patients presented with billiopysis. Diagnosis was confirmed by Fibre Optic Bronchoscopy, C.T. scan (Chest) and Endoscopic retrograde cholangio pancreatography. The etiology in these 2 patients was chronic liver abscess. They were surgically treated. The first patient underwent Right Lower Lobectomy as the Right Lower lobe was badly diseased. The second patient was treated by drainage of the abscess and closure of air leak in Right Lower Lobe.

Results: Both of them had made uneventful recovery and surgical closure is the treatment of choice in these very symptomatic patients.

Conclusions: Surgery offers beneficial treatment in these rare cases of billiopysis.

Non-Anatomical Resections of Culprit Segments for Diffuse Bilateral Bronchiectasis

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Background: Diffuse bilateral bronchiectasis is traditionally considered contraindication for surgery. But significant haemoptysis and recurrent lower respiratory infections affect the quality of life. We offered non-anatomical resections with good results in such cases.

Methods: Patients referred for surgery because of recurrent severe haemoptysis, recurrent suppuration. Patient prepared with antibiotics, mucolytics, postural drainage, bronchodilators, vigorous chest physiotherapy. Culprit segments identified by bronchoscopy,

high resolution CT scan of the chest and intraoperative assessment. Involved segments are resected like wedges with clamps and sutures. Perioperative analgesia with continuous thoracic epidural infusion of bupivacaine, fentanyl with chest physiotherapy to minimize P.O. infections and pulmonary morbidity.

Results: No mortality, No recurrence of haemoptysis. Marked decrease in respiratory infection. No air leak problems. No pleural space infections.

Conclusions: Non-anatomical resections of culprit segments are a good option for patients with diffuse and bilateral bronchiectasis, who present with recurrent haemoptysis, and recurrent chest infections. They offer good immediate palliation and improve quality of life.

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Unusual Presentations of Diaphragmatic Lesions— A Retrospective Study

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Objective: This is a retrospective study of five patients who presented to Gandhi Hospital, Secunderabad in September, 2000 with unusual manifestations of diaphragmatic lesions. The unusual features are discussed.

Patients and Methods: In September 2000, five patients with different manifestations of diaphragmatic lesions were treated at the Department of Cardiothoracic Surgery, Gandhi Hospital, Secunderabad. The case records were analysed retrospectively. All patients underwent surgery. The approach was transabdominal in one and transthoracic in four. Out of four Transthoracic approaches 2 were anterolateral & two posterolateral. In all cases repair was done in two layers using non absorbable sutures. There was no mortality and all cases are under follow up.

Discussion: One patient was referred to CT Surgery with correct diagnosis and the other four patients were admitted under other specialities with nondiaphragmatic diagnoses. This shows how often the diagnosis is missed. In all cases symptoms were non specific like dyspnoea, chest pain, vomiting, fever etc., Brief review of the cases, is as follows:

Case	Admission diagnosis	Final diagnosis
1.	Left Hydropneumo thorax	Acute Herniation of stomach through foramen of Bochdalek.
2.	Abdominal tuberculosis	Chronic Herniation of smallbowel through an anterolateral defect.
3.	Polytrauma with fracture forearmbones, left.	Rupture diaphragm with acute herniation of stomach, spleen, omentum.
4.	Lt. Haemothorax/Pleural effusion	Rupture of Lt. dome with herniation & ruptured stomach into Lt. pleuralcavity.
5.	Eventeration of Diaphragm, Lt. dome.	Diagnosed correctly

Conclusion: Diaphragm lesions are often missed by the 1st clinician/GP due to their rarity and non-specific clinical features and confusing radiological features. Hence referral to the C.T. Surgeon is often delayed. Once diagnosed the treatment is simple and straight forward with good results. There is a need to sensitize Primary Care Physicians.

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Two Interesting Cases of Chest Wall Tumours in Pediatric Age Group.

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Case-1: 9 Years, Muslim, Male admitted with 6 months H/O. painful swelling on Left upper part of chest and intermittent fever. A firm and tender swelling with diffuse margins was noted. ESR : 40 mm 1st. hour, Mantoux test: Negative, CXR showed a SOL in Lt. Upper zone with 2nd to 4th ribs erosion. USG guided FNAC: Small cell Carcinoma. Three pulses of Right relieved pain with diminution in size of mass.

Exploratory thoracotomy revealed a solid oval mass (5*8 cms) involving 2nd to 4th ribs and adherent to pleura. On cutting gritty sensation noted and multiple small spaces filled with blood (honey-combing) was found. HP report showed an Osteoblastoma like Osteogenic Sarcoma.

Case-2: 1 year 3 months, Hindu, Female admitted with a swelling (6x4 cm) of right anterior chest wall over 6th to 8th rib on mid axillary line giving H/O. excision 6 months back and recurring after 2 months. FNAC showed a lipoma (fat globules with spindle-shaped mesenchymal cells) without malignancy.

O/E: Firm, nontender swelling with diffuse margin noted on anterolateral chest wall. Routine investigations revealed moderate anemia. CXR -? Kochs infiltrations (mid and lower zone), erosion of 6th to 8th rib. CT Scan: huge intra-thoracic extension of tumor mass (encapsulated) with lung compression and rib erosion. No lymph node enlargement. Biopsy was done on admission and HP examination showed a Fibrolipoma.

Tumor which had extra and intrathoracic extension was removed enmasse along with excision of 3 ribs (6th x 8th) and a part of skin. The chest wall was reconstructed.

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Horner's Syndrome Due to a Posterior Mediastinal Tumor – A Rare Presentation

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Posterior mediastinal tumours are usually neurogenic and sometimes have an unusual presentation.

A 65 year old man presented in Neurology out patient department with a classical left sided Horner's Syndrome. He was evaluated and on chest X ray, a left apical mass was found. He was advised further evaluation and treatment, but patient refused further management. One year later, he came for review and a repeat chest X-ray showed no change in the shadow. CT Scan showed it to be a posterior mediastinal tumor and patient consented for surgery. A left thoracotomy was done and a large firm tumor was removed from the chest wall near left apex. The patient made good recovery. Histopathology revealed a Schwannoma, a benign tumor, possibly compressing the left cervical sympathetic chain.

We present this case because of the rare mode of presentation, and the good prognosis of such tumors.

"A Prospective Randomised Study of Comparison of Different Modalities of Post Thoracotomy Analgesia"

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Continuous thoracic epidural analgesia is considered by many the gold standard for post-thoracotomy pain control but is associated with its own complications. In this study we compare various common modalities of post-thoracotomy analgesia in 100 patients who underwent thoracotomy for various diseases from August 1998 till March 2000 at our institution. In a prospective fashion, 100 patients were randomized into five study groups of 20 each to receive different modalities of post-thoracotomy pain control. Bupivacaine and/or Fentanyl was administered at various concentration as Group 1- intercostals block; Group 2- local wound infiltration with intercostals nerve block; Group 3-epidural injections, Group 4- intrapleural injections and Group 5- extra pleural paravertebral injections. Preoperatively the patients' functional status was assessed using bedside PFT taking FVC, FEV1, FVC/FEV and MMV as target pulmonary functions. In the postoperative period, the patients were assessed at regular intervals using sedation and pain score. Their first requirement of additional injection of opioid and its total dosage required over the next 24 hours were recorded. The functional status was reassessed after 48 hours of surgery using bedside PFT. These 5 groups were compared against a cohort of control group of equal no. of patients where conventional regular postoperative parenteral opioid analgesia was employed. In the study group 1 through 5 the opioid requirement was significantly less (study average-0.75 mg/kg/d, control-5 mg/kg/d). The continuous Para vertebral injection of the combination of Bupivacaine (0.125%) and Fentanyl (1 ug/ml) delivered via a suitably placed catheter provides the maximum analgesia and faster recovery of PFT status. We recommend continuous paravertebral extrapleural infusion of local anaesthetic as an improved method of post-thoracotomy analgesia.

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Thoroplasty Revisited

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We have performed Thoroplasty in 326 patients for the past thirty years. For 169 patients it was done to collapse tuberculous cavities as a staged procedure. In 98 patients it was done as a space filling procedure for empyema and bronchopleural fistula. In 59 patients it was done for post pneumonectomy empyema.

During the early period the procedure was done under local anaesthesia. Apiculosis costotransversectomy in T.B. cavities which are situated in the apical and posterior segments of upper lobe and superior segment of lower lobe. If there is functioning underlying lung the procedure has to be staged. Otherwise it can lead to severe paradoxical respiration and respiratory failure. In post pneumonectomy patients with or without bronchopleural fistula it can be done as one stage procedure and the 1st rib need not be removed.

In conclusion Thoroplasty is a useful procedure in Tuberculous patients who are not fit for resection surgery and as a space obliterating procedure in empyema.

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Median Sternotomy Approach for Closure of Bronchial Fistula: Case Report

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Post pneumonectomy bronchial pleural fistula is a difficult condition to treat due to infection and unhealthy bronchus with limited access to length of bronchus.

For one of our patients a female of 47 years, a case of right sided BP fistula after trying twice for closure of BPF through the thoracotomy and once through bronchoscopy we tried a median sternotomy approach and we were successful in closure.

After a median sternotomy the pericardium is incised and the right pulmonary artery ligated. Aorta and SVC retracted. Healthy bronchus stapled. Pericardium closed.

With this technique many patients can be benefited. By approaching healthy and non infected bronchus chances of recurrence will be less.

Stag Horn Bronchial Fibroma treated by Lower Lobectomy and Segmental Resection of the Main Bronchus

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A male aged 38 yrs presented with recurrent respiratory infection. Chest X-rays and CT revealed collapse of the left lower lobe with isodense solid intra luminal mass in the left lower lobe bronchus. There was compensatory emphysema of the right lung. Bronchoscopy revealed a smooth rounded mass occluding the left lower lobe bronchus and protruding into the left main and upper lobe bronchi. Biopsy was not done.

He was operated on June 14th, 2000 in the supine position. Left anterolateral thoracotomy was done. The lower lobe was collapsed. The upper lobe was not inflating fully. The oblique fissure was ill defined. The pulmonary artery to the lower lobe and inferior pulmonary vein were ligated. The tumour was palpably adherent to the posterior wall of origin of the lower lobe bronchus. Bronchotomy in the anterior wall led to popping out of the intraluminal extensions of the tumour into the left upper lobe and main bronchi. The tumour was based on the origin of the lower lobe bronchus extending into the left main bronchus. It was also extending intraluminally into the distal lower lobe bronchus. The tumour was removed along with the lower lobe and a segment of the inferior wall of the main bronchus. Bronchi closed with interrupted ethibond sutures and covered with adjacent pericardial fat.

Post operative course has been uneventful except for recurrent respiratory infections. The left upper lobe remains aerated in December 2000. The histopathological study of the tumour with 3 horns, reveals a fibroma with no adenomatous elements.

A Case Report of Stricturoplasty (Esophagoplasty) of Esophagus in a Post Operative Myotomy for Achalasia Cardia

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We present a case of 20 year old girl, post operative cardiomyotomy for achalasia cardia seven years back with stricture esophagus. We did stricturoplasty with modification. Patient had dysphagia of one month. Had history of taking analgesics. Esophagoscope could not be passed beyond 39 cm. Barium swallow

showed complete holdup. Thoracotomy revealed narrowed segment, like pre-op achalasia. Did remyotomy and tried to pass Ryle's tube which could not be passed after myotomy. Esophagus opened longitudinally including the mucosa. The mucosa was fibrosed and puckerred to a pin point. The lower end of the esophagus and fundus was mobilised & pulled into the abdomen after laparotomy. Repaired the esophagus by stitching transversely making the lumen 2-3 cm wide. And reinforced by anchoring the fundus maintaining the angle (Not in true sense of fundoplication). Ba-swallow showed good lumen size. Results of Heller's operation vary considerably and reflux is reported in 1-30% cases. Results of myotomy only are extremely satisfactory.

Some surgeons combine antireflux procedures with myotomy for fear of reflux esophagitis. In our opinion this anti reflux procedure is unnecessary as it has potential danger as over zealous plication of fundus to the akinetic segment of the esophagus can lead to postop dysphagia. So we can conclude that our procedure is better in selected cases of post myotomy stricture as we took care of reflux though not being overzealous.

Surgical Management of Lower Oesophageal Malignancies – A Study of 18 Cases

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18 consecutive cases of oesophageal malignancies admitted in the Cardiothoracic department of N.R.S. Medical College between a period of 16.12.99 to 10.08.2000 were included in the study. Special reference was given to the mode of management, all being managed surgically, (either palliative or definitive) followed by chemotherapy. Patients ranged within an age group of 32 years to 73 years, male predominating. History of spicy food intake and addiction to tobacco was found in a majority of cases. Dysphagia was a major complaint, and pallor and weight loss were the most important clinical findings. All patients underwent Ba-swallow and endoscopy apart from routine investigations. Endoscopic biopsy showed 9 cases as squamous cell CA, 5 as adeno CA, 1 as leiomyosarcoma, rest inconclusive.

Definitive surgery was done in 11 cases, maximum underwent - subtotal gectomy, lower oesophagectomy with local clearance and oesophago-gastric anastomosis. Transhiatal was done in 2 cases. palliative surgeries done in rest of the 7 cases were colon bypass (2 cases), oesophageal dilatation and feeding jejunostomy (2 cases), distal-oesophagectomy and proximal gastrectomy with oesophagogastric anastomosis (3 cases).

Patients were followed up for 3 to 9 months. Study had 2 positive effect: (a) low mortality as compared to the mortality status of oesophageal malignancy in general. (b) An improved quality of life could be gifted to the patients by restoring the ability to swallow.

10 Year Experience of Esophagogastrectomy in Cancer Esophagus at SKIMS, Srinagar

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Carcinoma Esophagus is a dreadful disease because of the nature and distress of symptoms. Early detection and treatment is of crucial importance. We have reviewed our experience of 108 patients of carcinoma esophagus who underwent esophagogastrectomy in last 10 years (1991-2000). Males were 68, females were 40, with age range of 22-65 years.

58 (53%) patient had lower 3rd esophageal tumour, 33 (31%) had

G.E. Junction tumour while 17 (16%) patients had mid-esophageal tumour. All these patients had standard esophagogastrectomy (Ivor-Lewis), pyloroplasty and feeding jejunostomy. 8 patients died postoperatively because of anastomotic leak, 28 had wound sepsis, two had DVT and 8 patients had empyema thoracis that responded to conservative treatment.

We conclude that standard esophagogastrectomy with intrathoracic anastomosis can be quite rewarding in these otherwise miserable patients.

Malignant Melanoma of Gastroesophageal Junction A Case Report

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A 52 year old female presented to Govt. Medical College, Jammu with complaints of loss of appetite for 12 months duration and general weakness. The Dysphagia was for solid food. She was a diabetic on oral hypoglycaemic agents. A barium swallow revealed a polypoidal mass at lower end of oesophagus near gastro oesophageal junction which was confirmed as Malignant Melanoma, abdominal sonography did not reveal any evidence of secondaries. Patient was taken up for exploratory laparotomy which revealed typical umblicated secodaries on the superior surface of Rt. Lobe of liver as well as in the left lobe also. The growth was big measuring 8cm x 6 cm at the GE junction adherent posteriorly around the hiatus. The growth was unresectable hence palliative procedure with insertion of mousseau barbin tube was done. Post operatively patient was subjected to radiotherapy.

Malignant melanoma of the GE junction is a rare lesion accounting for only 0.1% of these lesions. Surgical treatment of GE junction melanoma requires a radical procedure with a far greater margin than for the usual squamous cell carcinoma. Intracavitary radiotherapy is also recommended as adjuvant therapy.

Corrosive Burn of Oesophagus: Management by Burdwan Technique

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This is an indigenously devised safe and simple technique of dilatation of corrosive stricture of oesophagus by a "continuous pull through method" through a preliminary gastrostomy opening. Locally available polythene tubes of graded diameters, connected end-to-end, are used as dilators. Before discharge the patient is taught "self bouginage" and is encouraged to practice self-dilatation at home. The method is eminently suitable in rural hospitals and in patients coming from remote villages with poor transport facilities. The first patient managed this way in 1981, when gumelastic bougies were not yet available in the hospital, was still doing well at 7 years follow up requiring no further hospitalization. At the Burdwan Medical College Hospital a total number of 8 patients were managed this way as a primary or a secondary procedure.

During the past 20 years, even in fully equipped Cardiothoracic Centres, often we had to resort to this technique for initial dilatation of difficult strictures, where gumelastic bougies could not be passed. Red rubber catheters or silastic tubings of graded diameters have also been used but the ordinary polythene tubings have a certain advantages over others. When dipped in hot water, a polythene tube becomes much softer and introduction becomes very easy, but once inside the oesophagus, within a few seconds it becomes rigid, thus dilating the stricture further.

Pulmonary Sequestration-Our Experience with 4 Cases

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Pulmonary sequestration is a very rare congenital anomaly of lung development. A high index of suspicion is necessary for the preoperative diagnosis of this condition. We present our experience with 4 cases of Pulmonary Sequestration in our Institute during the last 5 years.

All four patients were female, in the age group of 20 to 35 years. Three patients presented with cough and sputum and one patient with hemoptysis. Two of them had a suspicious lung shadow on chest x-ray and an aortogram was done; it showed the abnormal artery from the descending thoracic aorta. The other two patients were diagnosed as bronchiectasis and the correct diagnosis was made at the time of dissecting the inferior pulmonary ligament. The right lower lobe was involved in two patients and left lower lobe in two patients. All four patients had intra lobar type of sequestration and all made good recovery.

Elosser's Flap Operation - GMC Jammu Experience

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Between 1994 to 2000, 40 patients underwent Elosser's flap operation at GMC Jammu. They included 27 male and 13 females with age range from 14 to 70 years. The indications of surgery were chronic empyema in 22 patients, tubercular empyema in 7 patients, Empyema with bronchopleural fistula in 8 patients and Post pneumonectomy space infection in 3. Aims of the study was to assess the response to this modality of treatment. The response was in from of spontaneous closure in 27 definite surgery was taken up in 3 patients and 10 were lost in follow up.

Post operative follow up was carried out at 1 month, 3 months, 6 months and yearly intervals and assessment was done by clinical examination, amount of pus discharge, skiagram for assessment of cavity size and fitness for subsequent definite procedure. 18 patients had pus discharge, positive for different group of organism that were managed by appropriate antibiotics. The study highlights the use of Elosser's flap in three ways, it makes the patient ambulatory by getting rid of tube drainage. It can lead to complete healing of empyema/ bronchopleural fistula thereby obviating the need of major procedure and finally in sick patients helps to recover to be taken up for subsequent definite procedure.

Surgery in Bronchogenic Carcinoma

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In our experience in the past 4 years we have diagnosed 386 cases of bronchogenic carcinoma. Adenocarcinoma (42%) was the most common among them followed by Squamous Cell Carcinoma (23%), Small Cell Carcinoma (11%), Carcinoid (5%), Large Cell Carcinoma (4%) and others (15%). Central type of bronchogenic carcinoma were mostly diagnosed by bronchial punch biopsies whereas percutaneous Transthoracic biopsies were diagnostic in peripheral tumours. Diagnostic thoracotomy was done in 5% of the cases. 140 of our patients were diagnosed in a resectable stage which only 106 patients turned up for surgery. On clinical examination we specifically look for clubbing, supraclavicular lymphadenopathy and local chest wall

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tenderness because this alters the treatment procedure. Chest wall resection was done in 6 cases with chest wall reconstruction using Gortex patch (3 patients) and Prolene mesh (3 patients). Radical pneumonectomy with intracardiac ligation of pulmonary vessels was used in 6 cases. Frozen section was used to get clear bronchial margins in all cases. Surgery is still the best modality of treatment in Bronchogenic Carcinoma.

Single-Stage Minimally Invasive Approach of Anterior Minithoracotomy for Bilateral Pulmonary Hydatidosis

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Hydatid disease of the lung is one of the commonest surgical entities in Kashmir. Bilateral lung hydatid cysts are rare but pose a challenge to a thoracic surgeon in terms of accessibility and hospital stay. We report an analysis of 12 patients with bilateral disease, selected amongst a prospective group of 142 patients. Instead of posterolateral thoracotomy and median sternotomy approach, we subjected all of 12 cases to single-stage bilateral Anterior Minithoracotomy. The objective of the study was to find out an alternative approach which is applicable to inaccessible situations, is less painful and could shorten the hospital stay. Primary diagnostic tools were chest radiogram and serology. Mean hospital stay was 4.6 days. Morbidity was negligible and mortality rate was zero. In contrast to conventional one, this approach is economic, convenient, minimally invasive; less painful and provides prompt postoperative recovery. It is associated with insignificant per-operative hemorrhage.

Aspergilloma Lung-Clinical Profile and Surgical Outcome

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Between Jan'97 and Nov'2000, 5 cases of aspergilloma of the lung were treated. Their ages were 24, 32, 37, 42 and 59 years. 4 were male and one female. While 3 presented with recurrent mild to moderate hemoptysis, one presented with chronic cough and expectoration, and one with fever and eosinophilia. While three of the patients were diabetic and with a past history of sputum positive for pulmonary tuberculosis, 2 had an overall presentation suggestive of pulmonary tuberculosis in the presence of a negative sputum for AFB and were on Anti-tubercular chemotherapy. 4 patients had a pre-operative diagnosis of aspergilloma made based on the typical radiological feature-the Fungus ball; one was operated with a pre-operative diagnosis of bronchogenic cyst (chest x-ray not showing the characteristic "fungal ball" lesion).

2 patients had the lesion in the L. upper lobe, one patient each having the lesion in the L. lower lobe, R. upper lobe and R. lower lobe. The patients with a pre-op diagnosis of aspergilloma underwent lobectomies of the respective lobe of the lungs for extirpation of the lesion, while the other underwent segmental resection and marsupialisation of the lesion. This was later reported histopathologically to be an aspergilloma. One of the post-lobectomy patients developed a broncho-pleural fistula 4 months after surgery and is being managed conservatively; while the patient who underwent marsupialisation of the lesion has developed a recurrence. All the other patients are doing well on follow-up.

Conclusion: Aspergilloma may not present with typical clinical and radiological features and resection of the entire lobe/lung is the recommended treatment.

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Mediastinal Germ Cell Tumour with Oesophago-Tracheo-Cutaneous Fistula and Interruption of the Left Innominate Vein with Hemiazygos Continuation

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A male aged 27 yrs presented with a suprasternal sinus present for 11 years following an acute episode of fever. Chest X-rays and contrast CT, revealed a mediastinal mass of mixed density. The cutaneous sinus tract led to a maze of tracts within the mass. These also communicated with the trachea and oesophagus by apparently separate narrow tracts. Routine venography revealed hemiazygous continuation of the left innominate vein. There was almost complete interruption of the middle of the left innominate vein.

In June 2000, the mass was exposed by excision of left half of manubrium and adjacent first & second costal cartilages. Except for fibrosis cranial to the sternum, there were virtually no adhesions around the innominate vein or the tumour above it. A Y tract was leading from the tumour posteriorly with the limbs entering the trachea and oesophagus. The tumour was excised along with the tracts. He is asymptomatic in December 2000. Histopathological examination of the mass showed cutaneous, pancreatic and mesodermal derivatives. The interruption of left innominate vein with hemiazygous continuation was possibly congenital. The mass could have physically disturbed the development of the left innominate vein. The oesophago-tracheal fistulation could be congenital or acquired due to infection or digestion by pancreatic tissue.

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Surgical Management of Chronic Empyema- Our Experiences

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During one year from 1999 (NOV) to 2000 (NOV), we had 30 cases of empyema surgically treated in our Deptt. of Cardiothoracic surgery in Guwahati Medical College and Hospital.

Out of 30 cases 25 cases are post tubercular empyema treated with ATT also. Only 5 cases with post traumatic empyema needed only tube thoracostomy and decortication.

Out of 25 cases, 6 cases needed Decortication plus Thoracoplasty with intercostal flap myoplasty for broncho-pleural fistula. These cases were associated with diabetic mellitus.

Rest 19 patients, six had Rib resection and drainage.

13 patients had Decortication only.

All the patients who underwent decortication alone did well and were cured.

One patient out of six who had undergone thoracoplasty died on seventh post operative day due to respiratory failure.

Full expansion of the lung was achieved in 25 cases out of 30 patients.

Five patients discharged with open drainage tube and subsequent followup upto 2 months showed complete obliteration of space.

In conclusion, surgical management of chronic empyema gives excellent results and enable these economically poor patients to return to active life within a shorter period of time.

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Clinicopathological Profile of Bronchogenic Carcinoma and Evaluation of its Management

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Two hundred and fifty one patients with histopathologically proved bronchogenic carcinoma were studied retrospectively from March 1990 to September 2000. 208 were males, 43 were females. Mean age was 54.98 yrs. In males 55.98 yrs and females 48.55 yrs. The incidence of squamous cell carcinoma was 44.17%, adenocarcinoma 33.12%, large cell carcinoma 16% and small cell carcinoma (6.75%). Cough (85.88%), chest pain (66.87%), haemoptysis (34.97%), dyspnea (33.74%), hoarseness of voice (19.63%) and superior vena caval obstruction (18.4%) were the common presenting symptoms. Haemoptysis, hoarseness of voice and SVC obstruction were more common in squamous and small cell carcinoma. Dyspnea was more common in adenocarcinoma. The average duration of symptoms before diagnosis was 3.81 months. 89% who had haemoptysis, hoarseness of voice & SVC obstruction presented within one month. Mass lesion (50.92%), pleural effusion (26.38%) and SVC obstruction were the common clinical features. Common sites of secondaries were lymphnode (23.93%), bone (12.9%), liver (11.8%), brain (8.1%) and skin (4%). The incidence of parenchymal mass and pleural effusion was high in squamous cell and adenocarcinoma. The investigations used for diagnosis were chest X-ray, bronchoscopy, CT scan, FNAC and open biopsy. FNAC was very costeffective method of diagnosis. When repeat FNAC was negative, open biopsy was carried out. Most patients presented in Stage III and IV. Surgery was done in 10 patients. Pneumonectomy (2), debulking of tumour (2) and biopsy (6). Chemotherapy and radiotherapy was offered to most patients. Squamous cell and adenocarcinoma showed better response to combined chemo and radiotherapy than radiotherapy alone. Small cell and large cell carcinoma showed better response to radiotherapy alone. Radiotherapy was useful in reducing respiratory symptoms in 82.9% and intercostal tube drain and pleurodesis was effective in 78.4% of pleural effusion.

Surgical Management of Pulmonary Hydatid Cysts

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Background: Patients with pulmonary hydatid cysts are usually asymptomatic but some may present with symptoms due to gradual enlargement or rupture of cyst. We present our experience on the surgical management of such patients.

Patients & Methods: 147 patients between Jan 1998 to Nov. 2000 were treated in our department. Right sided disease was more common (92 cases), bilateral involvement was seen in 24 cases, 12 had ruptured cyst while 4 had associated liver cysts. Cough and chest pain were the most common presenting symptoms but 28 patients had haemoptysis. Fever, dyspnea, expectoration of cyst contents and anaphylaxis occurred in cases where the cyst ruptured. Diagnosis was suggested on chest skiagram which was confirmed on CT chest and also on serological tests (90 cases). Anterolateral thoracotomy was used in 82 cases posterolateral thoracotomy in 53 and sternotomy was done in 22 cases to remove bilateral cysts. Intact endocystectomy with closure of all bronchial openings and capitonage was the procedure choice but 14 patients required lung resection because of infected cysts and lung destruction.

Results: 12 cases had wound infection and 6 had bronchopleural fistula, treated conservatively. In follow up residual cavity was present in 4, while recurrent or new cyst was seen in only 2 patients.

Conclusion: Intact endocystectomy with capitonage is the treatment of choice of pulmonary hydatid cysts and can be performed with low morbidity and negligible chances of recurrence.

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Massive Thymic Hyperplasia Causing Respiratory Distress in Infancy : A Case Report

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Massive thymic hyperplasia (MTH) is a rare clinical entity, essential criteria for the diagnosis of MTH being normal architecture, consisting of Cortex & Medula with Hassalls corpuscles and increase in thymic weight beyond the upper limit for that particular age. In the best of our knowledge 84 cases of MTH are reported in English Literature. MTH usually occurs as a consequence of severe systemic stress. In this patient, it was severe meningococcal meningitis. In this study a female infant patient aged 5 months and weight 4.5 kg, was referred from local medical college hospital. With respiratory distress of 1 month duration. She had recovered from severe meningococcal meningitis a fortnight ago. X-ray chest showed widening of mediastinum with hardly any lung tissue seen in right chest. CT scan showed large antero-superior mediastinal mass. Patient was taken for urgent surgery, with a clinical suspicion of teratoma. 300 gram lobulated large thymus gland was removed. Postoperatively baby had an excellent recovery and was discharged from the hospital on 5th postoperative day. Histopathology of mass showed true thymic hyperplasia.

The Value of Wide Resection in Tumours Involving the Chest Wall-A Review of 35 yrs. Experience

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Over the last 35 yrs., 44 cases of chest wall tumours were treated and followed up in our unit. Two distinct phases were obvious with the early 1980s being the water-shed line. Comparisons between the two groups revealed interesting changes in the spectrum of the disease and a marked change in the surgical philosophy with emphasis on radical surgery in the latter group with vastly improved results.

The data comprises of the "Pre 1980" group (Group A) and the 'Post 1980' group (Group B). There were 22 patients in each group. Age ranged from 6-65 yrs. Ratio of soft tissue tumour to skeletal tumour was 11 : 11 in group A and 4 : 18 in group B. Radical surgery was possible only in 6 in group A while same was done in 18 in Group B. Others were treated with palliative excision + chemo and / or radiotherapy. Chest wall reconstruction was done by local muscle flaps in group A whereas pedicled flaps, synthetic meshes were used in group B, where indicated.

There were no operative deaths, but only 2 survived for more than 3 years in Group A while 11 survived the same period in group B.

We conclude that with radical resection and modern methods of chest wall reconstruction much can be offered in terms of longevity and quality of life to these patients.

Outcome of Pulmonary Resectional Surgery in Non-Neoplastic Lung Diseases—A study on 13,428 Cases

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Abstract: Pulmonary resectional surgery is a common practice in both neoplastic and Non-neoplastic diseases. In the developed world, the incidence of the Non neoplastic diseases are less due to successful control of the infectious causes. In developing countries the incidence of Non-neoplastic lung diseases is still high. This retrospective study focuses on etiology, operative technique, postoperative morbidity and mortality of these surgeries. In the last decade (1990-1999), a total number of 23,393 patients were admitted in the Department of Surgery of the Institute of the Diseases of Chest and Hospital (IDCH), Dhaka, Bangladesh. Among them 9,905 (42.6%) patients were for neoplastic and 13,428 (57.4%) cases were for Non-neoplastic cases. Among the Non-neoplastic cases ultimately 5245 (39.06%) cases needed some types of resectional surgery in IDCH.

The population under study comprised of 10,098 (75.2%) males and 3,330 (24.8%) females with a male:female ratio of 3:1 and the age ranged from 7 months to 84 years. The common etiology were Pulmonary Tuberculosis 2683 (51.2%), Bronchiectasis 1524 (29.1%), Non-tubercular Empyema 379 (7.2%), Complicated chest trauma 300 (5.7%), Non-tubercular lung abscess 147 (2.8%), Complicated COPD 116 (2.2%), Fungal infection 26 (0.5%), Congenital 15 (0.3%) and others 55 (1%). These lung diseases give rise to life threatening complications e.g. Recurrent infection, Empyema, Bronchopleural Fistula, Recurrent and massive hemoptysis and Destroyed lung. The study stated that the Pneumonectomies and Pleuro-pneumonectomies 2833 (54%), Lobectomies 1878 (35.8%), Segmental resection and Wedge resection 534 (10.2%) were commonly performed surgeries. Recorded morbidity shows 1033 (19.7%) and the total mortality was 398 (7.6%).

Hydatid Cyst of Heart : A Rare Presentation

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Hydatidosis is a parasitic infection caused by larval stage of *Echinococcus granulosus*. Cardiac involvement is rare, ranging from 0.5-20%. It commonly involves the left ventricle although the right ventricle, right atrium, left atrium involvement has also been reported. Heart is involved by contamination from systemic or pulmonary circulation.

We are reporting a 14 year old boy who presented with left hemiparesis, dyspnea on exertion, palpitations. Investigations revealed a cystic mass in left atrium with double shadow on 2D-Echocardiography, a well circumscribed mass emerging from inter-atrial sputum in both right atrium and left atrium. on C.T. scan of Thorax. C.T. scan Head showed old infarct in right basal ganglia and Ultrasound Abdomen revealed Hydatid cyst in liver. Following improvement of neurological symptoms, enucleation of cyst done under cardio-pulmonary bypass by biatrial approach & inter-atrial septum reconstructed with pericardial patch. Recovery of patient was uneventful and patient was discharged on Albendazole.

This is a rare case as only 2% of Hydatid cysts of heart involve the inter-atrial septum.

A Rare Case of Cystic Lymphangioma of the Mediastinum - A Case Report

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A 43-year-old male presented with complaints of dysphagia to solids and loss of weight since 9 months. CXR revealed a lower posterior mediastinal mass extending onto the right side of the chest along with right lower lobe collapse. CT scan reported it as a cystic mass behind the heart with fluid density. Bronchoscopy showed external compression of right lower lobe bronchus. Oescopy revealed external compression of esophagus with normal mucosa. The esophagus was displaced towards the right on barium swallow with no hold up of barium. On echocardiography, left atrium was pushed inwards with no infiltration of pericardium.

With a pre-op diagnosis of endoduplication cyst of the esophagus, patient was explored. A tense lobulated cystic mass, measuring 15x10x7 CM filled with straw colored fluid, was found extending from the base of the heart, below the carina, upto the diaphragm. Esophagus was pushed towards the right and cyst was infiltrating its muscular layer. There were nodular hyperemic lesions, on the inner surface of the cyst. The entire cyst was excised along with the anterior esophageal muscular layer at the point of infiltration, and the esophagus was reconstructed. Operative diagnosis was still endoduplication cyst of the esophagus with ectopic gastric mucosa. Histopathological report showed it to be a Cystic Lymphangioma.

Cystic Lymphangioma is a congenital benign lesion found in the neck with or without mediastinal extension, in children and young adults. Less than 1% are reported to arise in the mediastinum. In older adults, however, there are few reports of acquired lymphangiomas arising from the lymphnodes in the posterior and middle mediastinum.

Mechanical Stapler in Esophago Gastric Anastomosis in Carcinoma Esophagus - Our Experiences

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Carcinoma lower and middle third esophagus which are suitable for resection after pre-operative assessment is taken up for surgery. We did 20 cases of esophagogastrectomy from 1999 to 2000 (Nov) at cardio-thoracic surgery unit of GMCH.

We mainly perform two stage (IVOR LEWIS) and two cases with three stage operation.

Out of 20 cases 8 cases done using stapler Ethicon proscimate ILS intraluminal stapler (SDH/CDH 29) and 12 cases conventional suturing.

After mobilising the stomach we pull it to the chest cavity by either right or left thoracotomy.

Level of gastrectomy adjusted according to the growth involving the lower end of the esophagus or fundus.

Then we mobilise the esophagus and excised the esophagus involving the tumor and stomach level is already decided.

Now anastomosis was made between proximal esophagus to gastrostomy site.

In stapler group it is found to be fast with easy anastomosis. No post operative leak.

In non stapler group, out of twelve cases two had post operative leak after 48 hrs of surgery. In cases with leakage we perform jejunostomy for feeding purposes.

The average time taken in non stapler group was 4 to 6 hrs whereas with stapler the time period became reduced to 3 hrs only.

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No post operative mortality in stapler group.

In our series we had no post operative death.

Anastomotic leak was treated conservatively with prolonged chest drain and jejunostomy feeding necessitating hospital stay upto one and half months.

Despite conflicting reports on mechanical stapler this has proved to be best regarding time saving with no post operative mortality.

An Experience of 39 Cases of Mediastinal Masses Over 8 Years

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We operated 39 cases of mediastinal tumors, from June 92 to Oct 2000. Age range was 5 to 60 yrs. Maximum No. of patients were from 15 to 25 yrs (14). Various tumors were thymomas-3, Neurofibroma-5, lymphoma-14 (commonest), Tetroma, Sarcoma, Thymic & bronchogenic cyst. Commonest site of lesion was anterosuperior mediastinum (15), followed by posterior and middle mediastinum. It is said that 2/3rd of tumors are asymptomatic and 50% are malignant and others are benign. When detected incidentally 95% are benign. In our series all were symptomatic and 24 were malignant (62%) and 15 benign (38%).

Patients presented with breathlessness, chest pain and cough and 25 pts with secondary symptoms & 05 pts have associated systemic syndromes (myasthenia gravis, anemia). Diagnosis was confirmed by C-T Scan and guided FNAC after basic investigations. Surgical excision was treatment of choice. Patients with benign lesions have excellent results. In malignant group 15 received chemotherapy subsequently and had satisfactory results.

Experience of Thymectomy in 24 Cases

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Myasthenia gravis patients present with weakness & fatigue of voluntary muscles due to disorder of neuromuscular transmission. Neostigmin and pyridostigmin are the usual drugs. Surgery is indicated in progressive deterioration inspite of adequate drug therapy or suspicion of neoplasms. We performed thymectomy in 24 cases. 83.7% were females. Mean age of onset of the disease was 23 years. Ocular symptoms were present in 91.6% cases. Progressive clinical deterioration in spite of adequate drug therapy was indication of surgery in 91.6% cases & CT evidence of neoplasm in less symptomatic cases was indication in the rest. Thymectomy was done in all cases by mid sternotomy. All cases were electively ventilated for 12 hours. There was no death. HP revealed normal thymus in 3, thymoma in 7 including 2 cases of malignancies, hyperplasia in 13 and atrophic thymus in 1. All patients had sign of improvement and drug doses could be reduced in all cases. It may be concluded that thymectomy should be considered in all cases in whom clinical deterioration occurs in spite of adequate drug therapy or there is suspicion of neoplasm.

Pulmonary Arteriovenous Malformation

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Pulmonary Arteriovenous Malformation is a congenital lesion of

the lung in which there is an abnormal connection between pulmonary arterial system and pulmonary venous system. This defect leads to shunting of unoxygenated blood into the systemic circulation. We had one such a patient. The surgical presentation and operative procedure is presented as a video presentation. This patient has hereditary haemorrhagic Telangiectasia, or the Rendu - Osler-Weber syndrome with skin and liver malformation. He presented with an acute episode of haemoptysis which is a rare reported presentation. He presented with clubbing, cyanosis and a continuous murmur in the left 4th intercostal space.

The diagnosis was confirmed by 2 dimensional Echocardiography with bubble contrast and pulmonary angiogram. Needle biopsy is contraindicated because it can be fatal.

At surgery there was a large thin wall Arteriovenous malformation 4cm x 6cm occupying the Right middle lobe. Blood churning in the fistula could be clearly identified. After ligating the pulmonary artery branch and pulmonary venous branch leading the area became less turgid with no thrill or pulsation. Right middle lobectomy was done and the patient made eventful recovery.

Flail Chest—Fixation

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Traumatic chest with multiple rib fracture at multiple sites cause flail chest, clinically presenting with paradoxical respiration. Most of the time the irregular fracture ends pierce the lung causing damage to the lung resulting in continuous air leak. This prevents either conservative line of treatment or internal pneumatic stabilisation to be successful apart from its own inherent complication of prolonged bed rest and long ventilatory support with its complication.

Hence earlier correction/repair of lung injuries with fracture ribs fixation using simple K wires enabled us to retrieve the patients from the prolonged agony of hospitalisation. Video presentation of the patient with corrective procedure shown. 5 patients in last 2 years treated with 1 mortality (due to ATN) discussed.

Stenting in Tracheobronchial Obstructions

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Stenting is useful in palliating malignant tracheo-bronchial obstructions, Tracheomalacia, extraluminal tracheobronchial compressions and benign tracheal and bronchial stenosis unsuitable for surgical resection and in tracheo-oesophageal fistula.

We have used self expanding nitinol stents in ten cases. The technique of insertion of these stents have been clearly demonstrated in the video. Initially measurements are taken using a fiberoptic bronchoscope between vocal cords and upper end of the obstruction. C.T. Scan is very useful in confirming the lower end of obstruction and length of the lesion and also to demonstrate skip lesions. This helps us to decide on the length and width of the stent to be used and the site for placement.

On occasions balloon dilation has to be used to dilate the obstruction before passing the guidewire. The stent is railroaded through the guidewire and it expands once the thread tied to it is released.

In benign strictures there is a tendency for the stent to slip down. After 3 weeks it is possible to remove the stent because of ingrowth.

Pulmonary Blastoma - A Case Report

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A 6 year old male child presented with history of cough associated with breathlessness and expectoration of 3 months duration. There was history of fever of mild grade off and on but there was no history of hemoptysis. Clinical examination revealed decreased breath sounds on left lung base, there were no added sounds. Patient was anaemic with Hb of 6.8 gm%, chest x-ray was suggestive of opacity in the left lower zone. CT Scan, showed a mass lesion in the posteromedial aspect of the left hemithorax. A CT guided FNAC was done and a provisional diagnosis of neurogenic/germ cell tumour was thought of. Patient underwent a left posterolateral thoracotomy which revealed an intrapleural mass arising from the lower lobe of left lung, there was no mediastinal extension, however, there were multiple hilar lymph nodes. A left pneumonectomy was done. Post operative period was uneventful. Histopathology revealed the tumor as Pulmonary blastoma but with no mitotic activity. This case is being highlighted because of the fact that Pulmonary blastoma being a very rare tumor and its association with absence of mitotic activity is unparalleled in the screened literature.

Bullectomy/Pulmonary Resection in Emphysematous Bullae of Lung

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32 cases of emphysematous bullae of lung were operated in our hospital over a period of six years. All patients were less than 30 years of age and male : female ratio was 1:1. The patients were referred with the symptoms of chest discomfort or pain haemoptysis or asymptomatic pneumothorax. A few patients had history of recurrent chest infections. Plain X-ray chest revealed diagnosis in all, CT chest was also performed in few patients. Surgery involved bullectomy in all. Lobectomy in 17 and pneumonectomy in 15. Irremovable residual bullae were left in 3 patients. Improvement in functional class was seen in 31 patients. There was no mortality. Air leak was the major problem after bullectomy. Six patients had infection which resolved with drugs. Recurrence of the disease was seen in one patient (3%) from the group of residual bullae. The size of bulla is significantly increased but the patient is asymptomatic.

It is recommended that if bullae are multiple and small in one lobe, lung resection is indicated otherwise simple bullectomy will do if there is a single isolated air sac. In patients of residual bullae, patients should be followed closely and reoperated if necessary.

A New Operative Method for Repair of Hiatus Hernia

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Many operations have been described for the management of Hiatus hernia. Many have advantage and disadvantages. We have designed a new method of operative management of Hiatus hernia which is simple, reproducible and if facilities are available feasible with minimally invasive methods.

In this new technique, the greater omentum is dissected along and off the greater curvature with pedicle and blood supply attached to a small portion near the fundus of the stomach. This omentum is rolled and brought around the gastroesophageal junction and sutured to its seromuscular layer. This ridge of omentum will act like

"biological washer" and prevent the upward sliding of the OG junction into the thorax.

Unlike Angelchik prosthesis, it does not involve a foreign body implantation. As the fundus of the stomach is not manipulated like

Nissen procedure, the kinesis of the stomach is not disturbed. Our method is quite simple and reproducible and quite amenable for minimally invasive approach.

Early Results of Axillofemoral Bypass with Goretex Graft

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Introduction: Aorto femoral bypass with synthetic grafts are acceptable mode of treatment for dissection and atherosclerotic diseases of Aorta or peripheral vascular disease. Often these procedures are faced with difficulties due to lack of space for applying cross clamp or in suprarenal lesions, also in those cases where laparotomy is either contraindicated or not desirable to perform. Axillo-femoral or Axillo-Bifemoral grafts are used as an alternative method in these circumstances. This retrospective study is to assess early and intermediate term results of these procedures.

Material & Methods: During January 1998 to May 2000 such procedures were performed on 14 cases. Mean age was 62 years (range 47 to 77 years). Left Subclavian artery was used for proximal anastomosis in 13 cases, in one case right Subclavian to right femoral bypass was done. In 3 cases left Subclavian-bifemoral bypass graft was done. 8 mm Ring enforced Gore-Tex® (W.L. Gore & Assoc. Inc.) was used in all cases. Graft was taken to anastomosis sites (Subclavian to femoral and left to right femoral artery) through a subcutaneous tunnel made with a tunneler.

Results: Clinical improvement was observed in all cases (distal pulsation, warmth of limb, relief in ischaemic pain are major criterias). One patient had to undergo redo surgery for graft thrombosis after four months. During early follow up (4 to 28 months). All patients had good symptomatic relief with grade IV distal pulsation in 11 (grade II/IV in 2). Doppler study was done in all patients.

Conclusions: Axillo-femoral or bifemoral bypass with Goretex graft is a good alternative for patients not suitable for aortofemoral bypass through Laparotomy or Thoracotomy. Early results are encouraging but long term follow up is awaited.

Expansion Rates of Thoracic Aorta Following Initial Treatment of Aortic Dissection

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Introduction: Management of acute type A aortic dissection involves surgical treatment of the intimal tear in the ascending aorta while uncomplicated type B dissections are managed conservatively. Residual aortic disease in all these patients could deteriorate into life threatening conditions.

Whether surgical treatment of type A dissection provides protection to the distal aorta and also whether there is any difference in the disease progression in the distal aorta in these two groups is unknown.

Aim: To compare the expansion rates (ER) in descending thoracic aorta in surgically treated Type A and conservatively managed Type B dissections.

Methods: Between 1993 to 1999, 28 patients who were either treated surgically for type A dissection (16) or managed conservatively for type B (12) were studied. Only patients with at-least one follow

up CT or MRI scan with an interval of more than 3 months were included.

The minimal coronal aortic diameter at 5 set levels were measured using calliper method by a single observer yielding 227 segment - intervals (110-A, 117-B). Statistical analysis were performed using Mann-Whitney analytic method.

Results: Mean follow-up duration and scan intervals were 25 and 13 months. The overall mean ER ws 2.63 mm/yr. The ER for all measured segments in treated type A patients was 2.47 mm/yr and 2.78 mm/yr in type B (p=0.9 Mann Whitney). However if proximal segments of the descending aorta were compared, mean ER in type A was 1.42 mm/yr compared with 2.5 mm/yr in type B patients (p=0.023 Mann-Whitney)

Conclusions: There is no significant difference in the overall ER of descendig thoracic aorta in operated type A and non-operated chronic type B dissection. However as might be expected from the disease process, those segments closest to the intimal flap in type B patients expand more rapidly. Both these groups of patients require close suveillance protocols following the initial management.

Thoraco-Abdominal Aneurysm : Our Experience

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12 patients were operated for repair of Thoraco-abdominal aneurysm from January 1998 to July 2000. The mean age was 53.4 yrs. (Range 38 to 67 yrs) Two of them (16.67%) were females. 6 patients (50%) had bilateral renal artery involvement and 2 (16.6%) had aneurysms extending up to Inferior Mesenteric Artery. One patient had pre-operative paraparesis.

All were operated through a left thoraco-abdominal incision. Lower aortic perfusion was achieved either by Femoro-femoral perfusion (7 patients, 58.3%) or by a shunt from thoracic aorta to abdominal aorta (3 patients 25%). One patient had simple aortic crossclamping. When the Renals were involved in the aneurysm, they were perfused through balloon tipped catheters fed from the thoracic aorta.

The average cross-clamp time was 48.32 minutes (Range 29 to 68 minutes). The operative mortality was 8.3%. One patient had paraplegia and 2 had reversible paraparesis. 4 patients (33.3%) had post-operative renal failure which responded to dialysis. 5 patients had paralytic ileus exceeding 4 days. One of the survivors was reoperated for a pseudoaneurysm at 6 months. There were 4 late deaths unrelated to the disease. The seven surviving patients are asymptomatic on follow-up.

Aortic Dissection

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Aortic dissection is the most catastrophic event involving the aorta and is the commonest cause of death from aortic pathology. Surgical treatment of aortic dissection also carries a high rate of mortality and

morbidity. This paper aims to analyse the results of treatment in 23 patients during the past two years.

There were 9 patients with Stanford Type A (Debakey Type I 5 Type II 4) dissection. All the 9 were males. The average age was 40 years. 3 were acute dissection and 6 were chronic. 7 patients had severe aortic regurgitation (AR) and 2 had no AR. 5 patients underwent Bentall procedure, 2 aortic valve resuspension and ascending aorta replacement and 2 ascending aorta replacement alone. One patient who had severe mitral regurgitation underwent Bentall + mitral valve replacement. There were two deaths, both acute dissection; one patient who had dissection involving the arch branches and rupture into the pericardium died of uncontrollable bleeding. The other patient died of cerebro-vascular accident in the postoperative period.

There were 14 patients with Type B dissection, 13 were males and 1 was a female. The average age was 50 years. 9 patients underwent surgical repair; 5 patients are on medical follow up for various reasons. In surgically treated patients, surgery was done with cardio-pulmonary bypass and total circulatory arrest. Three patients with acute dissection died - one of intraoperative bleeding, one of cerebral embolism and one of postoperative myocardial infarction.

All the patients are on regular follow-up with antihypertensive therapy. To conclude, all type A dissection require surgery. Majority of type B dissections require surgery; some of them can be managed conservatively. The mortality is high in acute dissection.

Susceptibility of Peripheral Blood Vessels to Trauma: Analysis of Thirty Cases

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We are presenting a series of 30 patients with vascular injuries (both blunt and penetrating) who reported to the emergency room of our institution complex. Sixteen patients had associated fractures, three had concomitant venous injuries. The majority (n=28) of these patients presented within six hours and the vascular component of injury was diagnosed by clinical examination. Arterial reconstructions in the form of direct repair (n=17) and saphenous vein interposition grafting (n=13) were performed. Of these two required fasciotomy on suspicion of compartment syndrome and one required amputation for gangrene. Distal pulsations returned in upto 48 hours following surgery; confirmatory Doppler was performed in all cases.

It is concluded that prompt clinical diagnosis & vascular repairs after prior fixation of fracture along with absence of major visceral trauma was responsible for good results.

An Experience of 63 Cases of Post Traumatic Acute Limb Ischemia

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This is an experience of past 8 years from June 1992 to June 2000. Mode of injury was gun shot, Knife, sharp glass, road side accident with extensive crushing, moderate degree of blunt or penetrating trauma. Patients were divided in 3 groups. GR-I, (17 cases) Mild soft tissue injury with neurovascular impairment GR-II (40 cases). Moderate degree of soft tissue with neurovascular and bony injury. GR-III (06 cases). Extensive crushing of soft tissue, muscle, bone & neurovascular bundle. Diagnosis was made on evidence of

paresthesia, cold limb, absence of distal pulsations, sensory motor impairment etc. confirmed by portable doppler in all and duplex scan in few (18 cases). Immediate exploration of neurovascular bundle with fixation of long bone-fracture site was done. Artery was found cut sharply, lacerated in majority of patients. Fogarty catheter embedectomy & repair and end to end anastomosis was done in 40 cases and RSVG in 23 cases of 5-15 cm length was interposed. The main arteries involved were subclavian (3 cases), axillary (2), brachial (23), Ext. iliac (2), common femoral (16), popliteal (17). Major veins were repaired in 23 cases (subclavian-2) femoral-3, axillary-1, popliteal-2). Nerve repair was done in 35 cases (Median nerve 18, Sciatic nerve div. at knee-6, popliteal below knee-7, ulnar nerve in 4). In Gr I&II, soft tissue required minor debridement with primary approximation. In gr III, gross debridement in stages with amputation of limbs in 3 patients from 7th-10th day was done. Remaining 3 required repeated dressings & myocutaneous flaps later on. Excellent results were obtained in gr I & II with early discharge (within 2 weeks) and satisfactory neurovascular function. Minor residual complication of nerve repair e.g. pointing index (2), paresthesia (3), footdrop in 3 cases was observed in followup.

Conclusion: Excellent results can be achieved with timely repair of neurovascular pedicle and judicious debridement and good post opeprative care.

Review of 40 Cases of Vascular Emergencies Seen in Last 5 Years

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Trauma to blood vessels and bleeding from that injury is an emergency for which CTVS surgeons are often called, from May 1995 to Nov. 2000, 40 such emergency calls were attended to in CNMCH by one surgeon.

In 14/40 the injuries occurred during some surgical procedure either in the abdomen, neck or on the limbs (Group A). 20/40 cases were traumatic in nature (Group B). The trauma was either by sharp instruments, bullets, fractures or due to road traffic accidents. 6/40 came with bleeding peripheral aneurysms (Group C), and bleeding was due to inadvertent trauma to the swelling (4/6) or due to surgical interference.

All injuries were operated without delay and without the help of angiography as no such facility exists in CNMCH. For the last 3 years all traumatic cases are being shifted to CTVS O.R. and operated there rather than in Emergency OR. There were no deaths or complication in Group A or C. There were 3 deaths in group B.

We are of the opinion that angiography, through informative is probably not mandatory in vascular emergencies. Clinical evaluation and adherence to basic principles of vascular surgery can give good results. Moreover the protocol of shifting patients to CTVS OR with proper monitoring, anaesthesia and nursing help has yielded far superior results.

Benign Superior Vena Caval Obstruction Report of Successful Surgical Repair

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A male patient aged 55 years presented to Gandhi Hospital, Secunderabad, with puffiness of the face and distended veins over neck, chest and abdomen of 3 years duration. Preoperative investigation revealed complete obstruction of the extra pericardial

portion of the superior vena cava with thrombosis extending into both right and left brachiocephalic veins. He had antituberculous chemotherapy in 1998 and balloon angioplasty of SVC in another hospital in March, 1999, with no relief of SVC obstruction. He was operated on 13th March 2000. At operation complete fibrotic

obstruction of the SVC at its formation was seen with dilation of draining veins and thrombi in the veins. Left brachiocephalic vein was divided proximal to the obstruction and SVC was divided distal to the obstruction and venous continuity established with a 14 mm woven dacron graft. The case is reported because of its rarity.

Anaesthetic Technique in Poor Left Ventricular Function

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"Off Pump Coronary Artery Bypass" surgery (OPCAB) has gained popularity in recent years, promoting cost saving and faster patient recovery. Encouraged by these advantages the surgical team has taken up "High Risk" patients at our institution. We did a retrospective chart review to evaluate a subset of these patients with an EF < 25%.

57 patients with an EF < 25% were selected between 16th March and 14th November, 2000. 8 patients were in shock [6 patients had IABP *in situ*] and ventilatory support with low PO₂, 11 patients had mitral incompetence and received a TEE probe after anaesthetic induction. 39 patients were taken up in Acute MI setting. The usage of arterial grafts were possible in these subset.

Preoperative data was analyzed with special emphasis on Anaesthetic measures adopted to maintain electrical and haemodynamic stability during posterior vessel (OM & PDA) grafting on beating heart in these compromised, enlarged and hypertrophied ventricles.

Post operative profile early and late analyzing and highlighting reduced doses of inotropic support or any other support required. Early extubation with minimal pulmonary complications, lesser arrhythmias low morbidity and organ dysfunctions early discharge and quick return to work will be highlighted.

Thus it was conclusively seen that myocardial revascularisation using arterial or venous grafts in poor left ventricular function with tissue stabilizers and adjunctive intracoronary shunts provide a viable and perhaps 'safer' alternative to conventional CABG for multivessel CAD irrespective of coexistent "RISK FACTORS"

A Prospective Randomized Clinical Comparison of Induction and Recovery Between Sevoflurane and Halothane Supplementation of Anaesthesia in Children Undergoing Cardiac Cathlab Procedures

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In a prospective, randomised clinical study we have included 50 children, aged 2-15 years, to compare Halothane and sevoflurane for intervention cardiology procedures conducted in cathlab.

All patients were unpremedicated and received inhalation induction using nitrous oxide in oxygen supplemented with either halothane or sevoflurane. The inspired concentration used for inhalation via mask were increased every five breaths and were successively 5% and 8% for Halothane and sevoflurane.

Mean time for loss of consciousness and conjugate deviation of eyeball were 1 min. 10 sec. for sevoflurane and 1 min 18 seconds for halothane. Struggling scores were lower in the sevoflurane group than in the Halothane group. (P<0.002). The incidence of cardiac arrhythmia was higher, during halothane (62%) than during sevoflurane anaesthesia (28%) (P <0.005) and the arrhythmias were more often ventricular in origin. The two agents were comparable in terms of ease of use and quality of anaesthesia, and time to eye opening and discharge criteria were similar.

We conclude that sevoflurane has qualities that have made the halothane the most used one for children in day care procedures, and that it is superior to halothane in the intervention cardiology procedures where the cardiac stability is particularly required.

Sevoflurane for Severe LV Dysfunction in a Patient of PDA Ligation

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Patent ductus arteriosus (PDA) patients in 10-20% manifest as volume overload congestive heart failure (CHF). CHF increases operative risk 2-8 times. Induction of anaesthesia with any i.v. reducing agent produces varying degree cardiac depression. Newer volatile agent, sevoflurane claimed to be excellent cardiostable and easily titratable.

We present our experience with sevoflurane in a 10 year child of PDA and congenital aortic stenosis (AS), presented in CHF and severe LV dysfunction (EF 25%). Induction of anaesthesia established with sevoflurane (5-7%) and rocuronium as muscle relaxant. Sevoflurane (2-4%) administered to achieve adequate depth of anaesthesia along with morphine and vecuronium throughout the anaesthesia. No significant change in BP, HR and CVP was found. Sevoflurane at 5-6% produced controlled hypotension (60 mm Hg) at the time of dissection and ligation with less dependence on potent i.v. vasodilators. Postoperatively child electively ventilated with adequate analgesia till stabilisation of vitals. The subsequent period was uneventful. Hence sevoflurane (2-4%) could be safely used in children with severe LV dysfunction, because of its less myocardial depression and easy titrability. Controlled hypotension at the time of ligation of PDA could be achieved by further increasing the conc. of sevoflurane to 5-6%.

Comparison of Remifentanil with Fentanyl in Coronary Artery Bypass Surgery (CABG)

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Aims: To evaluate and compare the effectiveness of Remifentanil with Fentanyl for attenuation of hemodynamic responses to noxious stimuli and any untoward side effects.

Methods: 60 ASA Grade I-III consecutive patients for CABG were chosen for the study. Exclusion criteria included patients with severe LV dysfunction, EF<25%, severe LM stenosis and emergency CABG. All patients were induced with Thiopentone, Pavulon and maintained on O₂, N₂O and Isoflurane. Group 1 (30 patients) received Remifentanil started at a rate of 0.5 μ gm/kg/min and titrated to desired effect. Group 2 (30 patients) received Fentanyl bolus of 5 μ g/kg at induction and continued as an infusion of 1 μ g/kg/hr. Hemodynamic responses to noxious stimuli like intubation, skin incision and sternotomy were noted. Need for additional vasoactive agents and any untoward side effects in both groups was also documented.

Results: Remifentanil seems to be a better agent compared to

Fentanyl for attenuating hemodynamic responses to noxious stimuli. Hemodynamic effect of both the drugs will be compared and discussed in detail.

Conclusion: Remifentanil is an attractive agent and comparable to Fentanyl for attenuating hemodynamic responses to noxious stimuli like intubation, skin incision and sternotomy. However caution must be exercised and drug titrated to prevent hypotension and bradycardia.

Anaesthetic Considerations for Video Assisted Thoracic Surgery Using OLV± Capno-Thorax
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We present outcome of patients with various underlying pleural/pulmonary/thoracic vertebral/sympathetic chain pathology undergoing diagnostic and therapeutic VATS under general anaesthesia with OLV (One Lung Ventilation) ± artificial intermittent tension capno thorax over a period of 3 years.

Aim: To Prove that in Indian setting VATS can be undertaken

safely with OLV±capnothorax. To prove that proper pre-operative evaluation, preparation and judicious use of anaesthesia and monitoring limits post-operative morbidity and improve patient's outcome.

Summary: We herewith present the outcome of 31 patients who underwent VATS for Various Lung Parenchyma/Pleural/Thoracic Vertebral/sympathetic chain pathology under general anaesthesia with one lung ventilation (OLV) ± intermittent ± tension capno thorax over a period of 3½ years.

All patients had a complete preoperative assessment, received preoperative chest physiotherapy in appropriate cases and were also counseled for open thoracotomy. Procedures were done under GA with OLV using a balanced anaesthesia technique with appropriate monitoring. There were no mortality and one patient required open thoracotomy. There was no significant post-operative morbidity.

Conclusion: VATS using OLV ± Capno thorax is a safe procedure. Proper pre-operative evaluation especially airway assessment, good patient education and counselling and appropriate anaesthetic technique not only reduces post-operative morbidity but also improper patient satisfaction.

Form IV (See Rule 8)

Jan-March 2001 Issue
(Vol 17 No. 1)

1.	Place of Publication	:	New Delhi
2.	Periodicity of its publication	:	Quarterly
3.	Printer's Name	:	A. Sampath Kumar Through Thomson Press (I) Ltd.
	Whether citizen of India? (if foreigner state the country of origin)	:	Yes
	Address	:	Dept. of CTVS AIIMS, Ansari Nagar New Delhi - 29
4.	Publisher's Name	:	A. Sampath Kumar
	Whether citizen of India? (if foreigner state the country of origin)	:	Yes
	Address	:	Dept. of CTVS AIIMS, Ansari Nagar New Delhi - 29
5.	Editor's Name	:	A. Sampath Kumar
	Whether citizen of India? (if foreigner state the country of origin)	:	Yes
	Address	:	Dept. of CTVS AIIMS, Ansari Nagar New Delhi - 29
6.	Name and address of individuals who own the newspaper and partners or shareholders holding more than one percent of the total capital	:	Indian Association of Cardiovascular- Thoracic Surgeons

I A. Sampath Kumar hereby declare that the particulars given are true to the best of my knowledge and belief.

(A. Sampath Kumar)