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Observations on high stricture of the oesophagus with special reference to pathogenesis and the columnar epithelial-lined mucosa

K MOGHISSI This study of 60 patients was intended to clarify some of the confusion surrounding nomenclature and pathogenesis of high strictures. Only patients undergoing surgery were included because of the necessity of recording the following at operation: (1) location of phreno-oesophageal ligament (the junction), its relationship to the hiatus and the level of the stricture assessed by transgastric retrograde exploration; (2) oesophageal wall alterations.

Analysis of results show four types of patient.

Type 1 included 40 cases (66·6%) characterised by high junction, on a level with the stricture, and mucosa generally oesophageal above and gastric below. The oesophageal wall was altered. Type 2 included 12 cases (20%) characterised by low junction, on a level with the bottom of the stricture (elongated stricture), in eight cases, and low junction with definite high stricture in four (three with gastric mucosa above and below). All had altered oesophageal wall. Type 3 included four cases (6·6%) characterised by low junction and high stricture with gastric mucosa above and below in two, and oesophageal mucosa above and gastric mucosa below in two. There was no alteration of the wall. Type 4 included four cases (6·6%) characterised by low junction and high stricture with oesophageal mucosa above and below, and altered oesophageal wall only at the site of stricture (three with deep ulcers).

The aetiology and approach to surgery in each type were discussed and results suggest that columnar epithelial-lined oesophagus is not congenital.

Conservative management of so-called peptic stricture of the oesophagus

R ABBEY SMITH Over the last 28 years many patients with obstruction of the oesophagus associated with a sliding hiatus hernia have been treated by conservative management. This consists of reassurance that the lesion is not malignant, full explanation, and acceptance of the need to modify diet, general medical measures, and avoiding repeated dilatation. Repeated dilatation, especially if biopsy is performed, may damage the mucosa and lead to fibrosis. Under this regimen a considerable but unknown percentage of patients will obtain spontaneous relief of symptoms and barium swallow evidence of obstruction will be considerably reduced.

The term "stricture" in describing what is seen on barium swallow films should be avoided until clear evidence of fibrosis is revealed. This can only be achieved by direct macroscopic and microscopic examination of the obstructed segment of the oesophagus. A stricture defined as fibrous on barium swallow examination in a number of patients will be found to admit easily the Negus oesophagoscope, and the conclusion must be reached that these so-called strictures originate from spasm. Symptoms will be completely relieved in some of these patients by conservative management, although some years of treatment may be needed to achieve this.

Collis-Belsey operation for established peptic stricture of the oesophagus

JA DYDE In 1977, 14 patients had this operation together with dilatation of the oesophagus for the treatment of worsening dysphagia. Every patient had a proven fibrous stricture of three to 30 years duration associated with a hiatal hernia and gastro-oesophageal reflux. The gastroplasty was performed with a stapling machine, the repair was a Mark IV Belsey procedure, and the dilatation was performed using a No 54 Maloney bougie. None of the patients had radiologically shown reflux when examined at three months, but all had some evidence of residual oesophageal narrowing despite routine dilatation at one and three months.

At 18 months, the patients were reassessed. Eight patients had needed no further dilatation, were swallowing normally, and had no reflux. Six patients had needed further dilatations from time to time. Two of these six patients had recurrent hernia with reflux and were dissatisfied. The remaining 12 patients were pleased with the result of their operation.

Atrial myxoma

NB VAGHJIANI and WG WILLIAMS The Regional Cardiothoracic Unit at Walsgrave has dealt with 10 patients with atrial myxoma since 1970. These cases illustrate the many ways in which these patients may present.

One patient had a sister who died of atrial myxoma. Two cases had presented with recurrence and one of these had recurred twice, in spite of apparent complete excision on each occasion.

The diagnosis of atrial myxoma should be considered in any patient with obscure cardiac symptoms, and urgent investigation and operation is required.

Trends in coronary artery bypass surgery

IAN R GRAY and JA DYDE We have studied the first 300 patients to undergo

myocardial revascularisation at Walsgrave Hospital who have been followed for at least 12 months after operation. They are divided into three cohorts, each of 100 consecutive patients, and we compared certain features of these three groups. Changes in indications and contraindications to operation, and changes in numbers of additional surgical procedures carried out have been examined. Our data go some way towards explaining improvements in early mortality, and trends in the long-term results of surgery.

Pharmacological and hypothermic inhibition of metabolism during myocardial ischaemia

TAH ENGLISH, DKC COOPER, CJ HILTON, R WALTON, and DR WHEELDON Preservation of myocardial function during cardiac surgery is an important determinant of operative mortality and late prognosis. These experiments were designed to test methods for reducing myocardial metabolism to a minimum during prolonged periods of ischaemic arrest in conditions similar to clinical practice.

Three groups of pigs were placed on cardiopulmonary bypass for two hours. Control group A (n=7) received normothermic coronary perfusion. Group B (n=7) had 100 minutes of ischaemic arrest at myocardial temperature 10°C followed by 20 minutes supportive perfusion. Group C (n=12) was similar to group B but cooling was preceded by an infusion of cardioplegic solution. Effectiveness of myocardial preservation was assessed by early haemodynamic and late histological changes.

Cardiac output, left ventricular stroke work, and LV dp/dt max were depressed in group B 10 minutes after bypass but recovered by 30 minutes. Postoperative mortality in group B (57%) was significantly higher than in group A (14%) and group C (25%). Histological examination of the myocardium two months after operation showed normal appearance in nine, subendocardial fibrosis in four and patchy myocardial fibrosis in five. There was no statistical difference between groups A and C.

These results show that, for periods of ischaemic arrest lasting up to 100 minutes, the combination of single dose cardioplegia and profound topical hypothermia provides myocardial protection comparable to that obtained by normothermic coronary perfusion.

Comparative clinical study of pulsatile and non-pulsatile cardiopulmonary bypass in 325 patients

KM TAYLOR, WH BAIN, KG DAVIDSON, MA TURNER, S MITRA, and MARGARET RUSSELL From April 1977 to March 1978, a total of 325 adult patients were submitted to open heart surgical procedures in the cardiac surgical unit of Glasgow Royal Infirmary. Conventional non-pulsatile perfusion was employed in 175 patients and pulsatile perfusion in 150 patients, using the Stockert pulsatile pump system.

These two patient groups (non-pulsatile group and pulsatile group) have been studied retrospectively to assess comparative mortality and morbidity. The two groups were operated on by the same surgeons, using standard anaesthetic techniques, bypass and myocardial protection protocols, and a standard postoperative management regime.

There were no significant differences between the groups in terms of mean age, weight, operative procedure, or referral category.

The mean bypass time was 81 min in the non-pulsatile group and 93 min in the pulsatile group (NS). Mean cross-clamp time was 39 min in the non-pulsatile group and 46 min in the pulsatile group (NS).

Total mortality in the non-pulsatile group was 10·3% compared to 5·3% in the pulsatile group ($p<0·05$). Elective mortality was 8·4% in the non-pulsatile group compared to 3·7% in the pulsatile group ($p<0·05$). Intra-aortic balloon counter-pulsation was required to wean the patient off bypass in six non-pulsatile cases and in one pulsatile case ($p<0·05$). Eleven per cent of the non-pulsatile cases required inotropic support postoperatively compared to 4·7% of the pulsatile cases ($p<0·01$).

There was no increase in haemolysis in the pulsatile group and no incidence of aortic wall or cannulation site trauma. In both groups around 4% of cases required reopening for excessive bleeding.

The results clearly indicate the clinical superiority of routine pulsatile perfusion during open heart surgical procedures, in addition to the metabolic and haemodynamic superiority demonstrated in previous studies.

Topical lignocaine during open heart surgery

CTM SANG, MV BRAIMBRIDGE, F REYNOLDS, and C KNOTT Topically applied lignocaine has been used in the animal laboratory to reduce the incidence of dysrhythmias during manipulation of the heart. Having observed a similar protective effect in the human heart, it is our practice to use topical lignocaine during open heart surgery operations. 100 mg boluses of lignocaine are routinely applied to the heart immediately on opening the pericardium and repeated immediately before the manipulations of vent removal and decannulation.

No previous study has been made into whether the protective effect is solely due to a surface anaesthetic action or is also mediated through intravascular absorption and presence of therapeutically effective circulating levels of lignocaine.

The present clinical investigation aimed at measuring plasma lignocaine levels upstream and downstream from the heart, to elucidate the possible role of circulating lignocaine.

Pilot studies sampling central venous blood have shown that peak plasma levels are achieved at approximately five minutes after topical application. Subsequent sampling from CVP line, pulmonary artery, and radial artery have confirmed that the initial appearance of lignocaine is in the pulmonary artery sample suggesting absorption via the venous drainage of the heart. Therapeutic plasma lignocaine levels are attained in all observations between two and six minutes after a single topical 100 mg bolus.

These results suggested that the anti-arrhythmic protection observed with topical lignocaine is mediated at least in part by absorption via the heart and achievement of therapeutic circulating plasma lignocaine levels.

Total body potassium as a prognostic index in cardiac surgery

RK WALESBY, RB GALLAND, J SMITH, TJ SPINKS, and HH BENTALL Cardiac cachexia is well recognised in relation to valve disease, but there have been few previous attempts to quantify it or relate it to the outcome of cardiac surgical procedures.

Total body potassium was measured non-invasively in 129 patients undergoing cardiac surgery, 47 with coronary artery disease and 82 with valve disease

The measured potassium was related to the potassium concentration in the fat-free mass derived anthropometrically, and there was no reduction of concentration in unit mass, suggesting that the depletion represented loss of lean tissue mass and not lower cellular potassium concentrations.

In those patients requiring coronary artery surgery, the distribution of total body potassium did not differ significantly from that predicted from regression equations, two based on height, sex, age, and weight, and one with weight excluded. In mitral valve disease and double valve disease, the distribution was non-parametric with an increased incidence of potassium depleted patients. The median hospital stay of depleted patients was 50% greater than those nutritionally normal. The mortality was four times as high in those depleted beyond two standard deviations of the mean when compared with the nutritionally normal. The differences were significant ($p<0.01$).

The results were presented with emphasis on the preoperative quantification of cardiac cachexia and the probability of death in relation to the degree of depletion as measured by loss of total body potassium. The results of a three-year follow-up on a small group of survivors of valve surgery were presented with details of changes in the nutritional status of these patients.

Haemodynamic effects of disopyramide after open heart surgery

N NAQVI, D THOMPSON, WE MORGAN, DJ COLTART, and BT WILLIAMS The haemodynamic effects of disopyramide phosphate were assessed in nine patients after open heart surgery and coronary artery bypass grafting. Intra-arterial pressure, left atrial pressure, aortic flow, and ECG were monitored throughout the study. Disopyramide was administered intravenously in a dose of 1·2 mg/kg body weight over one minute eight to 12 hours after open heart surgery when all parameters of cardiovascular function were stable and satisfactory. The haemodynamic changes were studied during and for 30 minutes after drug administration. Changes were noted within 45 seconds of commencement of drug infusion. During infusion, the only significant changes were an increase in systemic blood pressure and systolic impedance signifying a direct increase in peripheral arterial resistance. Systemic blood pressure remained significantly higher for 10 minutes and systolic impedance for 30 minutes. Immediately after infusion, max dP/dT, a parameter of ventricular contractility, was significantly depressed for 15 minutes. Both cardiac output and aortic flow were significantly depressed for 30 minutes. DPTI/TTI, an estimate of subendocardial supply/demand ratio, showed an insignificant increase throughout the study. Heart rate remained unchanged throughout.

This study shows that intravenous disopyramide starts acting within 45 seconds of the start of infusion, directly increases peripheral arterial resistance, has a negative inotropic action which is shortlived, and does not reduce subendocardial blood flow.

Silent carotid artery disease in cardiac surgical patients: its detection by ultrasound methods

AW AYOUB, OJ LAU, PHILIP B DEVERALL, and ALAN K YATES The association of coronary artery disease and carotid artery disease is well known. At the Cardiothoracic Unit, Guy's Hospital, we experienced two unexplained "cerebral" deaths. At postmortem, significant carotid artery stenoses were found. This led to the adoption of a screening policy whereby all patients due for coronary bypass grafting and patients over the age of 45 due for other procedures under cardiopulmonary bypass (CPB) were studied by spectral analysis of Doppler ultrasound signals and a temporal artery occlusion test. Patients shown to have significant carotid artery stenosis were further studied by carotid angiography and had their carotid disease operated upon before the CPB procedures.

Analysis of the first 100 cases since the adoption of this policy and their comparison with a similar 100 cases treated during the previous six months, revealed some interesting observations. First, significant carotid artery stenosis can exist in a clinically silent state until CPB, where it may reveal itself in the form of serious or fatal complications. Second, a carotid bruit is not a sensitive indicator of carotid artery disease. Third, the ultrasound studies now used for screening patients at Guy's non-invasive angiology unit are simple, safe, and effective in detecting significant carotid artery disease, a correctable potential cause of complications and death during or after CPB.

Long-term results of cryosurgical His bundle ablation and ablation of refractory ventricular tachycardia

AJ CAMM, DE WARD, R CORY PEARCE, GM REES, and AJ SPURRELL Seven patients, mean age 53 years, underwent cryosurgical His bundle ablation 12 to 27 months ago. In two patients conduction resumed within one month and the other five patients form the basis of this report. The indications for surgery were paroxysmal atrial fibrillation (three patients), paroxysmal atrioventricular tachycardia (one patient), and chronic uncontrollable atrial fibrillation (one patient).

Surgery was performed by locating the His bundle electrographically and after confirming the position by cryothermal mapping (freezing to 0°−10°C), ablating the His bundle by several freezes to −65°C for two minute durations. Permanent programmable ventricular demand pacemakers were implanted.

During follow-up one patient, with chronic atrial fibrillation, has resumed AV conduction three months after surgery but has a controlled ventricular response. The other four patients remain in complete heart block with narrow QRS complexes 14 to 22 months postoperatively. Fascicular escape rhythms were assessed by chest wall stimulation and ventricular overdrive pacing. The escape rates vary from 35 to 56 beats/minute and are increased by isoprenaline but not by atropine. Overdrive ventricular pacing is followed by long periods, up to 11 s, before fascicular/ventricular escape occurs.

These results suggest that if AV block does not return within one month it is unlikely to do so and that the post-cryosurgical rhythms are unlike those of congenital complete heart block and probably do require permanent ventricular demand pacing.

Cryosurgical techniques were used to treat two women patients with recurrent, resistant ventricular tachycardia (VT). Patient 1, aged 49 yrs with "LBBB" VT arising from the right ventricular outflow tract, had a small subaortic aneurysm and normal coronary arteries. At surgery the origin of VT, in the interventricular septum, was cryoablated

at −65°C for two minutes. This terminated the tachycardia and prevented its return. Patient 2, aged 65 yr, with "RBBB" VT, had normal coronary arteries but a large posterior left ventricular aneurysm and gross mitral regurgitation. The VT arose close to the AV groove at the left margin. Cryoablation abolished VT and the mitral valve was replaced.

Patient 1 has been asymptomatic for 20 months but repeat 24 h taped ECGs have demonstrated an increasingly high incidence of ventricular beats and one short run of slow ventricular tachycardia. Patient 2 has been followed up for 16 months and is asymptomatic. Taped ECGs have shown isolated ventricular ectopic beats.

In both patients cryosurgical treatment of VT was initially dramatically successful but longer term follow-up, although the patients remain asymptomatic, reveals disturbing ventricular ectopic rhythms which may result from progression of the disease process, recovery of abnormal cardiac tissue from cryosurgical damage, or post-cryosurgical cicatrisation.

Long-term control of AV nodal tachycardias by patient-activated radiofrequency rapid atrial pacing systems

DE WARD, AJ CAMM, R CORY-PEARCE, AJ SPURRELL, and GM REES Eight patients, aged between 12 and 60 years had frequent paroxysms of AV nodal tachycardia (AVNT). This diagnosis was confirmed by preoperative studies. All patients had failed to respond to antiarrhythmic agents.

At operation the heart was exposed by a right lateral thoracotomy (two patients) or a median sternotomy (six patients). Electrographic mapping of the right atrial (RA) epicardium during AVNT localised the earliest site of RA epicardial activation. Permanent bipolar electrodes were sutured to the RA with the active electrode at the earliest point of RA activation thus providing closer proximity to the origin of AVNT. A receiver coil was implanted anterior to the right pectoralis major (six patients) or anterior to the rectus abdominis (two patients) and located just deep to the skin to provide maximum signal intensity from the radiotransmitter.

During follow-up (one to six years) effective control of AVNT has been achieved in seven patients. One patient developed atrial fibrillation. Complications requiring reoperation were: erosion of the coil (one case), muscle stimulation (one case).

These results suggest that long-term control of resistant AVNT with patient-activated rapid pacing systems is a successful alternative therapy. The superficial siting of the coil may cause local complications.

CAT brain scanning as a preoperative screen in bronchial carcinoma

JS COCKBURN, AV FOOTE, A MCDONALD, and L MATTHEWS Some 20% of all patients presenting with bronchial carcinoma show evidence of cerebral metastases at postmortem. Approximately 10% of patients who have thoracotomies for apparently localised tumours subsequently develop cerebral metastases and die within a short time. In an attempt to select out these patients, CAT brain scanning was adopted as routine preoperative screening and the first 100 cases (73 men/27 women) are detailed.

Of the 13 patients with positive CAT scans only two remain alive (median survival three months); four had squamous carcinomas and seven more highly malignant tumours. Thoracotomy was avoided in nine cases but closer analysis reveals that in seven of the patients, there were clear contraindications to surgery for other reasons. Four had operations at least three of which, in retrospect, might have been avoided if the significance of the brain scan changes had been fully appreciated.

Several patients subsequently developed symptoms and signs of cerebral metastatic disease, in six confirmed by further CAT scan or necropsy. Three of 53, who had surgical resection of tumours, died five to 15 months postoperatively with proven cerebral metastases.

CAT brain scanning can allow thoracotomy to be avoided in over half of the patients who would develop cerebral metastases in the early postoperative period.

Comparison between fibreoptic and rigid bronchoscopy in the diagnosis of bronchial carcinoma

G SUMMERS, J LYALL, I O'BRIEN, and MV BRAIMBRIDGE Under the same general anaesthetic, fibreoptic and rigid bronchoscopies were performed in 116 patients with suspected bronchial carcinoma. Fibreoptic bronchoscopy was carried out first, and brush biopsies of any suspicious area were taken. Rigid bronchoscopy followed and conventional biopsies were taken.

The final clinical diagnosis was malignant disease in 99 of the 116 (85%). Of these 99 a positive biopsy was obtained in 86%. Brush and rigid biopsies agreed in 61%, both being positive in 47% and both negative in 14%. In those in which there was disagreement, the brush biopsy provided a positive result in 35 and the rigid biopsy a positive in four.

Abnormal rigidity was found in 39 of the 76 cases formally assessed. Cell type was obtained from 36 of the 39. Brush biopsy through the fibrescope provided cell type in 35, and rigid biopsy in 25. Both methods yielded a positive result in 22.

We have shown that cytological examination of bronchial brushings is more reliable in the diagnosis of bronchial carcinoma than histological examination of conventional biopsies obtained through the rigid bronchoscope.

Long-term survival in bronchial carcinoma in cases selected by mediastinoscopy

MH ASHRAF, RK WAKELEY, and HC NOHL-OSER On account of the high inoperability rate in bronchial carcinoma Sarin and Nohl-Oser[1] proposed mediastinoscopy before thoracotomy as a means of reducing unnecessary operations.

The results of 638 pulmonary resections performed at Harefield Hospital under one thoracic surgeon (HCNO) between February 1966 and April 1978 were presented. No patients had evidence of lymphatic spread at mediastinoscopy, and the results of the practice of such a selection in the management of bronchial carcinoma were reviewed.

In this study of 638 cases (age range 34 to 81 years), a follow-up with complete data was possible in 608 (95·2%). There were 497 male and 60 female patients. In 590 (97%) patients lung resection was carried out. There were 31 lobectomies with 18 deaths (5·4%) and 240 pneumonectomies with 15 deaths (5·8%) within a month, making an overall hospital mortality of 33 patients (5·5%). Twelve patients (2·1%) developed bronchopleural fistula, of these

nine died within a year but three survived at four, 11, and 12 years.

Minimum follow-up was one year and the longest 13 years three months. To allow for five-year follow-up, patients up to April 1974 were considered. There were 132 survivors out of 146 patients—a five-year survival of 32·5%. Similarly, to calculate 10-year survival patients operated on after April 1969 were excluded. Twenty-four patients out of 135 survived for 10 years (17·7%). Up to April 1978 out of 557 patients 218 were alive (39·1%).

The routine use of mediastinoscopy is therefore recommended because of the high resectability rate associated with a low mortality even in elderly patients.

REFERENCE

1 Sarin CL, Nohl-Oser HC. Mediastinoscopy: clinical evaluation of 400 consecutive cases. *Thorax* 1969; 24:5858.

Case report of nocardia asteroides causing mediastinitis requiring surgical drainage

JR CHAPMAN, RK WALESBY, and JR BELCHER

Nocardia asteroides is reported as causing opportunistic lung abscesses in patients with suppressed immunity. A case is reported in which nocardia asteroides caused a lung abscess and mediastinal suppuration, in a patient with systemic lupus erythematosus treated with azathioprine and prednisolone.

The diagnosis was made by needle biopsy of the lung abscess. Ultrasound and thoracic computerised axial tomography (CAT scan) were used to delineate the mediastinal abscess. Antibiotic therapy alone did not arrest the progress of the disease, with development of dysphagia, stridor, the rarely reported superior vena caval obstruction, and the previously unreported inferior vena caval obstruction.

Drainage of 1100 ml of pus from the mediastinal abscess was achieved through a tube inserted through the bed of the third rib, with rapid relief of symptoms.

The nocardia asteroides was unusually resistant. It was sensitive to streptomycin, amikacin, and fucidin only, and resistant to all other antibiotics previously reported in nocardiasis. During five weeks of treatment, despite good fucidin and streptomycin serum and pus levels, the resistance pattern changed. Resistance to streptomycin and sensitivity to doxycycline developed.

A second thoracic CAT scan, after eight weeks, showed clearance of the mediastinal abscess. The patient was discharged on fucidin and doxycycline for one year.

The case review emphasised the use of ultrasound and CAT scans in the diagnosis of mediastinal abscesses. Emphasis was also placed on the pattern of antibiotic sensitivities in this case.

Total sternectomy for malignant disease

F PARIS

Seven patients treated by total sternectomy for malignant disease of the sternum were described. Three suffered from chondrosarcoma, three from secondary sternal involvement from previously resected breast carcinoma and one from plasmacytoma. The histories of the patients, the surgical techniques used, including method of repair of the defect, and the results, were presented.

Total sternectomy is a serious major operation but excellent palliation makes the procedure worthwhile in selected patients. Steps to be taken to assess the operability of the lesion, and the results were discussed.

Comparison of a new absorbable bone sealant with bone wax in median sternotomy

E MORGAN, C SANG, and MV BRAIMBRIDGE

Virtually unchanged for over 80 years, bone wax is widely used as a haemostatic agent but, being non-absorbable, it may delay wound healing, prolong infection, and promote chronic granulation. A new bone sealant, Absele, made from stabilised fibrin and soluble collagen, absorbs completely in three weeks and causes minimal foreign body reaction. Initial neurosurgical laboratory trials have shown favourable results. This is a preliminary report of the first clinical trial comparing Absele with bone wax in median sternotomy.

Eighty-eight cardiothoracic patients undergoing median sternotomy have been randomly allocated to two groups, bone wax being used in one group and Absele in the other. There were no significant differences between the groups for age, sex, operation, pre- and postoperative condition, and size and quality of sternum. Initial problems with packing and variation in consistency of Absele have been overcome. Bone wax and Absele are both easy to handle and apply, and are equally effective haemostatic agents.

Comparison of wound healing shows fewer early major wound problems in the Absele group, three of 43 (6·9%), as opposed to seven of 43 (16·3%) in the wax group, although the difference is not yet statistically significant. The incidence of minor wound problems in both groups were similar (18 Absele, 41·9%, 16 bone wax, 37·2%).

This is a continuing trial. Larger numbers and longer follow-up will provide us with a more complete assessment of Absele. Our early experience with this new bone sealant is encouraging.

Modified sternotomy

HFM BASSETT

The necessity, especially in coronary artery surgery, of having to close wounds leaving an open pericardium, means that if reoperation is required, the second sternotomy can become hazardous and dangerous, with the right ventricle and/or vein grafts firmly adhered to, or even incorporated in the healed sternotomy.

A technique was described in which the pericardium at the first operation is opened on the right side, creating a flap based to the left. Subsequent drainage is effected into the right pleura, and the wound closed bringing the pericardial flap to the free anterior edge of the right pleura, thus separating the heart from the sternotomy.

Pericardial packing—effective last resort

JOHN F DARK

Thirteen patients from my personal series at the Wythenshawe Hospital in the last five years having a variety of open heart surgical procedures, have had pericardial packing with merely closure of the skin when a prolonged period of haemostasis has not produced a dry field. Ten of the 13 patients were having a second or third heart operation and the other three also had extensive pericardial adhesions. None of these patients died as a result of haemorrhage and one developed wound infection. Two patients died from other causes before leaving hospital.

This is a safe and effective method of dealing with diffuse haemorrhage after open heart surgery when all other attempts have failed.

Preoperative carcinoembryonic antigen (CEA) levels correlated with histology and pathological staging in bronchogenic carcinoma

JOSEPH F PAONE, J DHASMANA, and JEYASINGHAM

Carcinoembryonic an

gen (CEA) is known to be produced by a wide variety of malignant tumours and inflammatory diseases and is gaining wide clinical application as a tumour marker. Recent studies suggest that CEA levels may be useful prognostically in patients with bronchogenic carcinoma and have stimulated interest in its use in the preoperative assessment of patients for pulmonary resection. The present study was designed to determine the correlation between preoperative CEA levels and the histology and pathological staging of disease found in patients undergoing thoracotomy for bronchogenic carcinoma. In this study serum samples were obtained preoperatively from all patients undergoing evaluation for pulmonary resection for suspected carcinoma, randomised, and analysed for CEA levels. All patients undergoing pulmonary resection had extensive nodal dissections and histologic staging was performed in each case, using the American Joint Committee Clinical Staging (TNM) system.

In the initial group studied (n=110), the mean CEA levels observed were 7·56 ±1·36 (SEM) ng/ml for stage I, 15·80± 2·16 ng/ml for stage II, 20·41±2·70 ng/ml for stage III, and 74·95±19·87 ng/ml for stage IV patients. ($p<0·025$ I vs II, $p<0·05$ I vs III, $p<0·001$ I, II, III vs IV). When correlated with histology, CEA elevations (>5 ng/ml) were found in 88·2% (15/17) of patients with adenocarcinoma, 82·4% (14/17) with undifferentiated oat cell, 80% (8/10) with undifferentiated large cells, and 68·5% (37/54) with squamous cell carcinoma.

These preliminary data indicate that preoperative CEA levels correlate positively with the extent of bronchogenic carcinoma determined histologically at the time of operation. Further studies are indicated and are in progress to determine the prognostic significance of preoperative CEA elevations in patients with pulmonary neoplasms.

Results of modified Blalock-Taussig shunts (Gore-tex) in infants and children

R MCKAY, J STARK, and M DE LEVAL While the Blalock-Taussig shunt remains the procedure of choice for most patients requiring systemic-pulmonary anastomosis, a small number are not suitable for the classical operation. Since October 1976 a modification employing Gore-tex conduits between the subclavian and pulmonary arteries has been used on 69 occasions in 66 patients. The age at operation ranged from one day to 14 years, half of the patients being less than one year of age, and 19 in the first month of life. Diagnoses included tetralogy of Fallot (13), pulmonary atresia (23), double outlet right ventricle (three), transposition of the great arteries with left ventricular outflow obstruction (10), univentricular heart (five), tricuspid atresia (11), and "absent" pulmonary artery (one). Six patients died in hospital (9% early mortality). Fifty-eight patients have been followed up from one to 30 months. There were four early shunt failures and two late deaths which may have been shunt failures. In 18 patients restudied 10–29 months postoperatively (mean=15·7), one shunt was occluded. However, three patients operated in the first week of life have required second shunts. There has been no instance of intractable heart failure. These early results suggest that Gore-tex conduits function satisfactorily in subclavian-pulmonary anastomoses at all ages, although late results remain to be evaluated.

Pulmonary vascular changes after the creation and subsequent closure of aorto-pulmonary shunts in young piglets

A REES, D GUERRERO, and SC LENNOX A 6 mm aorto-pulmonary shunt was created in piglets at four weeks of age. Over the next two months the animals were investigated by cardiac catheterisation to confirm that the shunts were still open to show any changes in pulmonary haemodynamics. In addition, serial measurements of lung mechanics were performed. At two months the shunts were closed and a small portion of lung was taken for histology. Again serial cardiac catheterisation and measurement of lung mechanics were performed at monthly intervals. The animals were killed at one to five months after shunt closure. Histological examination of the lungs with particular reference to pulmonary arterioles was then performed to show a progressive return to normal.

Practical approach to actuarial analysis in cardiac surgery

ENDRE BODNAR, STEVEN HABERMAN, and WILLIAM H WAIN Actuarial analysis of follow-up data in cardiac surgical reports has been widely accepted to characterise and compare performances of different valve prostheses, although the original method examines follow-up related to patients rather than valves. Factors other than the valve itself which might affect the fate of the patient have been neglected. The analysis of performances of the valve replacements has been potentially biased by the condition of the patients at or after cardiac surgery. Furthermore, as yet, there has not been a life table method offered to compare two independent sets of data, that is, performances of two different valves.

To overcome these difficulties and to make the assessment and presentation of data both comprehensible and comparable, actuarial analysis has been described in practical terms and a method has been completed which defines valve function and malfunction and which separates patient survival from valve performance. A simple formula for the calculation of the significance of the difference between two survival probabilities has also been proposed. The possible changes in the intensity of risk during the follow-up period have been described by offering the calculation of the instantaneous rate of the events.

More than 10 years' experience with the Björk-Shiley tilting disc valve

VO BJÖRK and A HENZEL Over 10 years' clinical experience with 1962 Björk-Shiley tilting disc valve experience was focused on improving its durability, flow dynamics, thromboresistance, and in vivo function control. The durability of the prosthetic valve was further prolonged by pyrolytic carbon as disc material. The opening mechanism was also reinforced by integrating the bearing struts with the valve ring. No other presently available heart valve prosthesis shows such a low resistance to flow for a given tissue diameter. The five-year survival rates were 82% after aortic, 66% after mitral, and 66% after mitral and aortic valve replacements including the operative mortality. The incidence of systemic emboli was 0·7%/year after aortic, 4·2%/year after mitral and 2·2%/year after mitral and aortic valve replacements with anticoagulation treatment. The new convexo-concave model decreases the stagnation zone behind

the disc, decreasing emboli from 4·2 to 1·2%/year after mitral valve replacement and has a lower gradient.

Five hundred consecutive aortic valve replacements

JK ROSS, MM MACKEAN, and JL MUNRO Between October 1972 and March 1979, 500 patients underwent aortic valve replacement in Southampton. There were 351 men and 149 women, average age 55·4 years (range 10–77). One hundred and twenty-two patients underwent additional procedures excluding other valve replacements.

There was no significant difference in early mortality (death in hospital or within 30 days after operation) between patients having an isolated valve replacement and those having an additional procedure. The early mortality for the different types of valves used was as follows:

Type of valve	*Number*	*Early mortality*	
Prosthetic	240	15	(6·3)
Homografts	151	3	(2·0)
Heterografts	109	1	(0·9)
Total	500	19	(3·8)

A life-table analysis shows a survival of 92% after five years for patients with heterograft valves, compared with a 66% survival for patients having prosthetic valves. Patients having homografts have only been followed up for two years but show a survival of 94% at that time compared with 92% and 88% for homograft and prosthetic valves respectively.

Event-free curves showed that 83% of patients with homografts had suffered no significant event at five years compared with 63% of patients with prosthetic valves.

Surgical management of ruptured chordae

DARRYL F SHORE, PHILIP WONG, and MATHIAS PANETH Between January 1961 and December 1978, 117 patients underwent surgery for ruptured chordae (RC) of the mitral valve. The hospital mortality was 11·8%. Survival at five years was 90±8% after repair 54 patients) and 76±8% after valve replacement (63 patients). The overall incidence of reoperation was 18·5% (10/54) after repair and 20% (13/63) after mitral valve replacement (MVR). Repair was performed by trapezoidal excision of redundant leaflet, reapproximation of the leaflet edges and annuloplasty. From 1971–78, we confined attempts at repair to patients with RC of the posterior leaflet. As a result, the incidence of reoperation after repair fell to 3% (1/33) while in the same period the incidence of reoperation after MVR was 14·7% (5/35). The incidence of major thromboembolic episodes was 0·67 per 100 patient years without anticoagulation after repair and 5·7 per 100 patient years with anticoagulation after MVR. The peak rate of dimension change (PRDC) of the transverse dimension of the left ventricle was determined by echocardiography in 17 patients after repair. The PRDC was within the normal range (10–30 cm/s) in 15 patients in the stenotic range (<10 cm/s) in one patient and in the regurgitant range (>20 cm/s) in one patient. MVR invariably produces PRDC values in the stenotic range. Valve repair is the procedure of choice in RC of the posterior leaflet.

Operative management of tricuspid valve disease

AJ MEARNS and MI IONESCU At Leeds General Infirmary between 1963–1977, 159 patients had 160 tricuspid valve operations.

There were five isolated tricuspid procedures; 108 patients had 109 mitral and tricuspid valve procedures; 44 patients had mitral, aortic, and tricuspid valve procedures; two patients had aortic and tricuspid procedures, both of whom died. The tricuspid operations were both replacements (102) and conservative (58). The conservative operations consisted of Kay annuloplasty (23 cases) and De Vega annuloplasty (35 cases). Both tissue (25) and mechanical (45) valves were used in the tricuspid position.

Tricuspid disease was diagnosed either before or at operation. There was no significant difference in the time at which disease of the tricuspid valve was detected, be it functional incompetence (67) or organic disease (83). The decision to operate was made predominantly at operation.

Forty-seven patients had had previous closed mitral valvotomy and the time from valvotomy to open mitral valve surgery with associated tricuspid procedures varied from nine months to 22 years. Actuarial assessment demonstrates that this is an even decay curve over the 23-year period. There were 55 deaths within one month of operation (34·4%). The predominant cause of death was a low output state. There were 19 late deaths in the series and there was no statistically significant difference in late deaths between double and triple valve replacements. Four late deaths were from congestive cardiac failure with no evidence of valve dysfunction, and each of these patients had made a good recovery initially and had deteriorated after a minimum of one year of good health, developing resistant congestive cardiac failure. There was no significant statistical difference between the prognosis of the patients who survived, whether replacement or conservative procedures had been carried out on the tricuspid valve. The majority of late valve related problems were usually caused by the failure of the mitral valve prosthesis in situ. There were no tricuspid valve related problems in patients with conservative tricuspid procedures.

The decision to operate on the tricuspid valve is usually made at operation, and the chosen procedure depends on the findings. Once the tricuspid valve surgery had been performed and the patient had survived, the tricuspid valve was unlikely to be the cause of further pathology. A small group of patients with rheumatic valve disease die of progressive ventricular dysfunction despite the initial improvement gained with multiple valve replacements. Conservative and replacement procedures for tricuspid valve disorders seem to be equally effective. Early operation should reduce mortality and improve the quality of life.