

1985 ANNUAL MEETING PROGRAM



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**American Association for
Thoracic Surgery
65TH ANNUAL MEETING
Scientific Program**

MONDAY MORNING, April 29, 1985

8:30 a.m. Business Session (Limited to Members)

8:45 a.m. Scientific Session - Grand Ballroom

1. Experiences with the Carpentier Techniques of Mitral Valve Reconstruction in 89 Patients

*FRANK C. SPENCER, STEPHEN B. COLVIN**
And O. WAYNE ISOM

New York, New York

During the past 4 years (May 1980-August 1984) 89 patients have had some type of Carpentier reconstruction performed for mitral insufficiency. There were two hospital deaths, unrelated to the operative technique. No late deaths or major thromboembolic episodes occurred. All patients are clinically well. Doppler studies in 71 found no insufficiency in 60 patients, a trace in 10, and moderate insufficiency in one. Catheterization performed one to three years after operation in 15 patients found no signs of insufficiency. Valve replacement was later necessary in two patients for unrelated infections (heroin addiction).

The basic disease was rheumatic in 9, prolapse in 27, ruptured chordae and prolapse in 45, endocarditis in 2, coronary disease in 6. Two patients had severe annular calcification. Annuloplasty alone was adequate in only 16. Fifty-one had resection of two or more cm of mitral leaflet combined with annuloplasty. In 22 aortic lesions, chordae transposition or shortening was used.

The absence of recurrent insufficiency fully supports the durability of the reconstructive techniques. Multiple abnormalities were present in most patients, explaining the limited role of annuloplasty alone. With present techniques of myocardial preservation, probably the vast majority of non-rheumatic, non-calcified valves can be repaired. A much wider use of these techniques is indicated.

*By Invitation

2. Late Thrombosis of the Tricuspid Bjork-Shiley Tilting Disc Valve: Thrombolytic Treatment with Streptokinase

DEJAN BOSKOVIC, IVO ELEZOVIC*
and DARINKA BOSKOVIC**

Beograd, Yugoslavia

Sponsored by: W. DUDLEY JOHNSON

Milwaukee, Wisconsin

The main complication after implantation of tricuspid Bjork-Shiley tilting disc valve is late thrombotic obstruction. Of 28 patients with tricuspid valve replacement (12 MVR + TVR and 16 MVR + AYR + TVR) (mean follow-up of 4.7 years), six (21.4%) developed thrombosis of tricuspid prosthesis, an incidence of 4.6 valve thromboses per 100 patient years. Thrombosis occurred 46, 43, 33, 35, 78 and 88 months after operation.

Clinical deterioration presented with signs of congestive heart failure. In all patients, the click of the tricuspid prosthesis was not heard and new systolic or diastolic murmurs were audible. The diagnosis was confirmed with bi-dimensional echocardiography (immobile disc, diminished opening angle of the disc).

Thrombolytic therapy with Streptokinase was used in all six patients. Treatment consisted of Streptokinase (initial loading dose of 250,000 IU then 150,000 IU/h) for 12 hours in two patients and 24 hours in four patients. Thrombolytic therapy was always monitored with thrombin time.

Complete regression of clinical, echocardiographic and radiological signs of thrombosis was seen in all six patients during the first 24 hours of thrombolytic treatment. There were no bleeding

complications. In one patient, clinical signs of mild pulmonary embolism occurred and were confirmed with chest radiography.

Follow-up extends between 4-24 months, mean 13 months. In four patients, long-term results are excellent: There have been no clinical, radiological, or echocardiographic signs of thrombosis of tricuspid prosthesis.

Rethrombosis of tricuspid prosthesis was observed in two patients four and seven months after initial treatment with Streptokinase. Repeat thrombolytic treatment with Streptokinase was performed with success in both patients.

Summary: Fibrinolytic treatment with streptokinase seems to be treatment of choice for thrombosis of tricuspid Bjork-Shiley valve and should always be tried before reoperation.

*By Invitation

3. Experience with 110 Consecutive Patients Undergoing Surgery for the Wolff-Parkinson-White Syndrome

*JAMES L. COX, JOHN J. GALLAGHER**
*and MICHAEL E. CAIN**

St. Louis, Missouri and Charlotte, North Carolina

Between July 1, 1980 and October 1, 1984, 110 patients underwent surgery for correction of the Wolff-Parkinson-White (WPW) syndrome by the senior author. There were 67 males and 43 females with ages ranging from 9 months to 70 years (mean, 28 ± 6 yrs). The major indications for surgery were medical refractoriness or drug intolerance (79%) and previous cardiac arrest (13%). Associated abnormalities included Ebstein's anomaly (8%), other arrhythmias (36%), coronary artery disease (5%), cardiomyopathy (6%), and other congenital heart disease (24%). Two patients had undergone WPW surgery previously at other institutions. Twenty percent of patients had multiple (2-4) accessory pathways, a total of 138 pathways being present in the 110 patients. Distribution of the accessory pathways was: 56% left free-wall, 24% posterior septal, 14% right free-wall, and 6% anterior septal. The surgical technique employed previously for the WPW syndrome was modified in August, 1981 to include: 1) 2.5 power optical magnification, 2) exclusive use of the endocardial approach under cardioplegic arrest, 3) wider margins of surgical excision, 4) sharp dissection of the involved valve annulus,

5) division of only the ventricular insertion of the accessory pathway, and

6) internal identification of the ventricular epicardial peel in all regions of dissection. Using these modifications, 137 of 138 accessory pathways were divided successfully in the 110 patients. In comparison to our initial 200 patients previously reported, the modified surgical technique resulted in an increase in the success rate from 86% to 99.3%, a decrease in the reoperation rate from 19.5% to 0%, and a decrease in the incidence of heart block from 10.5% to 0.9%. The mortality rate was 5.5% in the entire series but only one death occurred following elective surgery in the absence of associated cardiac anomalies. The present surgical technique and attendant results suggest that surgery is the conservative alternative to a lifetime of medical therapy in young, otherwise healthy patients suffering from the WPW syndrome.

*By Invitation

4. Twelve Year Experience with Internal Mammary Artery for Coronary Artery Bypass

*HENDRICK B. BARNER, JOHN W. STANDEVEN**

*and JEFFRY REESE**

St. Louis, Missouri

From January 1972 to January 1984 1000 patients have had primary coronary reconstruction with one or two (100 patients operated between 6/72 and 6/74) internal mammary arteries (IMA). Patients having associated procedures such as valve replacement or aneurysmectomy were excluded. Prior to 6/74, patients were not selected and subsequently they were. Overall operative mortality was 1.3% but eight deaths occurred in the 100 patients having bilateral IMA bypass and all but one death occurred in the first 500 patients. Survival at five years is 89% and at 10 years 76%.

One or more postoperative cardiac catheterizations have been done in 485 patients; 345 of these were operated from 1972 through 1975 and 30% of them have had three postoperative studies. Patency for IMA grafts at one year is 94%, at five years 90% and at 10 years 88%. Patency for saphenous vein grafts in these same patients is 92% at one year, 81% at five years and 67% at 10 years. We have not recognized progressive graft atherosclerosis leading to IMA closure.

Although the durability of the IMA has been established this has not been firmly translated into enhanced survival. The right IMA was usually placed to the right coronary artery at the acute margin and did not bypass all disease so that follow up angiograms frequently revealed a patient IMA into a distally diseased or occluded vessel. More appropriate use of the right IMA is to the obtuse marginal artery, usually as an in situ graft, or to the posterior descending artery, usually as a free graft. It is hoped that use of bilateral IMA grafts, with sequential grafting when appropriate, will be associated with enhanced survival and a reduced need for reoperation.

10:00 a.m. Intermission - Visit Exhibits - Grand Salon

Complimentary Coffee

*By Invitation

10:45 a.m. Scientific Session - Grand Ballroom

5. Electron Microscopy in Selection of Patients with Small Cell Carcinoma of the Lung for Medical Versus Surgical Therapy

J. DIRK IGLEHART, WALTER G. WOLFE,*

WALTER B. VERNON, ROBIN T. VOLLMER*,*

JOHN D. SHELBURNE and DAVID C. SABISTON, JR.*

Durham, North Carolina

Although most patients with small cell carcinoma of the lung (SCCL) are currently managed by a combination of chemotherapy and radiotherapy, controversy continues concerning indications for surgical treatment. A study was conducted to determine the role of electron microscopic sections (EM) in establishing a pathological diagnosis in patients with SCCL. The EM findings were correlated with the clinical pathological state and the prognosis. Forty-five patients with a pulmonary lesion demonstrated on chest film were evaluated. Twenty underwent thoracotomy and 12 had biopsy of a metastatic lesion. Light microscopy (LM) of the tissue in each of these patients

was reviewed independently. All EM preparations were examined for features of squamous epithelial differentiation, for features of adenocarcinoma, and for those which were classic for SCCL. A postoperative "TNM" state was established and actuarial survival determined for each group. When examined by EM, 26 (59%) of the neoplasms appeared to be classical SCCL, whereas 19 (41%) displayed features of squamous differentiation (15) or of adenocarcinoma (4). There was no relationship between LM and EM characteristics. While the majority of patients with classic SCCL by EM presented with inoperable disease and underwent biopsy of a metastatic lesion, 14 of 19 patients with electron microscopic features of squamous differentiation presented with operable disease and a curative resection was possible in 9. The actuarial survival in patients with EM features of squamous differentiation exceeded 25% at 5 years and was comparable to figures for bona fide squamous carcinoma. In contrast, only one patient with classic SCCL survived longer than 22 months. This study has identified a special and sizable group of patients with SCCL who have a quite favorable prognosis and cannot be distinguished by LM alone. In view of the markedly improved results with surgical therapy in this group, preoperative anatomic staging and selective surgical resection followed by EM examination is recommended.

*By Invitation

6. Treatment of Bronchopleural Fistula After Pneumonectomy

JOHN C. BALDWIN and JAMES B.D. MARK*

Stanford, California

Disruption of the closure of a mainstem bronchus after pneumonectomy is frequently a catastrophic complication; those patients who survive frequently develop empyema and bronchopleural fistula. Management of these fistulae remains a formidable therapeutic challenge, which has been approached with a variety of surgical techniques. We report our experience with anterior transpericardial closure of bronchopleural fistulae, emphasizing the possibility of approaching either mainstem bronchus and the efficacy of in-continuity ligation of the bronchus.

Three patients are presented, who developed bronchopleural fistulae after pneumonectomy. The first patient had left pneumonectomy for complicated tuberculosis; the second had right pneumonectomy for neoplasm; and the third had right pneumonectomy for trauma. All patients were approached surgically using median sternotomy and transpericardial approach to the distal trachea, dividing the posterior pericardium between the superior vena cava and aorta. Simple in-continuity staple closure of the proximal mainstem bronchus was employed in all cases. All patients are clinically well at 16, 12, and 2 months after surgery.

In post-pneumonectomy bronchopleural fistula, the technique of anterior transpericardial approach to bronchial ligation carries the advantages of the well-tolerated median sternotomy incision, the avoidance of dealing directly with a devascularized bronchial stump and areas of post-surgical scarring, the avoidance of areas of chronic sepsis, and the avoidance of surgical deformity of the chest wall with associated compromise in pulmonary function. Our experience also indicates that either mainstem bronchus is accessible using an approach between the superior vena cava and aorta without division of either pulmonary artery. In addition, since closure of a divided distal bronchial stump would increase the risk of mediastinal sepsis and still leave a blind stump, we propose that the procedure of in-continuity staple ligation is safer and no less satisfactory from the theoretical viewpoint.

11:30 a.m. Presidential Address - Grand Ballroom

Observations On The Coronary Circulation

DAVID C. SABISTON

12:15 p.m. Adjourn for lunch

*By Invitation

MONDAY AFTERNOON, April 29, 1985

2:00 p.m. Scientific Session - Grand Ballroom

7. Complications of Tracheal Reconstruction - Incidence, Treatment and Prevention

HERMES C. GRILLO, PIERO ZANNINI
and FABRIZIO MICHELASSI**

Boston, Massachusetts, Milan, Italy and Chicago, Illinois

Complications were analyzed in 365 consecutive patients who underwent tracheal resection and primary reconstruction for tumors and post-intubation stenosis between 1962 and 1982. Complications included: (I) those due to incomplete diagnosis, (II) technique and (III) miscellaneous. In I were: glottic incompetence (2), malacia (3), extent of lesion. In II were: granulation (28), anastomotic separation (4), stenosis (21), hemorrhage (2), laryngeal nerve injury (5). In III were: wound infection (6), laryngeal edema (1), respiratory failure (2), pneumonia (2).

Treatment included removal of granulations and steroid injection, re-suture of acute separation, tube stenting of delayed separation or stenosis and later resection, innominate artery repair or resection, T-tube by-pass for TEF with later repair, conservative management of cord palsy.

Prevention, as demonstrated by lesser incidence of complications in the second half of the series, includes use of absorbable sutures to avoid granulations, total removal of inflammatory lesions to avoid re-stenosis, avoidance of separation and stenosis due to excessive anastomotic tension, pre-operative definition of laryngeal incompetence and extensive malacia; peri-tracheal dissection to avoid innominate hemorrhage, peri-operative antibiotics and meticulous dissection, avoidance of devascularization, use of temporizing measures such as T-tube splinting and intraluminal excision of tumor to allow selection of optimal conditions for operation.

*By Invitation

8. Effects of Coronary Revascularization on Left Ventricular Function in Ischemic Heart Disease

J. SCOTT RANKIN, GLENN E. NEWMAN*,*

LAWRENCE H. MUHLBAIER, VICTOR S. BEHAR*.*

HARRY R. PHILLIPS and DAVID C. SABISTON, JR.*

Durham, North Carolina

Analysis of regional wall motion (RWM) during reperfusion of acute myocardial infarction has demonstrated reversibility of ischemic dysfunction in many cases. However, similar data about changes in RWM after coronary revascularization in broader categories of ischemic heart disease have not been available. Using conventional or digital subtraction techniques, 100 patients

underwent coronary arteriography and biplane left ventriculography before and 7-14 days after coronary bypass grafting. RWM was assessed by the 100 segment method of Sheehan and Dodge, and a perioperative change in shortening of greater than 2 S.D. of normal variability in 20 or more adjacent segments was considered significant. 51 patients had stable or progressive angina (SA), 49 had medically refractory unstable angina (UA), 89 were NYHA class IV, and 20 had a preoperative left ventricular (LV) ejection fraction (EF) of less than 0.4. Myocardial integrity was preserved with crystalloid cardioplegia and topical hypothermia. 438 bypass grafts were performed (323 vein grafts and 115 mammary artery grafts), and 8 patients underwent concomitant LV aneurysmectomy. Overall postoperative graft patency was 95% (93% for vein grafts and 100% for mammary arteries). Only one patient had a decrement in RWM, and 46 had significant postoperative improvement (26 in UA and 20 in SA); of the patients with improved RWM, EF increased by an average of 0.18 ($P<0.01$). EF also improved in all patients undergoing aneurysmectomy (avg. of + 0.11; $P<0.05$), and the increment seemed to result from both a reduction in end-diastolic volume and improved RWM. Thus, reversible ischemic myocardial dysfunction appears to be common in the general population of patients undergoing coronary artery bypass grafting; 51% of UA and 39% of SA patients can be expected to improve RWM after successful revascularization. Finally, ventricular aneurysm resection significantly enhances LV performance as assessed by ventriculographic EF.

*By Invitation

9. Intraoperative Color Flow Mapping By Real-Time Two-Dimensional Doppler Echocardiography for Evaluation of the Valvular and the Congenital Heart Diseases, and the Vascular Diseases

SHINICHI TAKAMOTO, SHUNEI KYO*,
YUJI YOKOTE* and RYOZO OMOTO*
Saitama, Japan*

Sponsored by: MORTIMER J. BUCKLEY

Boston, Massachusetts

No accurate methods for intraoperative evaluation of the valvular and the congenital heart diseases, and the vascular diseases in the dynamic state have existed. We have newly developed real-time two-dimensional Doppler echocardiography (2-D Doppler) which displays real-time color flow mapping on B-mode echocardiogram. Flow towards the transducer is displayed by red color and flow away from it by blue color. Velocity of the flow is displayed in direct proportion to the brightness of the color. This study was performed to examine the clinical usefulness of intraoperative 2-D Doppler in the valvular and the congenital heart diseases and the vascular diseases. Intraoperative 2-D Doppler was performed in 17 patients. 6 valvular (MS 1, TR 1, AR 2, other 2) and 5 congenital heart diseases (VSD 2, ASD + MR 1, d-TGA 1, other 1) and 8 vascular diseases (Dissecting Aortic Aneurysm 8). In valvular diseases status of regurgitation after mitral commissurotomy and repair of the valve, and that of untouched valve were evaluated in the beating state and necessity of valve replacement was checked. In congenital heart diseases pre-operative diagnoses were confirmed, location of VSD was precisely determined and post-repair states were evaluated. 2-D Doppler guided blade atrioseptostomy in d-TGA was performed successfully. In the dissecting aortic aneurysms sites and size of even small entry and re-entry, flow dynamics in the true and false lumens were displayed and the precise operative procedures were determined. And the post-operative flow status in the graft anastomosis, the residual dissection and the major aortic branches were evaluated.

In conclusion intraoperative 2-D Doppler can display clearly and easily the intra-cardiac and vascular abnormality of not only the structure but also flow dynamics in a short time. Intraoperative

2-D Doppler is very effective in evaluating pre- and post-operative states and determining the precise operative procedures in the cardiovascular diseases.

3:00 p.m. Intermission - Visit Exhibits - Grand Salon

Complimentary Coffee and Soft Drinks

*By Invitation

3:45 p.m. Forum Session - Grand Ballroom

10. Retained Intracardiac Air: Transesophageal Echo-cardiography for Definition of Incidence and Monitoring Removal by Improved Techniques

*YASU OKA **, *TETSUhide INOUE**, *YONG HONG**,

*DONATO A. SISTO**, *JOEL A. STROM**

and ROBERT W.M. PRATER

The Bronx and New York, New York

Retained intracardiac air is a continued hazard for cardiopulmonary bypass (CPB). M-mode TEE of LA, LV & Ao is a highly sensitive method for detecting retained intracardiac air bubbles. In 15 valve surgery (VS) and 18 coronary bypass (CABG) patients - M-mode TEE was used to record air bubble presence during and for 15 minutes after bypass. Routine air cleaning methods were: ascending Ao needle aspiration (VS & CABG), LA & LV & Ao aspiration after careful passive chamber filling (VS).

12/15 (79%) VS patients and 2/18 (11%) CABG patients had air detected. One with Ao air had visible R coronary air embolism. Three patients with positive echograms had transient CNS disturbances. In a further eleven (11) VS patients, Asc. Ao to Venous shunt were instituted before discontinuing bypass but air continued to be present in the LA. Finally, in 7 patients, positive chamber filling with echo demonstration of LA stretching, vigorous chamber ballottement, specific echo directed chamber aspiration and maintenance of CPB until TEE was negative for retained air were added to the routine. Although small amounts of atrial air could still be detected for a minute or two in some patients, this technique appears finally to have eliminated significant retained air and its consequences.

A sensitive technique for intracardiac air detection reveals retained air surprisingly often post CPB. There are both possible and probable adverse consequences of this air. After VS, LA air is the most difficult to eliminate. The essential elements of air removal are: 1) Mobilization of the air: positive chamber filling, stretching the atrial wall and ballottement are critical. 2) Removal of mobilized air: continuous Asc. Ao to venous shunting and non-suction LA venting are very important. 3) Proof of elimination prior to ending CPB: TEE is vital for this.

*By Invitation

11. Cryoprecipitate-Topical Thrombin Glue: Initial Experience in Cardiac Surgery Patients

*FLAVIAN M. LUPINETTI**, *WILLIAM S. STONEY,*

*WILLIAM C. ALFORD, JR., GEORGE R. BURRUS**,

*DAVID M. GLASSFORD, JR. **

MICHAEL R. PETRACEK and*

CLARENCE S. THOMAS, JR.

Nashville, Tennessee

The use of fibrin glues as topical hemostatic agents is reported in numerous clinical series in the European literature. We have composed a fibrin glue in our operating rooms from cryoprecipitate and topical thrombin (5000 units/5 ml saline) in equal volumes applied directly to the site of bleeding. This report describes our initial experience using cryo-precipitate-topical thrombin (CTT) in 26 patients undergoing open-heart operations. Severe bleeding not responding to usual methods of control was encountered during or after CAB (n= 17), valve replacement (n = 3), CAB + valve replacement (n = 5), or repair of post-infarction VSD (n = 1). Five patients were operated on emergently and 4 were undergoing their second open-heart operation. CTT was used in 4 patients while on bypass and fully heparinized and in 17 patients who continued to bleed after separation from bypass and administration of protamine. Hemostasis was achieved in all cases and none required reexploration for bleeding. In 5 patients who were reexplored for postoperative hemorrhage (none having received CTT during the initial operation), CTT provided hemostasis when other measures failed, and no additional reexplorations were needed. No patient developed hypersensitivity, fibrinolysis, or coagulopathy following the use of CTT. In 18 patients surviving and discharged from the hospital, no hepatitis has occurred over a follow-up period of 3 to 6 months. The highly concentrated fibrinogen in cryoprecipitate is activated by thrombin to form fibrin and bring about rapid hemostasis. CTT is a readily available, reliable, and inexpensive topical hemostatic agent in the cardiac surgery patient.

*By Invitation

12. Externally Stented PTFE Valved Conduits for Right Heart Reconstruction: An Experimental Comparison with Dacron Valved Conduits

JOHN W. BROWN, MICHAEL P. HALPIN,
FRED J. RESCORLA*, BRUCE W. VANNATTA*,*

ANDREW C. FIORE, GARY D. SHIPLEY*,*

MOGES BIZUNEH, RANDY BILLS**

*and BRUCE WALLER**

Indianapolis, Indiana

Valve containing conduits have made possible the repair of many congenital anomalies which involve right ventricular to pulmonary artery (RV-PA) discontinuity. The distressing problem of neointimal peel (NP) formation with eventual conduit obstruction in clinical series of Dacron valved conduits (DVC) has led to the need for premature replacement in many patients. Externally stented polytetrafluoroethylene (ES-PTFE) has demonstrated superior patency in the venous system experimentally and clinically and may offer advantages when compared to Dacron for the development of NP. The purpose of this study was to compare the trans-conduit resistance and the thickness of NP in RV-PA valved conduits constructed of ES-PTFE with those of woven Dacron.

Nineteen millimeter ES-PTFE conduits (Impra) containing a porcine valve (Hancock-Extracorporeal) were implanted in six adult mongrel dogs followed by proximal PA occlusion. In six additional animals a DVC of similar size and length was inserted. Cardiac Output (CO), transconduit gradient (G) and resistance (G/CO) were measured at operation and at 3 months. All

conduits were subsequently explanted, opened longitudinally and the thickness of the NP (excluding suture lines) measured. Groups were compared statistically using a T test.

		<u>Operation</u>	<u>3 Months</u>
ES-PTFE	G/CO	9.93 ± 1.83	6.5 ± 5.55
(N = 6)	NP		156 ± 50
DVC	G/CO	7.75 ± 1.71	4.41 ± 1.3
(N = 6)	NP		609 ± 144

CO in liters/minute; G in mmHg; NP in microns; Each value expressed as a mean ± SEM.

Cardiac output and resistance were not significantly different between the two groups (P<.09). The NP was four-fold greater in DVC (P<.01). ES-PTFE conduits had a thin, uniform NP with normal opening valves, while DVC had a thick NP which extended into the valve cusps limiting leaflet excursion.

This study demonstrated: (1) the early hemodynamic performance of ES-PTFE conduits was comparable to that of DVC; (2) DVC demonstrated an accelerated rate of NP formation which affected cusp mobility; and (3) ES-PTFE conduits formed a thin neo-intima and valve leaflet motion was preserved.

These data suggest that right heart conduits constructed of externally stented PTFE offer advantages over Dacron valve conduits and warrant careful clinical trial.

*By Invitation

13. Double Orifice Mitral Valve in AV Canal Defect: Surgical Experience in 25 Patients

*CHUEN-NENG LEE**, *GORDON K. DANIELSON,*

*HARTZELL V. SCHAFF**, *FRANCISCO J. PUGA*

*and DOUGLAS D. MAIR**

Rochester, Minnesota

Double orifice mitral valve is an uncommon, but surgically important condition. Our surgical experience with 25 cases of double orifice mitral valve associated with atrioventricular (AV) canal defects (16 partial and 9 complete) was reviewed. This constituted 4.3% of the 581 cases of AV canal defects operated upon between 1961 and July 1984. Of the 24 cases in which the interconnecting tissue bridge was left intact, all survived surgery. The single operative death (4.0%) occurred in an early (1967) patient in whom the tissue bridge was severed, resulting in massive mitral regurgitation. The combined mitral orifice area ranged from 85% to 91% of normal in those valves sized intraoperatively. Two patients required mitral valve replacement for mitral regurgitation 3 and 11 yrs postoperatively, respectively. Of 23 patients with cleft mitral valves, 20 had partial or complete closure of the cleft. All patients had either none or only mild mitral stenosis at a mean follow-up of 6 yrs. Double orifice mitral valves without clefts are usually competent. Many of those valves with clefts are incompetent at the cleft. Complete closure of the cleft may cause hemo-dynamically significant mitral stenosis. Repair should be made so that a minimum amount of mitral insufficiency and mitral stenosis remain. Measurement of valve orifice areas and comparison with standard tables, intraoperative valve testing, and post-repair double sampling dye

curves improve accuracy of the repair. In most patients, an excellent repair can be accomplished with very low mortality.

*By Invitation

14. Saphenous Vein and Intraoperative Evaluation of the Coronary Arterial System Using Angioscopy in Cardiac Surgery

BENJAMIN WESTBROOK, HAROLD L. LAZAR*,*

JOHN R. McCORMICK, TIMOTHY A. SANBORN**

JOERGEN RYGAARD and ARTHUR J. ROBERTS**

Boston, Massachusetts

Sponsored by: IRVING MADOFF

Brookline, Massachusetts

Improvements in fiberoptic systems have permitted the development of clear photographic images processed through flexible 1.5 to 1.7 mm solid state catheters. Accordingly, intraoperative assessment of the luminal anatomy of the saphenous vein, native coronary arteries and anastomotic relationships between these structures were evaluated during coronary artery bypass graft surgery. In addition, changes in native coronary obstructions prior to and following intraoperative balloon catheter dilatation were visualized. Preliminary evaluation was performed in a group of patients during a period of cardioplegic arrest utilizing hypothermic crystalloid potassium cardioplegia. The fiberoptic catheter was inserted into the vascular system through a coronary arteriotomy or a previously completed distal coronary artery-saphenous vein anastomosis. Native coronary artery obstructions were identified by this process and semi-quantitative correlations with preoperative coronary angiograms showed reasonable correlations in terms of the extent of luminal narrowings. Coronary artery anastomoses showed a wide range of patency and, in some cases, intraluminal projections related to native vessel disease or imperfect coronary anastomoses were identified. Improvements in luminal diameter related to balloon catheter dilatations were also clearly discernible. There were no vessel dissections, coronary perforations, or mortalities associated with the use of this new and intriguing technique. Further evaluation is warranted and is presently in progress.

*By Invitation

15. Immediate Tricuspid Valve Replacement for Endocarditis: Indications and Results

HENRY J. STERN, DON A TO A. SISTO*,*

JOEL A. STROM, RUY SOEIRO*, STEPHAN R. JONES*,*

and ROBERT W.M. PRATER

New York, New York

Tricuspid valve excision is currently recommended for TE in addicts and purports to avoid 1) early and 2) late postoperative infection and 3) any severe hemodynamic cost to the patient. Three (3) patients had TV excision. All left with gross TI and one was last seen in critical failure. We report the alternative policy of routine TVR with bioprostheses in 10 patients over 3½ years. Indications for surgery: Uncontrolled infection 10; Repeated pulmonary embolism 7; Valvular insufficiency 3. All 10 had Staphylococcus Aureus (SA) infection and 2 had additional other

organisms. All had vegetations > 1 cm. in size on echo. Preoperative complications: Organ failure - Hepatic (2); Resp. (1) and Renal (4); Pericarditis (2); Empyema (2); Recurrent hemoptysis (1); Septic Arthritis (1); Anemia (8); Thrombocytopenia (6); Vasculitis (1). There was no in-hospital mortality and all patients left infection free. At least 3 patients returned to their addiction. One needed repeat TVR at 28 mos. One patient died at 5.5 mos. (perforated DU + torulopsosis). There was no evidence of prosthetic valve endocarditis at autopsy.

Indications: To put these findings in perspective - 22 consecutive patients with TE were studied in one year. Infecting agents: Staph A: 13 (8 vegs.>1 cm.). Other organisms 9 (2 vegs.>1 cm.). During the year 3 had TVR for uncontrolled infection. All had Staph infection with vegs.>1 cm. All 22 patients left hospital infection free.

Conclusions: TE rarely needs surgery. Failed antibiotic therapy occurs in Staph infection with large vegs. and is the likeliest cause for surgery. TVR is not accompanied by early reinfection and avoids congestive failure. Chronic addiction is a mortal disease with or without a tricuspid valve prosthesis.

*By Invitation

TUESDAY MORNING, April 30, 1985

6:45-8:15 a.m. Simultaneous Breakfast Sessions**

A. MYOCARDIAL PROTECTION

Moderator: Robert W. Anderson, Evanston, Illinois

Background of Myocardial Protection

William A. Gay, Jr., Salt Lake City, Utah

Laboratory Studies in Development of Myocardial Protection

Sidney Levitsky, Chicago, Illinois

Summary

Robert W. Anderson, Evanston, Illinois

B. PREOPERATIVE EVALUATION OF THE PULMONARY RESECTION PATIENT

Moderator: James B. D. Mark, Stanford, California

Evaluation of Cardiac Function

Robert H. Jones, Durham, North Carolina

Evaluation of Pulmonary Function

Richard M. Peters, San Diego, California

Evaluation of Hemostatis

Morris A. Flaum*, New Orleans, Louisiana

C. SURGERY FOR CARDIAC DYSRHYTHMIA

Moderator: Alden H. Harken, Denver, Colorado

Advances in the Surgery of Atrial Arrhythmias

James L. Cox, St. Louis, Missouri

Surgical Electrophysiology of Ventricular Arrhythmias

James Lowe*, Durham, North Carolina

Electrophysiologic Basis for Ventricular Arrhythmias

Alfred Buxton*, Philadelphia, Pennsylvania

8:30 a.m. Scientific Session - Grand Ballroom

16. Surgical Management of Effusive Pericardial Disease: Influence of Extent of Pericardial Resection on Clinical Course

*HARTZELL V. SCHAFF**, *JEFFREY M. PIEHLER**,

JAMES R. PLUTH, *GORDON K. DANIELSON*,

*THOMAS A. ORSZULAK** and *FRANCISCO J. PUGA*

Rochester, Minnesota

Surgical drainage of effusive pericardial disease is usually accompanied with pericardial resection to obtain tissue for analysis and to lessen the chance of the late constriction or recurrent effusion. The relationship between the extent of pericardial resection and the development of these late complications has not been studied in detail. From 1960 through 1983, 145 patients with pure pericardial effusive disease underwent operative drainage. The effusions were malignant in 72 patients (49.7%) and benign in 73 (50.3%), the largest benign subgroup having had idiopathic pericarditis (29.0%). The patients were divided into three groups, determined by extent of pericardial resection: complete (removing all accessible pericardium) in 72 patients (49.7%), partial (resection limited by the phrenic nerves) in 36 patients (24.8%), and window (lesser resections) in 37 patients (25.5%). Approach was via left anterior thoracotomy in 118 patients (81.4%), subxyphoid in 13 (9.0%) median sternotomy in 7 (4.8%), and right thoracotomy in 7 (4.8%). Thirty-day mortality was 19.4% for malignancy patients and 5.5% for those with benign effusions ($P < 0.05$). All survivors had immediate improvement in symptoms, and deaths in patients with benign disease were related to underlying cardiac or pulmonary disease. Actuarial one-year survival for patients with malignancy was 23.4% (4.2 months mean) and 85.6% for patients with idiopathic effusions ($P < 0.001$). Survival was not influenced by extent of pericardial resection. Fifteen patients (10.3%) developed late constriction or recurrent effusion, and 6 of these required reoperation. Reoperation incidence was 0%, 0%, and 16.2% for complete, partial, and window procedures respectively (20.8% for transthoracic and 7.7% for subxyphoid windows) $P = 0.001$. Actuarial probability of reoperation or late complication was greater with window procedures than other resections, both for all patients ($P = 0.001$) and those with benign disease ($P = 0.003$). Transthoracic complete peri-cardiectomy is the procedure of choice for effusive pericardial disease. Subxyphoid drainage has immediate advantages for selected patients, but has statistically greater chance of late complications. Transthoracic window procedures have unacceptable complication rates and should be abandoned. Given their poor survival, patients with malignant effusions must have individualized management, with therapy determined by the status and responsiveness of the underlying malignancy.

*By Invitation

**No advance registration. Attendance by ticket only. Tickets must be purchased at registration desk by 2:00 p.m. on Monday, April 29, 1985. Price of ticket covers attendance at session and breakfast.

17. Mediastinitis after Cardiac Valvular Operations: Impact Upon Survival

EDSON H. CHEUNG, JOSEPH M. GRAVER,*

ELLIS J. JONES, DOUGLAS A. MURPHY,*

CHARLES R. HATCHER, JR.

*and ROBERT A. GUYTON**

Atlanta, Georgia

Mediastinitis after cardiac valve replacement is a dreaded complication with consequent mortality estimated as high as 70%. We have reviewed 2491 patients with cardiac valve operation to assess the impact of mediastinitis upon mortality in our institution in the last 10 years.

37 patients (1.5%) developed mediastinitis after valve replacement. All patients required operative intervention for mediastinal infection with positive bacterial cultures. 13 of these patients had other perioperative problems associated with a high mortality independent of mediastinitis: bacterial endocarditis not cured by valve replacement (3), recent pre-operative myocardial infarction (5), triple valve disease with biventricular failure (1), and severe perioperative cerebral damage (3). 11 of these high risk patients died (84.6%).

The impact of mediastinitis upon survival is best evaluated in the remaining 24 patients without high risk perioperative problems. 8 of these patients were managed before 1980 with debridement and irrigation as the primary treatment with 2 hospital deaths (25%). Pectoral or rectus muscle flaps were frequently used after 1980 (flaps in 11 of 16 patients), leading to a significantly short time between diagnosis of infection and hospital discharge free of infection (62 vs. 401 days, $p < .05$). Only 1 of these 16 patients died. Valve re-replacement for endocarditis was performed in 3 of these 24 patients although 14 of 24 had positive blood cultures.

Mediastinitis after valve operations in the absence of other high risk perioperative problems can be successfully managed. Early debridement and muscle flap closure has led to a 94% survival in 16 patients during the last four years.

*By Invitation

18. Comparison Between Antibiotic Irrigation and Mobilization of Pectoral Muscle Flaps in Treatment of Deep Sternal Infections

YVES LECLERC, RAYMOND D. MARTIN*,*

CATHY P. TONG, RONALD J. BAIRD*

and HUGH E. SCULL Y

Toronto, Ontario, Canada

Between January of 1978 and December of 1983, 41 (1%) of patients (pts.) developed deep sternal infections with mediastinitis after cardiac surgery. Between January of 1978 and December of 1981, 22 of these pts. were treated with debridement, primary wound closure and mediastinal antibiotic irrigation (Group I). Between January of 1982 and December of 1983, 19 pts. were treated with debridement, open "clean" packing and delayed wound closure by the technique of pectoral muscle flap mobilization, preserving the thoraco-acromial pedicle and the pectoral

humeral attachments (Group II). The purpose of this study was to compare the results of treatment of deep sternal infection after cardiac surgery with these two techniques.

The peri-operative hemodynamic, operative, functional and pathological profiles of both groups of patients were the same.

	Hospital Mortality	Hospital Stay	Recurrent Infection	Late Mortality
Group I	2/22 (14%)	39 days	1/19 (5%)	1/19 (5%)
Group II	2/19(16%)	35 days	0/17 (0%)	1/17 (6%)

The cosmetic and functional results were the same in both groups, as were shoulder girdle and torso mobility. We conclude that either technique is equally effective in the management of patients who develop the serious complication of deep sternal infection with mediastinitis after cardiac surgery.

*By Invitation

19. Post-Infarction Angina: An Expanding Subset of Patients Undergoing Coronary Artery Bypass

ROBERT H. BREYER, RICHARD M. ENGELMAN,*

JOHN A. ROUSOU and STANLEY LEMESHOW**

Springfield and Amherst, Massachusetts

The development of percutaneous angioplasty and improved antianginal medications have led to generally improved expectations for nonsurgical treatment of coronary artery disease (CAD). Increasingly, coronary artery bypass grafting (CABG) is deferred for low risk candidates while an ever-increasing proportion of patients are referred for surgical treatment of unstable post-infarction angina (UPIA). In order to document the increasing incidence of this indication for CABG and to characterize the patient population and operative results, an analysis of patients undergoing CABG for UPIA (< 30 days of infarct) during two time periods was undertaken: Group I - 1/82 to 12/82, Group II - 9/83 to 8/84. Clinical, angio-graphic and operative data were coded and statistical analysis used to compare the two patient groups, evaluate operative results, and identify risk factors.

Results: The incidence of UPIA as an indication for CABG increased significantly ($P < 0.01$) from the first to second time frame, 8.7% (24/276) to 18% (51/283). Group II patients had use of IV Nitroglycerin (51% vs 20%, $P < 0.05$) and a higher number operated within 7 days of infarct (37% vs 21%, $P < 0.01$). All other variables examined were similar in the two patient groups. Analysis of the combined Group I and II patients ($N = 75$) indicate the following: transmural/subendocardial - 39%/61%; previous infarction - 60%; extent of CAD: 3 vessel (V) - 76%, 2 V - 21%, 1 V - 3%, left main - 20%; left ventricular (LV) ejection fraction was 40-27%, 40-32%, not obtained - 41%; mean LV end diastolic pressure = 19.5%; IABP required preop - 40%; mean interval from MI to CABG = 12 days; no. grafts = 3.3 (1-6). Overall in-hospital mortality was 8% (6/75). Univariate analysis demonstrated that ejection fraction and number of grafts to be associated with an increased risk of mortality. No other variables were correlated with mortality. Group I patients have mean follow-up of 23 months and Group II patients of 7 months. No late deaths have occurred; 91% of Group I and 85% of Group II survivors remain in Functional Class I.

Patients with UPIA constitute an ever increasing subset of the 1980's CABG population. Operation can be achieved with satisfactory mortality and excellent long-term outlook compared to less acceptable published results with medical management alone. Preop LV function and extent of disease constitute the major indicators of operative risk.

**10:00 a.m. Intermission - Visit Exhibits - Grand Salon
Complimentary Coffee**

*By Invitation

10:45 a.m. Scientific Session - Grand Ballroom

20. Expanding the Use of the Internal Mammary Artery to Improve Patency in Coronary Artery Bypass Grafting

*ALFRED J. TECTOR, TERENCE M. SCHMAHL**

*and VINCENT R. CANINO**

Milwaukee, Wisconsin

Nearly 10 per cent of saphenous vein grafts (SVG) will fail early from intimal hyperplasia after coronary artery bypass grafting (CABG). At 10 years, 35 to 40 per cent of the veins will be occluded and a large portion of the remaining patient SVGs will have angiographically significant atherosclerotic narrowing of 50 per cent or greater. Resistance to intimal hyperplasia and minimal atherosclerosis enhances longterm patency in the internal mammary artery (IMA) graft making it a more desirable bypass conduit. We have attempted to increase overall longterm patency and have placed three or more IMA grafts in 100 patients from October, 1982, through July, 1984. Eighty-seven patients received three IMAs, 12 received four, and one had six. Mobilization, preparation and anastomoses were performed with magnification and microsurgical techniques. There are many possibilities of bypasses and each patient's coronary anatomy as well as sites of lesions are used to select the best combination. None of the patients died early, however, one patient expired late from complications of gangrene of both lower extremities. Three patients had perioperative infarctions. Stress tests were performed in 55 patients and all but one were negative. Five patients had postoperative angiograms and all IMA grafts were patent except a RIMA to the posterior descending artery. This conduit was kinked by the lung. We do not use the attached RIMA to bypass the right coronary artery past the acute margin. One patient complains of angina.

As we gain experience, we are able to place at least three IMA grafts in nearly every patient undergoing CABG. Usually the arteries supplying the anterior, lateral and proximal one-half of the inferior wall of the myocardium can be bypassed with IMA grafts while saphenous vein grafts are used for the right coronary artery and the posterior branches of the circumflex. Multiple IMA grafts will limit the incidence of early and late graft failure and improve survival and longterm results from CABG. It is our procedure of choice.

*By Invitation

21. Longterm Results with Total Replacement of the Ascending Aorta and Re-implantation of the Coronary Arteries

CHRISTIAN CABROL, A. PAVIE*, P. MESNILDREY*,*

I. GANDJBAKHCH, L. LAUGHLIN and V. BORS**

Paris, France and Loma Linda, California

Sponsored by: PIERRE R. GRONDIN

Miami Beach, Florida

From November 1976 to June 1983, one hundred patients, 84 men and 16 women ranging in age from 13 to 74 years, were operated for aortic insufficiency associated with an aneurysm of the ascending aorta. Twenty patients were in NYHA Class I, twenty-two in Class II, fifty-one in Class III, and seven in Class IV. The surgical treatment in all cases consisted of total replacement of the ascending aorta with a tube graft containing a prosthetic valve and reimplantation of the coronary arteries by an intermediate dacron tube graft according to the technique already reported. In sixty-eight patients there was a dystrophic fusiform aneurysm and in thirty-two, there was a dissecting aneurysm of which nine were operated during the acute phase. The operative mortality for the entire group was 4.7% (4 deaths). All patients but one were followed from three months to six and one-half years (average three years). The late mortality has been 8.3% (8.96). Among the eighty-eight survivors, clinical improvement is readily apparent (98.8% are in Class I or II). Twenty-five patients have been restudied by angiography showing a satisfactory coronary and aortic appearance in all cases with neither stenosis nor aneurysm. 85.1% are alive at three years. In conclusion, the treatment of aortic insufficiency associated with aneurysm of the ascending aorta by insertion of a composite graft and reimplantation of the coronary arteries through an intermediate Dacron tube is a sure method with low mortality and excellent long term results.

11:30 a.m. Address by Honored Speaker - Grand Ballroom

**HANDS ACROSS THE OCEAN: GERMAN/AMERICAN RELATIONS IN
THORACIC SURGERY**

PROFESSOR HANS G. BORST

Hannover, Federal Republic of Germany

12:15 p.m. Adjourn for Lunch

12:15 p.m. Cardiothoracic Resident's Luncheon - Belle Chase Room

*By Invitation

TUESDAY AFTERNOON, April 30, 1985

2:00 p.m. Forum Session - Grand Ballroom

22. The Use of Muscle Flaps in the Repair of Aortic Defects

PETER J. HORNEFFER, JAMES H. FRENCH*,*

GROVER M. HUTCHINS and TIMOTHY J. GARDNER*

Baltimore, Maryland

Infection of an arterial anastomosis or prosthetic patch is an uncommon but devastating complication with few treatment options. The concept of bringing a fresh blood supply in the form of a muscle flap to help clear an infection is a well established surgical technique. When considering the use of a muscle flap for repair of an infected artery or graft, it must be established that striated muscle can withstand systemic arterial pressure and preserve vascular integrity. In the present study, 23 young pigs weighing 17 to 19 kg underwent left lateral thoracotomy under sterile

conditions. Aortic defects 2 cm in diameter were created in the descending aorta just distal to the takeoff of the left subclavian artery. In one group (n = 11), this defect was patched with a freshly harvested but devascularized segment of chest wall muscle. In the second group (n = 12), the aortic defect was patched using a vascularized chest wall muscle flap.

Pigs from each group were sacrificed at three time intervals: within two weeks, at six weeks, and at 12 weeks postoperatively. There were no deaths or vascular complications in any pig which received a devascularized muscle patch. Muscle cells were necrotic as early as 3 days postop and an organized fibrinous pseudointimal layer had already begun to form. At six weeks, most of the muscle had been replaced by mature pseudointima, and by 12 weeks the pseudointima was of comparable thickness to the original arterial wall and contained smooth muscle-like elements. No aneurysmal changes were noted in any animal and the aortas maintained a normal lumen despite a tripling in mean body weight over the 12 week period. In the 12 pigs which received vascularized muscle flaps, overall flap viability at autopsy was 65%, but appeared to improve with surgical experience. There were two postoperative deaths at 4 and 6 weeks of apparent pneumonia and sepsis. The remaining animals sacrificed at 9 and 12 weeks had viable flaps overlying an organized pseudointima similar to the muscle patch recipients. In some, where the distal edge of the flap had died, vascular integrity was well maintained by pseudointima.

These results demonstrate that viable muscle flaps can be used to patch aortic defects and avoid the use of prosthetic materials in undesirable situations. The loss of flap viability appears to offer no threat to vascular integrity since free muscle patches, although undergoing cell necrosis and substantial remodeling, remain intact. These studies demonstrate at least the short term feasibility of this technique for use in patients for whom there is no other reliable approach.

*By Invitation

23. Concomitant Cardiac and Pulmonary Surgery

JEFFREY M. PIEHLER, VICTOR F. TRASTEK*,
PETER C. PAIROLERO, JAMES R. PLUTH,
GORDON K. DANIELSON, HARTZELL V. SCHAFF*,
THOMAS A. ORSZULAK* and FRANCISCO J. PUGA*

Rochester, Minnesota

Patients with surgical pathology of both the heart and lungs can be managed at one combined procedure or with staged operations. Although the combined approach through a single incision is theoretically advantageous in accelerating the definitive correction of both problems and eliminating a second procedure, little evaluation of such an approach can be found in the literature. From 1965 through 1983, 43 patients underwent concomitant cardiac and pulmonary procedures at our institution. Most patients presented with cardiac symptoms and were incidentally found to have a roentgenographically indeterminate lung nodule. The pulmonary diagnosis was unknown preoperatively in 38 patients (88%) and proved malignant in 9 of these (24%). All cardiac procedures required extra-corporeal circulation and included coronary bypass in 27 patients, valve replacement or repair in 12, correction of congenital anomalies in 2, and resection of myocardial tumor in 2. Pulmonary pathology proved benign in 31 patients, bronchogenic carcinoma in 10, and metastatic carcinoma in 2. Concomitant pulmonary procedures were single wedge resections in 32 patients, lobectomy in 7, multiple wedge resection in 3, and pneumonectomy in 1. Most resections were performed either before or after institution of bypass, without systemic anticoagulation. There were no significant technical difficulties in performing the indicated resections via median

sternotomy, and 9 of 10 resections for bronchogenic carcinoma were curative. Of the 2 operative deaths (4.6%), one was related to intra-parenchymal pulmonary hemorrhage after multiple wedge resections with the patient heparinized. Thus, pulmonary resections performed during anticoagulation may be associated with increased risk and probably should be avoided. The second death was cardiac in origin and not related to pulmonary resection. The remaining patients recovered uneventfully. Definitive correction of both cardiac and pulmonary pathology can be performed at an operation via a single incision with safety and benefit to the carefully selected patient.

*By Invitation

24. Heart and Unilateral Lung Transplantation in the Dog

AKIRA KAWAGUCHI, PAUL D. HIRSH*,*

TIMOTHY C. WOLFGANG and RICHARD R. LOWER*

Richmond, Virginia

Chronic studies of heart-lung transplantation have been few because total cardiopulmonary denervation precludes prolonged survival in animals lower than primates. A procedure has been devised to study heart-lung transplantation in the dog employing orthotopic grafting of the heart and left lung, thereby preserving innervation of the autologous right lung to allow long term survival.

On cardiopulmonary bypass, the heart and left lung are excised preserving a pericardial pedicle. A heart-lung graft is implanted by anastomosing the left main bronchus with pericardiopexy, both atria, aorta and main pulmonary artery. All animals (n = 12) resumed normal respiratory pattern with prompt removal from respiratory support. This is in sharp contrast to dogs with total cardiopulmonary denervation who have erratic respiration insufficient to support life. With experience and cyclosporine immune-suppression, prolonged survival more than 24 hours (n = 8, 61%) up to 4 weeks has been obtained. Chronic serial studies have revealed normal ECGs, blood gases, chest X-rays and right heart catheterization pressures except during an episode of pulmonary reimplantation response.

The advantages of this canine model include: 1) its suitability for chronic studies of heart-lung transplantation, 2) it is less expensive than a primate model, and 3) the retained native lung serves as a control for evaluation of changes occurring in the lung allograft. If pericardiopexy or other procedures are successful in facilitating bronchial anastomotic healing, this procedure might have clinical application in selected cases.

*By Invitation

2:30 p.m. Scientific Session - Grand Ballroom

25. Surgical Management of Broncholithiasis

VICTOR F. TRASTEK, PETER C. PAIROLERO,*

ERIC L. CEITHAML, JEFFREY M. PIEHLER*,*

W. SPENCER PAYNE and PHILIP E. BERNATZ

Rochester, Minnesota

Fifty-two patients (31 male and 21 female) underwent surgical treatment for complications of broncholithiasis between 1969 and 1983. Mean age was 50.8 years (range 27 to 74 years). Indication for operation included symptoms in 49 patients and an abnormal chest x-ray suggestive of tumor in 3. Symptoms included cough in 47 patients, hemoptysis in 30, fever in 18, chest pain in 11, and lithoptysis in 10. Forty patients were initially treated by thoracotomy and 12 by bronchoscopy alone. In the group treated by thoracotomy, pulmonary resection was performed in 34 patients and broncholithectomy in 6. There was 1 operative death (2.5%). Significant complications, including postoperative bleeding, vocal cord paralysis, and esophageal leak, occurred in 4 patients (10.3%). In the group treated by bronchoscopy, broncholithectomy was successful in 8 patients (75%). Significant complications, including bronchial bleeding and bronchial tear, occurred in 2 patients. There were no deaths. In the 4 unsuccessfully treated patients, subsequent thoracotomy to remove the broncholith was necessary in 3. Follow-up was available in 50 patients and averaged 76.5 months (range 6 to 183 months). Overall 15-year survival (Kaplan-Meier) was 75.1% and did not differ from a control group of patients matched for age and sex. Thirty-three patients following thoracotomy are alive and well without evidence of recurrent disease. Four patients have died from causes unrelated to their procedure or broncholithiasis. In contrast, broncholithiasis recurred in 3 patients (37.5%) who were initially treated successfully by bronchoscopy. Subsequent thoracotomy was necessary in 1 of these patients, and broncholithiasis was responsible for 1 of 2 late deaths. We conclude that thoracotomy remains the preferred treatment for patients with complications of broncholithiasis, as the risks remain low and the long-term results are excellent.

*By Invitation

26. Wedge Resection as an Alternative Procedure for Peripheral Bronchogenic Carcinomas in Poor Risk Patients

LEE E. ERRETT, JAMES WILSON*, RAY C.-J. CHIU*

and DARRELL D. MUNRO

Montreal, Quebec, Canada

Although lobectomy is the procedure of preference for patients with peripheral, clinical stage I bronchogenic carcinomas, wedge resection of the tumor may be a satisfactory alternative in poor risk patients.

Between 1970 and July 1982, 190 patients with peripheral bronchogenic carcinomas were operated upon. Clinical staging was established by radiography, bronchoscopy and mediastinoscopy. Ninety-three patients underwent lobectomies, while 97 had wedge resections. The decision to perform wedge resection was made pre-operatively in the majority of cases based on the assessment of their operative risks.

Compared to lobectomy patients, those who had wedge resections were older (70.4 ± 4.6 years versus 64.9 ± 4.9 ; $P < 0.001$), with lower pre-op FEV₁ (1.56 ± 0.29 versus 1.94 ± 0.24 ; $P < 0.001$), lower PaO₂ (71.7 ± 8.2 mmHg versus 76 ± 4.8 ; $P < 0.001$) and higher PaCO₂ (42 ± 3.6 mmHg versus 38 ± 4.4 ; $P < 0.001$). In spite of more severely compromised pre-op respiratory functional status, the wedge resection group had 30 day operative mortality and morbidity comparable to those of the lobectomy group (3.1 versus 2.2% and 12 versus 9%, respectively). Our follow-up results at 24 months showed that the absolute survival rate of 66.5% in the older, poor risk wedge resection group is not statistically significantly different ($P = 0.5$) from 74.9% for the lobectomy patients.

Wedge resection can be carried out faster, with the loss of lesser amount of functional pulmonary tissue. It appears, therefore, by performing wedge resection in selected poor risk

patients, one can reduce the operative mortality and morbidity to an acceptable range, without seriously compromising their long term survival.

3:15 p.m. Intermission - Visit Exhibits - Grand Salon

Complimentary Coffee

*By Invitation

3:45 p.m. Scientific Session - Grand Ballroom

27. Cyclosporine: An Immunosuppressive Panacea?

JACK G. COPELAND, MARK M. LEVINSON,
 JAMES K. FULLER*, JANICE A. COPELAND*,
 MARY JEAN McALEER* and ROBERT W. EMERY**

Tucson, Arizona

From January 1, 1983 through October 31, 1984, 26 patients, age 16 to 57 years, have undergone cardiac transplantation utilizing Cyclosporine/-Prednisone (CsA/P) immunosuppression. Five patients died %□ 90 days (20%) of infection (3), renal failure (1), and severe rejection (1). One patient died at 4 months of diffuse lymphoma. These patients are compared to a similar group of 32 cardiac recipients, age 13 to 52 years, with Imuran/Prednisone (I/P) immunosuppression:

	Actuarial Survival (3 mo.)	Actuarial Survival (1 yr.)	Infections (3 mo.)	Rejections (3 mo.)	Hospital Stay (Average)
CsA/P	79%	74%	0.9/Pt	1.4/Pt	26 Days
I/P	78%	66%	1.0/Pt	1.6/Pt	62 Days

Rejection episodes occurred in 21/26 CsA/P patients, the average onset of the first on the 8th post-transplant day. Two patients (8%) developed postoperative mediastinitis, both survived. Of 17 patients surviving %¥ 90 days, there has been one late rejection episode, occurring 16 mos. post-transplantation, and two patients have required hospitalization for the treatment of opportunistic infections (Herpes Zoster -1; nocardia -1). One patient underwent cholecystectomy, one highly selective vagotomy and cholecystectomy, and one appendectomy, 7 months, 6 months, and 4 months respectively post-transplantation without complications. One year cardiac catheterization performed in 5 patients revealed normal coronary anatomy, intra cardiac pressures and ejection fractions. Late renal failure has not occurred, however, at one year renal function tests (BUN = 32 ± 10; Creatinine = 1.8 ± 0.5) are elevated. We conclude that while survival and rejection and infection episodes are similar between I/P and CsA/P groups, these events are more easily controlled in the CsA/P patients. Hospital time and its intercurrent costs are reduced. CsA/P is currently the immunosuppressive agent of choice in patients undergoing cardiac transplantation.

*By Invitation

28. Management of Benign and Malignant Lesions of the Trachea and Bronchi with the Nd-YAG Laser

WALTER G. WOLFE and DAVID C. SABISTON, JR.

Durham, North Carolina

The neodymium-YAG (yttrium-aluminum-garnet) laser is basically different from other lasers in that the argon and carbon dioxide lasers are dependent upon generation of *heat* and the thermal coagulation produced may be absorbed by the surrounding tissues. However, the Nd-YAG laser is based upon another mechanism which produces a shorter energy pulse with a much higher peak power and creates an ionized cloud of particles with little heat dissipation to surrounding structures.

This report consists of a series of 32 patients with lesions of the trachea or bronchi. Thirty patients have presented with advanced carcinoma of the lung with pulmonary infection or abscess distal to an obstructing bronchial lesion or with hemoptysis. Benign strictures have been seen in 2 patients. A total of 52 laser treatments have been administered, 42 primarily for obstruction and 10 for hemoptysis. There was no significant morbidity and only one hospital death unrelated to the laser therapy. Most patients' hospital stay was limited to a single day.

Among the 30 patients with malignancy, obstructive complications and hemoptysis were successfully controlled in 27. Those with benign lesions have been successfully managed by laser therapy. Presently 20 patients in the malignant group remain alive and are symptomatically improved. The longest survival after successful laser treatment has been 69 weeks and the shortest 12 weeks.

In summary, the YAG laser is a very effective means of managing patients with benign lesions and those with advanced carcinoma of the lung and severe hemoptysis or infection distal to occluding lesions in the trachea or main stem bronchus. The latter group obtain very favorable palliation with this mode of therapy.

*By Invitation

29. The Role of Adjuvant Therapy Following Resection of Modified Stage II Lung Cancer

MARK K. FERGUSON, RO YBEVERIDGE*,*

ALEX G. LITTLE, HARVEY M. GOLOMB*,*

TOM R. DEMEESTER, PHILLIP C. HOFFMAN

and DAVID B. SKINNER Chicago, Illinois

From 1974 through 1984, 36 consecutive patients with modified Stage II (T₁N₁M₀ or T₂N₁M₀) non-small cell lung cancer were evaluated and treated. Six patients had T₁ tumors, 29 had T₂ tumors and in one patient the size of the primary was not available. There were 25 males and 11 females aged 38 to 80 years (mean 64.1 years). Nineteen patients had adenocarcinoma, 13 had squamous histology and 4 had large cell cancers. Two patients had radiation therapy as their sole treatment and are not considered further. Resection was performed in 34 patients, 16 by pneumonectomy and 18 by lobectomy, with two operative deaths. Nine patients received no additional treatment. Seven patients (SR) had resection followed by postoperative mediastinal radiation therapy only (3000 cGy). Sixteen resected patients (SRC) had adjuvant mediastinal radiation therapy (3000 cGy) and chemotherapy (cytoxan, adriamycin,, methotrexate and procarbazine for an average of 10 cycles). Median survival for all patients was 18.5 months. Surgical treatment alone yielded a median

survival of 11.5 months ($p = .055$ vs SR, $p=.004$ vs SRC) with one patient currently alive. Resection combined with radiation therapy produced a 19.2 month median survival ($p=.19$ vs SRC) with 2 patients alive. For patients treated with the combination of surgery, radiation therapy and chemotherapy the median survival was 45.3 months with 8 patients currently alive. Survival was unrelated to cell type, size of the primary tumor, presence or absence of visceral pleural involvement, distance of the tumor from the resected margin, the number of nodes involved, or the type of resection performed. There were 14 documented recurrences, of which only one was local, while 6 occurred in the brain. Of 21 deaths other than operative mortalities, 13 were due to progressive disease.

The data indicate that adjuvant treatment, consisting of radiation therapy and chemotherapy, provides significantly prolonged median survival following resection of modified Stage II non-small cell lung cancers. Nevertheless, there is a high rate of relapse at distant sites which necessitates careful follow-up of these patients and suggests the need for improved modes of adjuvant therapy.

AN HISTORICAL VIGNETTE

LYMAN A. BREWER, III

Pasadena, California

5:00 p.m. Executive Session (Members Only) - Grand Ballroom

7:00 p.m. President's Reception - Grand Ballroom

Tickets Required

*By Invitation

WEDNESDAY MORNING, May 1, 1985

8:30 a.m. Scientific Session - Grand Ballroom

30. Chest Wall Tumors: Experience with 100 Consecutive Cases

PETER C. PAIROLERO AND PHILLIP G. ARNOLD*

Rochester, Minnesota

One hundred consecutive patients (55 female and 45 male) with chest wall (CW) tumor underwent CW resection between October 1976 and November 1984. Ages ranged from 18 to 84 years (median 54.5 years). Fifty patients had primary tumor, 32 had metastatic tumor, and 18 had benign tumor. The tumor had been previously resected in 34 patients and irradiated in 18. Twenty-two patients presented with skin ulceration. Location was in the ribs in 78 patients and in the sternum in 22. Average number of ribs resected ranged from 1 to 8 (median 3.4). Sternectomy was performed in 22 patients. Overlying soft tissue was resected en bloc in 45 patients. Reconstruction was with autogenous tissue alone in 46 patients and with prosthetic material in 54. There were 100 muscle transpositions, including 45 pectoralis major, 33 latissimus dorsi, 9 serratus anterior, and 13 others. Free rib grafts were used in 11 patients and omental transposition in 3. Hospitalization ranged from 4 to 80 days (median 9.6 days). Complications occurred in 9 patients and included wound infections in 5, partial flap loss in 5, and respiratory insufficiency in 4. One patient required tracheostomy. There was 1 operative death. Follow-up ranged from 1 to 91 months (median 31.5

months). Ninety-eight patients had a healed CW. Recurrent CW tumor developed in 7 patients. All patients with benign tumor and 94.2% of patients with primary tumor not previously treated were alive. However, only 41% of patients with metastatic tumor and 38% of patients with previously treated primary CW tumors were alive. Metastases were responsible for 90% of deaths. We conclude that aggressive resection for CW tumor with reliable reconstruction can be accomplished safely and that early wide resection is potentially curative treatment.

*By Invitation

31. Modern Management of Adult Thoracic Empyema

JOHN H. LEMMER, MARK J. BOTHAM**

and MARK B. ORRINGER

Ann Arbor, Michigan

Seventy adult patients with thoracic empyema were treated between 1978 and 1982. Twenty-one (30%) of these empyemas were associated with pneumonia, 25 (36%) occurred as postoperative complications, and 7 (10%) were iatrogenic, developing after thoracentesis of sterile pleural effusions. Standard thoracentesis was performed in 50 patients and was diagnostic in 38 (76%). In seven additional patients, diagnostic thoracentesis was performed after localizing the empyema with either ultrasound, fluoroscopy, or chest CT scan. Bacteriologic cultures were positive in 94% of these patients, and anaerobes were present in 26%. When used as the initial mode of therapy, repeat thoracentesis was successful in only 4 of 11 cases (36%). Similarly, closed tube thoracostomy, as initial treatment, was successful in only 14 of 40 cases (35%). Eight of 12 patients (67%) with parapneumonic empyemas were treated successfully with closed tube thoracostomy, in contrast to only 2 of 17 patients (12%) with postoperative empyemas so treated. Overall, rib resection was performed 22 times, thoracoplasty 7 times, and thoracotomy with decortification 4 times. Control or cure of empyema was achieved in 57 patients (81%), while 13 (19%) died (5 from their empyema and 8 with empyema as an active problem at the time of death). The cure/control rate for immuno-suppressed patients was only 50% (5 of 10 patients). This analysis of a large recent series of adult empyemas suggests that chest tube drainage is often inadequate, and more aggressive management is likely to result in fewer treatment failures, fewer total procedures and shortened hospital stay. Early rib resection, especially for immunocompromised patients and postoperative empyemas, is recommended.

*By Invitation

32. Surgical Management of the Failed Gastroplasty Operation

ROBERTO. HENDERSON

Toronto, Ontario, Canada

Gastroplasty has been used in surgical management of reflux for 25 years. The creation of a gastric tube prior to fundoplication complicates further corrective surgery, should the original operation fail. Experience has been gained with 51 patients, 34 partial fundoplication gastroplasties (PFG: Belsey) and 17 with total fundoplication (TFG: Nissen) who have major persistent or recurrent symptoms. All were evaluated by history, radiology, endoscopy, manometry with pH and acid perfusion prior to surgical management. The PFG patients had heartburn (85%), reflux (70%) and dysphagia (91%). Radiologic recurrence was present in 26.5%, endoscopic incompetence in 94.1% and a stricture in 26.5%. TFG patients had heartburn (52.9%), reflux (29.4%) and dysphagia (82.4%). Radiologic recurrence was present in 29.4%, endoscopic incompetence in 35.3% and a stricture in 5.9%. On average these patients had had 2.3 prior operations (range 1-5 operations). The dominant cause of failure (in the absence of anatomic recurrence) with PFG was continued or

recurrent reflux and with TFG was too tight or too long a fundoplication. All patients had a thoraco-abdominal revision TFG and a 1 cm. completion fundoplication. Pyloro-myotomy was added if not previously performed. There was no mortality or major morbidity. Follow-up in 51 patients averages 4.2 years (range 0.3-8.8 years). None have radiologic recurrence, 1 minor reflux, 1 a traumatic diverticulum and 1 moderate esophageal obstruction. Of these patients 82.4% are asymptomatic, 13.7% have minor symptoms and 3.9% (2 patients) have significant residual symptoms. This conservative surgical approach avoids the higher mortality of resection with interposition and the results are satisfactory.

*By Invitation

33. Transhiatal Esophagectomy for Benign Disease

MARK B. ORRINGER

Ann Arbor, Michigan

During the past 8 years, transhiatal esophagectomy without thoracotomy has been performed in 65 adult patients with dysphagia from benign esophageal disease: strictures (from reflux in 8, caustic ingestion in 7, and other causes in 15); neuromotor dysfunction (Achalasia in 12, spasm in 9, scleroderma in 3); acute iatrogenic perforation (5); acute caustic injury (4); and recurrent gastroesophageal reflux (2). Nearly 70% (45) of these patients had undergone at least one prior esophageal operation, and 26% (17) had a history of between 2 and 4 esophageal operations. The esophagus was replaced with stomach in 53 pts (82%). Colon was used to replace the esophagus in 10 pts and only when there was a history of either prior gastric resection or caustic injury to the stomach. Intraoperative blood loss averaged 1050 cc. Intraoperative complications included pneumothorax in 38 pts (58%) and a tracheal laceration (1 pt). Postoperative complications included transient recurrent laryngeal nerve paresis in 11 pts (17%); chylothorax in 4 pts (6%); anastomotic leak in 4 pts (6%); and small bowel obstruction (2 pts). There were 5 hospital deaths (8% mortality), none related to the technique of esophagectomy. Follow-up ranges from 1 to 84 months (avg. 28 months). Thirty patients have experienced varying degrees of postoperative dysphagia, and 22 have been treated with intermittent outpatient anastomotic dilations. True anastomotic strictures have developed in 5 pts. The ability to eat foods of a normal consistency has been excellent in 56 pts. Four patients with initial esophageal spasm have had poor functional results from esophagectomy and visceral esophageal substitution. Occasional mild regurgitation has been experienced by 12 pts, and post-vagotomy diarrhea (dumping) by 16 pts. It is concluded that transhiatal esophagectomy for benign disease is feasible and safe, even after multiple previous esophageal operations, and that the stomach is a better visceral esophageal substitute than colon, providing an initially easier technical operation and long-term superior functional results.

10:00 a.m. Intermission - Visit Exhibits - Grand Salon

Complimentary Coffee

*By Invitation

10:45 a.m. Scientific Session - Grand Ballroom

34. Anatomic Correction for Transposition of the Great Arteries and Double Outlet Right Ventricle

KIRK KANTER, MICHAEL RIGBY*,*

*ELLIOTT SHINEBOURNE**

*and CHRISTOPHER LINCOLN**

London, England

Sponsored by: J. W. KIRKLIN

Birmingham, Alabama

Since October, 1981, 27 patients have undergone anatomic correction for a spectrum of complex CHD. Eight pts had transposition of the great arteries with intact ventricular septum and patent ductus arteriosus (TGA/-PDA), 13 pts transposition with ventricular septal defect (TGA/VSD), and 6 pts double outlet right ventricle with subpulmonary VSD (DORV), the Taussig-Bing anomaly. At operation, the age ranged from 18 hrs to 6 yrs (mean 9.4 mos) and the weight ranged from 2.6-14.6 kg (mean 5.6 kg). The TGA/PDA group on average was younger (mean 1.2 mos) and smaller (mean 3.5 kg) than the other two groups. Associated congenital heart defects were seen in 7 pts, including 5 with coarctation, 2 with multiple VSD's, 2 with right ventricular hypoplasia and one each with interrupted aortic arch, Wolff-Parkinson-White syndrome, and left juxta position of the atrial appendages. All 9 pts who had undergone prior palliative surgery had pulmonary artery banding. In addition, four of these pts had coarctation repairs, 4 had atrial septectomy and one had systemic/pulmonary shunting. All recognized patterns of coronary anatomy were encountered. The aorta and pulmonary artery were side-by-side in 13 pts and antero-posterior in 14 pts. The Le Compte maneuver to establish right ventricular pulmonary artery continuity was successfully used in 13 of 14 pts with antero-posterior great vessels but in only one of those with side-by-side relations. Six pts developed right ventricular outflow tract obstruction, 5 at operation and one 4 months postoperatively. This was responsible for death in 3 pts. Thirty day hospital mortality was one in TGA/PDA (12.5%), 6 in TGA/VSD (46%) and one in DORV (16.7%); overall mortality 8 pts (29.6%). There has been only one death in the last ten patients.

There have been no late deaths up to 3 years follow-up. Postoperative angiograms in ten pts with frame by frame analysis of left ventricular wall motion shows normal ejection fraction and satisfactory regional wall movement.

*By Invitation

35. Ninety Consecutive Corrective Surgeries for Tetralogy of Fallot With or Without Minimal Right Ventriculotomy

*YASUNARU KAWASHIMA *, HAJIME HIROSE*,*

HIKARU MATSUDA, SUSUMU NAKANO*,*

*RYOTA SHIRAKURA * and JUNJIRO KOBAYASHI**

Osaka, Japan

Sponsored by: HITOSHI MOHRI Yamaguchi, Japan

Out of 90 consecutive patients (pts) who underwent corrective surgery for tetralogy of Fallot (TF), 43 pts were operated upon without right ventriculotomy and 47 pts had a minimal right ventriculotomy of about 10 to 15 mm in length. The ventricular septal defect was closed through the tri-cuspid valve in 75 pts. The pulmonary valve was either preserved or reconstructed to maintain its competence. Fifty-one pts were either one or two years of age.

There was one operative death and no late mortalities. Results of postoperative cardiac catheterization and cine angiocardiography, performed in 34 randomly selected pts, were compared with those of 21 pts who had undergone conventional method of surgery in the preceding period. The following results were found: 1) There was no significant difference in the right ventricular to left ventricular systolic pressure ratio ($0.46 \pm .15$ vs. 0.44 ± 0.13). 2) Pulmonary regurgitation

(Grade 2/4 or more) was found in 47% (16/34) of the present series of pts (P-pts) and 81% (17/21) of the controls (C-pts) ($p < 0.05$). 3) There was no significant difference between the two groups in cardiac index (4.38 ± 0.88 vs. 4.20 ± 1.18 L/min/m²) or right ventricular ejection fraction (RVEF) (53 ± 6 vs. $50 \pm 5\%$). However, during isoproterenol infusion, accelerating the heart rate by 50%, the RVEF was significantly higher in P-pts ($57 \pm 4\%$) than in C-pts ($49 \pm 6\%$) ($p < 0.001$). The right ventricular end-diastolic volume index was significantly smaller in P-pts than in C-pts both at rest (81 ± 21 vs. 109 ± 30 ml/m²; $p < 0.01$) and during isoproterenol infusion (91 ± 37 vs. 142 ± 28 ml/m²; $p < 0.01$).

A Grade 2 or higher ventricular arrhythmia defined by Lown's criteria was found in 17% (6/35) of P-pts and in 54% (35/65) of C-pts. The difference was statistically significant ($P < 0.005$).

Thus, the present method of corrective surgery for TF carries no more risk than the conventional method and the results were more favorable in respect to postoperative right ventricular function.

*By Invitation

36. Definitive Surgery for Refractory Cardiac Tachydysrhythmias in Children

*DAVID A. OTT, ARTHUR CARSON**

and DENTON A. COOLEY

Houston, Texas

105 children (age range 4 months-18 years) underwent definitive surgery for life threatening or incessant tachydysrhythmia due to accessory conduction pathways (Kent bundle) (75), atrial ectopic foci (18) or ventricular ectopic foci (12). 64% (48/75) of patients with the accessory pathway type of supraventricular tachycardia had classical Wolff-Parkinson-White syndrome whereas 36% (27/75) had retrograde conduction only across the pathway. Location of the pathways were as follows: left posterior 46% (35/75), right anterior or lateral 29.3% (22/75), posterior septal 17.3% (13/75), anterior septal 4% (3/75), both right and left 2.7% (2/75). With increasing experience the success rate (cure of tachycardia) had improved from 85% in the first 40 patients to 96% of the last 35 patients. One surgical death (1.3%) occurred secondary to a paradoxical air embolus. Atrial ectopic tachycardia was treated by cryoablation (9), excision (1), combined excision and cryoablation (6), and atrial disconnection (2). The ectopic focus was located on the right atrial wall in 12 patients (66%) and cardiopulmonary bypass was required in 9 (50%). Two patients (11.1%) continued to have tachycardia after surgery. Ventricular tachycardia presenting in the first 2 years of life was due to tumor in 5 cases (rhabdo-myoma 1, Purkinje cell tumor 4) and was treated by excision and cryoablation. In 4 cases no tumor was found but the area of ectopic focus was successfully cryoablated. One child with diffuse endocardial tumor died following surgery. Ventricular tachycardia in older children was localized to outflow patch aneurysms following Tetralogy of Fallot repair (3 patients, treated by excision or cryoablation) and arrhythmogenic right ventricular dysplasia (2 patients, treated by right ventricular disconnection).

We conclude that mapping and surgery for supraventricular tachycardia due to accessory pathways is predictable and curative in a high percentage of patients. Atrial ectopic tachycardias are more difficult to precisely localize but can be cured by a combination of excisional and cryoablative techniques. Ventricular tachycardia in infants is commonly due to tumors for which surgery can be a lifesaving procedure.

*By Invitation

37. Diaphragmatic Paralysis and Eventration in Infants

ROBERT M. SADE, CHARLES D. SMITH,*

FRED A. CRAWFORD, H. BIEMANN OTHERSEN**

*and DAVID M. BARTLES**

Charleston, South Carolina

Diaphragmatic malfunction in small babies can interfere substantially with ventilation. Since 1979, we have diagnosed 27 infants (9 boys, 18 girls) as having either diaphragmatic paralysis or eventration at 1 day to 15 months of age. A congenital phrenic lesion (CPL) was found in 13 patients (pts), and 14 (all newborns \leq 3 months old) had an operative phrenic nerve injury (OPNI). Respiratory distress was present in 19 pts and not present in 8. Diaphragmatic plication (DP) was carried out in 21 pts (10 CPL, 11 OPNI), but was not done in 6 pts (3 CPL, 3 OPNI). A thoracic approach for DP was used in 12, an abdominal approach in 9 pts; re-plication for reappearance of diaphragmatic elevation after 2 thoracic and 1 abdominal DP was transthoracic. All 6 pts not plicated survived. Hospital death occurred in 9/21 (43%) DP pts (3/10 CPL and 6/11 OPNI), including 7 who could not be weaned from the ventilator. Late death occurred in 5/12 (42%) DP survivors (1 CPL and 4 OPNI). Thus, the mortality rate was 14/21 (67%) DP pts (4/10 CPL, 10/11 OPNI), and was 14/27 (52%) overall. None of the 8 pts without respiratory distress died, but 14/19 (74%) of those with respiratory distress died. No death was related to DP itself. The 7 long-term survivors of DP were extubated within 6 days after DP; those who died were intubated for 3 days to 1 year (2.8 ± 1.3 months, mean \pm SEM). During the period of this study, 11 of 176 (6.3%) newborns \leq 3 months old undergoing lateral thoracotomy for heart disease suffered OPNI, an unexpectedly high incidence. No OPNI occurred after 52 median sternotomies in newborns or after 707 sternotomies and thoracotomies in older children. We conclude that the mortality rate of infants with respiratory distress due to diaphragmatic malfunction is high; DP itself is safe and is equally effective from a thoracic or abdominal approach; intubation for longer than a week after DP is a very ominous prognostic sign; and the incidence of OPNI during lateral thoracotomy in newborns with congenital heart disease is greater than generally appreciated.

12:00 p.m. Adjourn for Lunch

*By Invitation

WEDNESDAY AFTERNOON, May 1, 1985

1:30 p.m. Scientific Session - Grand Ballroom

38. Long Term Results After Excision of Fixed Subaortic Stenosis

H. ASHRAF, JOSEPH COTRONEO*, NAVEEN DHAR*,*

ROBERT GINGELL, J. MICHEL ROLAND*,*

DANIEL PIERONI and S. SUBRAMANIAN*

Buffalo, New York

Between 1968 and 1984, 49 patients (30 male, 19 female), ages between 0.5-22 years (mean = 7.7 ± 4.8) underwent surgical excision of fixed subaortic obstruction (discrete and tunnel) with one operative death and two late deaths. Three patients (pts.) were under one year. Forty-six (92%) were followed for 0.6 to 15 years (m = 5.6 ± 4). Twenty-five have completed 5 years and 10 are followed for 10 years or more. Twenty-five (50%) pts. had associated defects, VSD (9) being the

most common. Sixteen required combined procedures. In 9 pts. subaortic obstruction was diagnosed 3 months to 8 years after a previous operation. In two other pts., the occult obstruction was discovered at surgery for VSD. There were 46 discrete sub-aortic ring (complete 31, incomplete 15) and 3 tunnel. For the discrete ring, excision alone was done in 31 while myotomy was added in 15 pts. All tunnel were treated with myotomy and myectomy. Reoperation was performed in 10 pts. (one death), 7 (15%) for recurrence and 3 for aortic valve replacement, all of whom had pre-existing aortic regurgitation which had progressed. Of the seven recurrences, 1 patient had primary surgery elsewhere. The interval of recurrence in the remainder was 2-6 (m = 4.1 ± 1.5) years, 3 recurrences in the excision alone group (31 pts.) and three in excision and myotomy group (15 pts.). Before 1976 (pre-cardioplegia) out of 22 pts., 6 had recurrence while none recurred in 26 pts. after 1976 ($P = 0.0027$). At 5 year follow-up, persistence of high gradient between LV and aorta after primary surgery proved to be significant. Only 3 out of 18 pts. with gradient less than 15mm recurred while all 3 pts. with gradient of 30 or higher recurred in 5 years ($P = 0.015$). There was no recurrence in tunnel. Thirty-nine pts. are now in NYHA Class I and 6 in Class II.

Conclusions: (1) Low early and late mortality. (2) Complete excision of the ring using cardioplegia has significantly reduced the recurrence, indicating that the recurrence may be an incomplete excision. (3) Elimination of LV-aorta gradient at initial surgery reduces recurrence rate. (4) Addition of myotomy in this series has not altered the outcome, therefore routine myotomy for discrete ring may not be necessary.

*By Invitation

39. 14 Years Experience with the Bjork Shiley Tilting Disc Prosthesis

BABULAL SETHIA, MURDO A. TURNER*,
ROSE A. RODGER* and WILLIAM H. BAIN*
Glasgow, Scotland*

*Sponsored by: NICHOLAS T. KOUCHOUKOS
Birmingham, Alabama*

1562 B/S tilting disc prostheses have been implanted in 1235 patients and followed for a total of 3,748 patient years.

999 standard disc (SD: 1970-1980) and 563 concavo-convex (CC: 1980-1983) prostheses were inserted. (37.3%) of patients had had previous cardiac surgery. (71.1%) were in NYHA grades III or IV.

Hospital mortality was 119/1235 (9.6%): 84/761 (11.0%) for patients with SD prostheses and 35/474 (7.3%) for CC prostheses. Late mortality was 108/1235:85/761 (11.2%) for SD prostheses, and 23/474 (4.9%) for CC prostheses.

1116 patients left hospital and have been followed for up to 14 years.

49 patients were re-operated: 26 for repair of peri-prosthetic leak: 12 for thrombotic obstruction: 4 for prosthetic endocarditis: 3 for strut fracture: and 4 for replacement of another natural valve. Mortality for re-operation was 7/49 (14.2%).

Thrombotic obstruction occurred in 20/677 SD patients (0.6/100 patient years). No case of thrombotic obstruction occurred in CC disc patients.

Systemic emboli occurred in 34/677 SD patients (1.1/100 patient years), and in 9/439 CC patients (1.3/100 patient years).

Strut fracture occurred in 3/439 CC disc patients (0.4/100 patient years): none in the SD group.

The incidence of prosthetic endocarditis (19/1116 or 0.5/100 patient years) was similar in SD and CC patients.

All patients were anticoagulated with Coumadin, complications occurred in 42 (1.1/100 patient years).

Actuarial survival at 5 years is 77.4% and at 10 years 71.9%.

Event-free survival at 5 years is 69.2% and at 10 years is 54.7%.

Our experience confirms the long term reliability of the SD prosthesis.

The incidence of thrombo-embolism with the CC disc is significantly lower, but has been offset by the 3 cases of strut fracture in this series.

*By Invitation

40. Early and Late Risk of Mitral Valve Replacement: A 12 Year Concomitant Comparison of Porcine Bioprosthetic and Disc Prosthetic Mitral Valves

*LAWRENCE H. COHN, ELIZABETH N. ALLRED**,

LESLIE A. COHN, JOHN AUSTIN*, JOSEPH SABIK**,

*VERDI J. DISESA *, RICHARD J. SHEMIN**

and JOHN J. COLLINS, JR.

Boston, Massachusetts

711 Consecutive patients (245 males/466 females, 17 to 86, 58 years) operated upon from 1/72 to 1/84 received 532 porcine bioprosthetic mitral valves (BPV) and 179 prosthetic disc mitral valves (PDV). Age, sex, and functional impairment were similar in both valve types. Mitral stenosis (MS) was the primary etiology in 363, mitral regurgitation (MR) in 348. There were 6 functional class (FC) I-II, 329 FC III and 376 FC IV patients. Associated procedures were done in 253/711 (36%) (168 [24%] received CABG). Overall operative mortality was 76/711 (10.6%), 34/476 (7%) for MVR alone, 30/168 (18%) for MVR + CABG ($p < .0001$), 35/363 (9.6%) for MS, 41/348 (11.7%) for MR, 50/532 (9.3%) for BPV and 26/179 (14.5%) for PDV, 13/535 (3.8%) FC I-III, 63/376 (16.7%) FC IV.

Long-term follow-up for 482 BPV and 153 PDV patients was 6-151 mos (50 mos); 52 (8%) were lost to follow-up. Overall actuarial survival at 108 mos was $60 \pm 3\%$, for MS $67.5 \pm 4\%$, MR $53 \pm 5\%$ ($p = .0001$), for BPV $67 \pm 4\%$, $41 \pm 6\%$ for PDV ($P = < .0001$), for MVR $67 \pm 4\%$, for MVR + associated procedure $45 \pm 6\%$ ($p < .0005$), for FC I-III $71 \pm 4\%$, and $51 \pm 4\%$ for FC IV ($p < .0001$). Thromboembolic events (TE), including thrombosis, occurred overall in 68 patients (2.8%/pt yr); 2.43 for BPV and 4.37 for PDV ($p < .05$). Actuarial freedom at 108 months from TE overall was $83 \pm 2\%$, for BPV 84.5 ± 3 , for PDV 78 ± 6 ($p = \text{NS}$). For BPV patients in atrial fibrillation (AF), probability freedom from thromboemboli at 12 years was $80 \pm 4\%$ versus $92 \pm 2\%$ for sinus rhythm (SR).

Primary valve dysfunction occurred in 18 patients with BPV, 3 with PDV. Freedom from primary valve dysfunction at 108 mos for BPV was $89 \pm 3\%$ and $93 \pm 4\%$ for PDV ($p = \text{NS}$), (0.9%/pt yr for BPV, 0.6 for PDV). There were 18 perivalvular leaks, but no significant difference in patients according to valve (0.7/pt yr BPV vs 0.8 for PDV). The probability of freedom from late endocarditis at 108 mos for BPV was $89 \pm 3\%$ and $95 \pm 3\%$ for PDV ($p = \text{NS}$).

Early and late survival after MVR reflects preoperative functional class and associated coronary artery disease. Thromboembolism and valve thrombosis are major risks of PDV, although there is some element of valve dysfunction. Primary valve dysfunction is a major risk factor of mitral BPV and compared to aortic valve data, primary valve dysfunction is higher, but the risk of endocarditis may be lower. The risk of TE in BPV patients with chronic atrial fibrillation is significant.

*By Invitation

41. Comparison of Bioprosthetic and Mechanical Valve Replacement for Active Endocarditis

*GEORGE J. REUL, JR., MICHAEL S. SWEENEY**,

DENTON A. COOLEY, DAVID A. OTT,

J. MICHAEL DUNCAN, O. HOWARD FRAZIER**

and JAMES J. LIVES AY Houston, Texas*

The choice between bioprosthetic valve (BPV) or mechanical prosthetic valve (MPV) replacement for active valvular endocarditis has been controversial. To establish the role of each, we reviewed 185 patients who underwent valve replacement for active valvular endocarditis during the past 5 years. All patients had life-threatening, active bacterial endocarditis of a native or prosthetic valve. The BPV group (Group I, 88 patients) had replacement with the Ionescu-Shiley pericardial valve and the MPV group (Group II, 97 patients) with the St. Jude Medical valve. The male/female distribution, age range, and functional classification were the same in both groups. Mean follow-up was 22.3 months, and all events occurred within the first two years in both groups. Valve replacement was done because of native valve endocarditis in 76 patients in Group I and 49 patients in Group II ($p>0.01$). Of the remainder of Group I patients, 6 had endocarditis of a BPV and 6 of a MPV; of the remainder of Group II patients, 30 had endocarditis of a BPV and 18 of a MVP ($p>0.01$). Early mortality was not significantly different (14 in each group). Of the 74 survivors in Group I, 15 underwent valve reoperation: 9 because of recurrent endocarditis and 5 because of sterile perivalvular leakage. This was significantly different ($p<0.01$) from Group II, where only 5 patients underwent valve reoperation: 4 for recurrent endocarditis and one for sterile perivalvular leakage. The actuarial rate for freedom from reoperation was also significantly higher in Group II patients, where 93.4% were free from reoperation at 3 years compared to 75% at 4 years in Group I patients. Two thromboembolic events occurred in both groups in the first year of follow-up. Actuarial survival, which was not significantly different, was 78.7% at 4 years in Group I and 82.6% at 3 years in Group II. Patients receiving BPV for active endocarditis had a significantly higher reoperation rate and a significantly greater incidence of recurrent endocarditis; therefore, we prefer the MPV for valve replacement in most patients who have active endocarditis.

*By Invitation

42. Prospective Evaluation of Mediastinoscopy for Assessment of Carcinoma of the Lung

*WILLIAM P. LUKE**,

FREDERICK GRIFFITH PEARSON,

*THOMAS R.J. TODD**,

GEORGE ALEXANDER PATTERSON*

and JOEL DAVID COOPER

Toronto, Ontario, Canada

Between 1979 and 1984 cervical mediastinoscopy was carried out on 960 (61.5%) of the 1559 patients admitted to the Thoracic Surgical Service of the Toronto General Hospital with a diagnosis of lung cancer. In 127 cases, concomitant anterior mediastinostomy was also performed. Positive nodes were found in 286 patients (30%). There was an overall 2% complication rate with no mortality. Positive mediastinal nodes were found in 17% of squamous carcinomas, 23% adenocarcinomas, 49% small cell, 30% large cell undifferentiated and 9% bronchoalveolar. Positive mediastinal nodes were found with equal frequency in right and left sided tumours and occurred in 34% of tumours of the main bronchus, 26% of upper lobe tumours and 17% of lower lobe tumours. Of the 674 negative mediastinoscopies, 562 patients (83%) came to thoracotomy, at which time 58 patients (10%) were found to have positive mediastinal nodes. Overall resectability rate was 93% (86% curative, 7% palliative). Twenty per cent of the resections were pneumonectomies. Fifty-five (19%) of the 268 positive mediastinoscopy patients were selected for thoracotomy. In this group, resectability rate was 85% (67% curative, 18% palliative). Pneumonectomy rate was 34%. Follow-up data is complete for 925 of the 960 patients with a mean follow-up of 36 months.

	Actuarial Survival		
	One Year	Two Years	Five Years
Negative Mediastinoscopy with Thoracotomy	58%	52%	33%
Positive Mediastinoscopy with Thoracotomy	26%	16%	-
Positive Mediastinoscopy without Thoracotomy	19%	4%	-

We conclude that routine mediastinoscopy can be done with negligible morbidity and provides essential information for the management of patients with lung cancer.

*By Invitation

43. Comparative Merits of Conventional, CT and MR Imaging in Assessing Mediastinal Involvement in Surgically Confirmed Lung Carcinoma

NAEL MARTINI, ROBERT HEEL AN*,

JACK WESTCOTT*, MANJITBAINS,

PATRICIA MCCORMACK*, JAMES CARAVELLI*,

ROBIN WATSON* and MUHAMMAD ZAMAN

New York, New York

Nineteen patients presenting with potentially resectable malignant tumors of the lung had computed tomography (CT) and magnetic resonance (MR) imaging of the chest in addition to PA and lateral chest x-rays and bronchoscopy. The purpose of the study was to assess the extent of

tumor involvement in hilum and mediastinum by direct invasion and by regional lymph node metastasis.

At thoracotomy a mediastinal lymph node dissection or sampling was carried out to correlate nodal involvement with the preoperative studies. All nodes were examined histologically and their size and location recorded.

The tumor was peripheral in 13 patients and central in 6. Histologically, 11 were adenocarcinomas, 6 squamous cancers and 2 atypical carcinoids. Preoperatively, 6 were recorded to have NO disease, 6 N1, and 7 N2. Pathologically, 6 were NO, 3 N1 and 10 N2.

As expected, conventional imaging correlated poorly with the findings at surgery with false positives in 2 and false negatives in 9 patients.

CT and MR imaging demonstrated N2 disease in 9 and 10 N2 patients. False positive N2 disease was reported by both methods in 4 patients, 2 of whom had enlarged hyperplastic lymph nodes.

MR imaging was accurate in assessing the hilum in all 9 patients with NO and N1 disease whereas 2 false positives and 1 false negative N1 were reported on CT.

Hilar and mediastinal disease was shown with greater clarity in MR imaging but no advantage of MR over CT could be demonstrated in detecting N2 disease or mediastinal involvement. Neither method could differentiate hyperplastic from mediastinal nodes.

3:30 p.m. Adjournment

*By Invitation

NECROLOGY

Richmond Douglass, M.D., Olean, NY

Frank Gerbode, M.D., San Francisco, CA

Clive R. Johnson, M.D., Salt Lake City, UT

Derward Lepley, Jr., M.D., Northbrook, IL

Frederick R. Mautz, M.D., Chardon, OH

Carl G. Merkel, M.D., Saranac Lake, NY

David T. Smith, M.D., Durham, NC

American Association for Thoracic Surgery, 1984-1985

(Listed by Countries, States, Provinces and Cities)

Geographical - UNITED STATES

ALABAMA

Birmingham

Blackstone, Eugene H

Blakemore, William S

Kahn, Donald R.

Kessler, Charles R.

Kirklin, John W.

Kouchoukos, Nicholas T

McElvein, Richard B

Pacifico, Albert D.

Montgomery

Simmons, Earl M.

Opelika

Le Beck, Martin

ALASKA

Anchorage

Phillips, Francis J.

ARIZONA

Phoenix

Brown, Lee B.

Cornell, William P.

Fisk, R.Leighton

Melick, Dermont W.

Nelson, Arthur R.

Sun City

Read, C. Thomas

Tucson

Burbank, Benjamin

Copeland III, Jack G

Sanderson, Richard G

ARKANSAS

Jasper

Hudson, W. A.

Little Rock

Arcadia

Silver, Arthur W.

Carmel

Daniels, Albert C.

Chico

Becker, Ronald M

Covina

Carter, P.Richard

El Macero

Andrews, Neil C.

Escondido

Mannix Jr., Edgar P.

Fresno

Evans, Byron H.

Hemet

Hewlett, Thomas H.

Irvine

Connolly, John E.

Miller, Don R.

Wakabayashi, Akio

La Canada

Aronstam, Elmore M.

La Jolla

Fosburg, Richard G.

Hutchin, Peter

La Mesa

Long Jr., David M.

Loma Linda

Bailey, Leonard L

Wareham, Ellsworth E

Long Beach

Bloomer, William E.

Carlson, Herbert A.

Stemmer, Edward A

Los Angeles

Baisch, Bruce F.

Campbell, Gilbert S.

Read, Raymond C.

Williams, G. Doyne

CALIFORNIA

Anaheim

Main, F. Beachley

Laks, Hillel

Lindesmith, George G

Longmire Jr, William

Maloney Jr, James V

Matloff, Jack M.

Meyer, Bert W.

Morton, Donald L.

Mulder, Donald G

Stiles, Quentin R.

Martinez

Guernsey, James M.

Montebello

Lui, Alfred H. F.

Oakland

Ecker, Roger R.

May, Ivan A

Orange

Gazzaniga, Alan B.

Mason, G. Robert

Salyer, John M.

Oxnard

Dart Jr., Charles H.

Pac Palisades

Ramsay, Beatty H.

Weinberg, Joseph A.

Palm Desert

Julian, Ormand C.

Benfield, John R.

Buckberg, Gerald D.

Davis, Lowell L.

Fonkalsrud, Eric W.

Holmes, E. Carmack

Hughes, Richard K.

Kay, Jerome Harold

Khonsari, Siavosh

Lamberti Jr, John J

Peters, Richard M

Trummer, Max J.

San Francisco

Culiner, Morris M

Ebert, Paul A.

Ellis, Robert J

Gardner, Richard E.

Grimes, Orville F.

Heydorn, William H

Hill, J. Donald

Kerth, William J.

Leeds, Sanford E.

McEnany, M. Terry

Richards, Victor

Roe, Benson B

Rogers, W. L.

Thomas, Arthur N.

Turley, Kevin

Ullyot, Daniel J.

San Jose

Oakes, David D

Santa Ana

Pratt, Lawrence A.

Santa Barbara

Higginson, John F.

Jahnke Jr., Edward J

Palm Springs

Goldman, Alfred

Palo Alto

Conn, Roy B.

Jamplis, Robert W.

Pasadena

Ingram, Ivan N.

Penido, John R. F.

Rancho Mirage

Bjork, Viking O.

Sacramento

Harlan, Bradley J

Hurley, Edward J.

Miller Jr., George E

Smeloff, Edward A.

Tyson, Kenneth R. T.

San Bernadino

Flynn, Pierce J.

San Diego

Angell, William W.

Baronofsky, Ivan D.

Chambers Jr., John S

Daily, Pat O.

COLORADO**Denver**

Blair, Emil

Brown, Robert K.

Burrington, John D.

Condon, William B.

Eiseman, Ben

Grow, John B.

Harken, Alden H.

Harper, Frederick R.

Hopeman, Alan R.

Kovarik, Joseph L.

Lewis, F. John

Love, Jack W.

South Laguna

Oatway Jr, William H

South Pasadena

Brewer III, Lyman A.

St Helena

Dugan, David J.

Stanford

Mark, James B. D.

Miller, D.Craig

Shochat, Stephen J

Shumway, Norman E.

Wilson, John L.

Thousand Oaks

Tsuji, Harold K.

Torrance

Carey, Joseph S.

Cukingnan, Ramon A

Moore, Thomas C.

Nelson, Ronald J.

State, David

Mills, Mitchell

Randolph, Judson G.

Simmons, Robert L.

Smyth, Nicholas P.O.

Wallace, Robert B.

FLORIDA**Belleair**

Lasley, Charles H.

Boca Raton

Seley, Gabriel P.

Coral Gables

Newman, Melvin M.

Pappas, George

Paton, Bruce C.

Pomerantz, Marvin

Rainer, W. Gerald

Van Way III, Charles W.

Waddell, William R.

Wright, George W.

Lakewood

Swan II, Henry

CONNECTICUT

Hartford

Kemler, R. Leonard

New Haven

Baue, Arthur E.

Carter, Max G.

Flye, M. Wayne

Geha, Alexander S.

Glenn, William W. L.

Hammond, Graeme L.

Lindskog, Gustaf E.

Stansel Jr, Horace C

Stern, Harold

Norwich

Kelley, Winfield O.

Sharon

Wylie, Robert H.

Wilton

Pool, John L.

DELAWARE

Wilmington

Pecora, David V.

DISTRICT OF COLUMBIA

Aaron, Benjamin L

Bowles, L. Thompson

Hufnagel, Charles A.

Cooke, Francis N.

Delray Beach

Geary, Paul

Gainesville

Bartley, Thomas D.

Jacksonville

Koster Jr, J. Kenneth

Stephenson Jr., Sam

Lakeland

Brown Jr., Ivan W.

Marathon

Mangiardi, Joseph L.

Miami

Beattie Jr., Edward

Bolooki, Hooshang

Center, Sol

Daughtry, Dewitt C.

Gentsch, Thomas O

Jude, James R.

Kaiser, Gerard A.

MacGregor, David C.

Papper, Emanuel M

Reis, Robert L.

Ripstein, Charles B.

Thurer, Richard J.

Miami Beach

Greenberg, Jack J.

Grondin, Pierre

N. Miami Beach

Spear, Harold C.

N. Palm Beach

Dorsey, John M.

Naples

Linberg, Eugene J.

Orlando

Sherman, Paul H.

Ponte Vedra Bch

Gilbert Jr, Joseph

Keshishian, John M.

Midgley, Frank M

Stranahan, Allan

So Miami

Chesney, John G.

St Petersburg

Clerf, Louis H.

Daicoff, George R.

Dematteis, Albert

Wheat Jr., Myron W.

Tallahassee

Kraeft, Nelson H.

Tampa

Blank, Richard H.

Connar, Richard G.

Seiler, Hawley H.

Titusville

Labrosse, Claude C.

Winter Haven

Maurer, Elmer P. R.

Winter Park

Bloodwell, Robert D.

GEORGIA

Atlanta

Graver, Joseph M

Hatcher Jr., Charles

Hopkins, William A.

Jones, Ellis L.

King, Richard

Lee Jr, Arthur B

Logan Jr., William D

Mansour, Kamal A.

Miller, Joseph I

Rivkin, Laurence M.

Symbas, Panagiotis

Williams, Willis H

IDAHO

Boise

Ashbaugh, David G.

Herr, Rodney H.

ILLINOIS

Chicago

Baffes, Thomas G.

Barker, Walter L.

Campbell, Charles D

Faber, L. Penfield

Hanlon, C. Rollins

Head, Louis R.

Hunter, James A.

Idriss, Farouk S.

Javid, Hushang

Jensik, Robert J.

Karp, Robert B.

Kittle, C. Frederick

Leininger, Bernard J

Levitsky, Sidney

Michaelis, Lawrence

Midell, Allen I.

Najafi, Hassan

Raffensperger, John

Replogle, Robert L.

Shields, Thomas W.

Skinner, David B.

Thomas Jr., Paul A.

Vanecko, Robert M

Weinberg Jr., Milton

Evanston

Augusta

Ellison, Robert G.

Rubin, Joseph W.

Brunswick

Collins, Harold A.

Macon

Sealy, Will C.

Van De Water, Joseph M

Savannah

Langston, Hiram T.

Yeh, Thomas J.

HAWAII**Honolulu**

Ching, Nathaniel P.

Gebauer, Paul W

McNamara, Joseph J.

Moreno-Cabral, Ricardo

Kailua Kona

Fell, Egbert H

Tripler Amc

Strevey Jr, Tracy E

INDIANA**Indianapolis**

Battersby, James S.

Brown, John W

King, Harold

King, Robert D.

Mandelbaum, Isidore

Siderys, Harry

IOWA**Cedar Rapids**

Lawrence, Montague S

Des Moines

Anderson, Robert W.

Fry, Willard A.

Tatooles, Constantine

Geneva

Tarnay, Thomas J

Glencoe

Rubenstein, L. H.

Maywood

Keeley, John L.

Pifarre, Roque

Oak Brook

Hudson, Theodore R.

Nigro, Salvatore L.

Peoria

Debord, Robert A.

Springfield

Wellons Jr., Harry A

Winnetka

Mackler, S. Allen

New Orleans

Blalock, John B.

Decamp, Paul T.

Hewitt, Robert L.

Lindsey, Edward S.

Mills, Noel L.

Moulder, Peter V.

Ochsner, John L.

Pearce, Charles W.

Rosenberg, Dennis M.

Schramel, Robert J.

Strug, Lawrence H.

Webb, Watts R.

Dorner, Ralph A.

Watkins, David H.

Iowa City

Brandt III, Berkeley

Ehrenhaft, Johann L

Rossi, Nicholas P.

Stanford, William

KANSAS

Cunningham

Allbritten Jr., F.F.

Kansas City

Friesen, Stanley R.

Overland Park

Barnhorst, Donald A.

Wichita

Tocker, Alfred M.

KENTUCKY

Lexington

Crutcher, Richard R.

Dillon Jr., Marcus L

Todd, Edward P.J

Louisville

Gray Jr, Laman A

Mahaffey, Daniel E.

Ransdell Jr, Herbert

LOUISIANA

Alexandria

Knoepp, Louis F.

Baton Rouge

Berry, B.Eugene

Beskin, Charles A.

Marrero

O'Neill Jr, Martin J

Metairie

Ochsner Jr., Alton

MAINE

Liberty

Hurwitz, Alfred

Portland

Drake, Emerson H.

Hiebert, Clement

Rockport

Swenson, Orvar

MARYLAND

Baltimore

Attar, Safuh M. A.

Baker, R. Robinson

Brawley, Robert K.

Cowley, R.Adams

Gardner, Timothy J

Gott, Vincent L.

Haller Jr., J. Alex

Hankins, John R.

McLaughlin, Joseph S

Michelson, Elliott

Moulton, Anthony L

Turney, Stephen Z.

Bethesda

Clark, Richard E.

Shumacker Jr, Harris B

Chevy Chase

Iovine, Vincent M.

Potomac

Zajtchuk, Rostik

Worton

Walkup, Harry E.

MASSACHUSETTS

Acton

Boyd, Thomas F.

Boston

Akins, Gary W
Austen, W. Gerald
Barsamian, Ernest M.
Berger, Robert L.
Bernhard, William F.
Bougas, James A.
Braunwald, Nina S.
Buckley, Mortimer J.
Burke, John F.
Castaneda, Aldo R.
Cleveland, Richard J
Clowes Jr., George
Cohn, Lawrence H.
Collins, John J.
Daggett, Willard M
Deterling Jr., Ralph
Frank, Howard A.
Gaensler, Edward A.
Grillo, Hermes C.
Moncure, Ashby C.
Neptune, Wilford B.
Overholt, Richard H.
Rheinlander, Harold F
Russell, Paul S.
Scannell, J. Gordon
Schuster, Samuel R.
Starkey, George W.
Weintraub, Ronald
Wilkins Jr., Earle W

Brookline

Madoff, Irving M

Burlington

Boyd, David P.

So Weymouth

Malcolm, John A.

Springfield

Engelman, Richard M

Stoughton

Black, Harrison

West Roxbury

Khuri, Shukri F

Westport Harbor

Findlay Jr, Charles W

Winchester

Taylor, Warren J.

Worcester

Vander Salm, Thomas J

MICHIGAN**Ann Arbor**

Bartlett, Robert H.
Behrendt, Douglas M.
Gago, Otto
Kirsh, Marvin M.
Morris, Joe D.
Orringer, Mark B.
Sloan, Herbert

Birmingham

Dodrill, Forest D.

Detroit

Arbulu, Augustin
Arciniegas, Eduardo
Day, J. Claude
Levine, Frederick H
Magilligan Jr, D.J
Steiger, Zwi
Wilson, Robert F.

Ellis Jr, F.Henry
Watkins Jr., Elton

Cambridge
Harken, Dwight E.

Concord
Soutter, Lamar

Lynnfield
Wesolow, Adam

Medford
Desforges, Gerard

Methuen
Wilson, Norman J.

Nantucket
Mahoney, Earle B

Newton Lwr Fall
Laforet, Eugene G.
Strieder, John W.

No Andover
Cook, William A.

MINNESOTA
Duluth

Fuller, Josiah

Minneapolis

Arom, Kit V.

Foker, John E

Gannon, Paul G

Garamella, Joseph J.

Helseth, Hovald K

Humphrey, Edward W.

Johnson, Frank E

Kiser, Joseph C.

Molina, J.Ernesto

Nicoloff, Demetre M.

Rochester
Bernatz, Philip E.

Clagett, O. Theron

Danielson, G.K

Farmington Hls

Lam, Conrad R.

Grand Rapids
Harrison, Robert W.

Meade, Richard H.

Rasmussen, Richard A

Tomatis, Luis A

Grosse Pointe

Benson, Clifford D.

Taber, Rodman E.

Kalamazoo
Neerken, A. John

Leonard
Gerbasi, Francis S.

Sutton Bay
Timmis, Hilary H.

St Louis
Barner, Hendrick B.

Bergmann, Martin

Connors, John P.

Cox, James L

Ferguson, Thomas B.

Kaiser, George C.

Lewis Jr., J. Eugene

Pennington, D.Glenn

Roper, Charles L.

Weldon, Clarence S.

Willman, V. L.

St Paul

Codd, John E.

NEBRASKA

Omaha

Demeester, Tom R.

Kaye, Michael P.
McGoon, Dwight C.
Olsen, Arthur M.
Pairolero, Peter C
Payne, W. Spencer
Pluth, James R.
Puga, Francisco J

St Paul

Lillehei, C. Walton
Miller, Fletcher A.

Perry Jr., John F.

**MISSISSIPPI
Jackson**

Dalton Jr., Martin L
Hardy, James D.
Johnston Jr., J. H.
Neely, William A.
Netterville, Rush E.

**MISSOURI
Columbia**

Silver, Donald

Kansas City

Adelman, Arthur
Ashcraft, Keith W.
Benoit Jr., Hector W
Holder, Thomas M.
Killen, Duncan A.
Mayer Jr., John H.
Padula, Richard T.
Reed, William A.

Mt Vernon

Campbell Jr, Daniel C

Fleming, William H.
Malette, William G.
Schultz, Richard D
Sellers, Robert D.

NEW HAMPSHIRE

Hanover

Crandell, Walter B.

Peterborough

Woods, Francis M.

Wolfeboro

Deniord, Richard N.

**NEW JERSEY
Bellville**

Gerard, Franklyn P.

Belmar

Bailey, Charles P.

Browns Mills

Fernandez, Javier
Gonzalez-Lavin, Lorenzo

Camden

Camishion, Rudolph C

Cherry Hill

Pierucci Jr., Louis

East Orange

Auerbach, Oscar

Jersey City

Demos, Nicholas J.

Millburn

Parsonnet, Victor

Moorestown

Morse, Dryden P.

Cooperstown

New Brunswick

Kunderman, Philip J.
Lewis, Ralph J
Mackenzie, James W.

Newark

Abel, Ronald M.
Amato, Joseph J.
Gielchinsky, Isaac
Neville, William E.
Norman, John C.

No Caldwell

Wychulis, Adam R.

Paterson

Bregman, David

Short Hills

Timmes, Joseph L.

Tenafly

Gerst, Paul H.

NEW MEXICO

Albuquerque

Edwards, W. Sterling

Artesia

Glass, Bertram A.

Las Vegas

Thai, Alan P.

NEW YORK

Albany

Alley, Ralph D.
Foster, Eric D
Kausel, Harvey W.
McKneally, Martin F.

Bay Shore

Ryan, Bernard J.

Bronx

Fell, Stanley C

Blumenstock, David A

Fayetteville

Bugden, Walter F.

Floral Park

Crastnopol, Philip

Irvington

Altai, Lari A.

New Hyde Park

Tyras, Denis H.

New Paltz

Johnson, Elgie K

New York

Adams, Peter X

Bains, Manjit S

Bloomberg, Allan E.

Bowman Jr, Frederick

Boyd, Arthur D.

Cahan, William G.

Clauss, Roy H.

Conklin, Edward F.

Cournand, Andre

Cracovaner, Arthur J

Culliford, Alfred T

Friedlander, Ralph

Giannelli Jr, Stanley

Green, George E.

Holman, Cranston W.

Holswade, George R.

Hood, R. Maurice

Hutchinson III, John E

Isom, O. Wayne

Jaretzki III, Alfred

Jurado, Roy A

King, Thomas C.

Kirschner, Paul A.

Lambert, Adrian

Ford, Joseph M
Prater, Robert W. M.
Hirose, Teruo
Robinson, George

Brooklyn

Cunningham Jr, J.N
Griepp, Randall B.
Levowitz, Bernard S.
Sawyer, Philip N.

Buffalo

Adler, Richard H.
Andersen, Murray N.
Bhayana, Joginder N
Lajos, Thomas Z.
MacManus, Joseph E.
Subramanian, S.

Litwak, Robert S.
Maier, Herbert C.
Malm, James R.
Martini, Nael
Nealon Jr., Thomas F
Okinaka, Arthur J.
Redo, S. Frank
Reemtsma, Keith
Rubin, Morris
Spencer, Frank C
Spotnitz, Henry M
Steichen, Felicien M
Subramanian, V. A.
Tice, David
Veith, Frank J.
Wallsh, Eugene
Wichern Jr, Walter
Wolff, William I.

Patchogue

Finnerty, James

Plattsburg

Potter, Robert T.

Rochester

Craver, William L
Deweese, James A.
Schwartz, Seymour I.
Stewart, Scott
Zaroff, Lawrence I.

Roslyn

Thomson Jr., Norman
Wisoff, B. George

Saranac Lake

Decker Jr., Alfred M

Scottsville

Emerson, George L.

Southampton

Oriental

Deaton Jr., W. Ralph

Pinehurst

Fischer, Walter W.

Tryon

Wilson, Julius L.

Winston-Salem

Cordell, A. Robert
Hudspeth, Allen S.
Johnston, Frank R.
Meredith, Jesse H.

NORTH DAKOTA

Grand Forks

James, Edwin C

OHIO

Akron

Heroy, William W.

Staten Island

Garzon, Antonio A.

Stony Brook

Anagnostopoulos, C.

Dennis, Clarence

Soroff, Harry S.

Syracuse

Bredenberg, Carl E

Effler, Donald B.

Meyer, John A

Parker Jr, Frederick

Valhalla

Reed, George E.

Westhampton Bch

Sarot, Irving A.

NORTH CAROLINA

Asheville

Belts, Reeve H.

Scott, Stewart M.

Sethi, Gulshan K.

Takaro, Timothy

Chapel Hill

Murray, Gordon F.

Starek, Peter J. K.

Wilcox, Benson R.

Charlotte

Robicsek, Francis

Taylor, Frederick H.

Durham

Jones, Robert H.

Oldham Jr., H. N.

Sabiston, David C.

Wechsler, Andrew S.

Wolfe, Walter G.

Falor, William H.

Cincinnati

Albers, John E

Flege Jr, John B

Gonzalez, Luis L.

Helmsworth, James A.

Rosenkrantz, Jens G.

Wright, Creighton B.

Cleveland

Ankeney, Jay L.

Cosgrove, Delos M.

Cross, Frederick S.

Groves, Laurence K.

Kay, Earle B.

Loop, Floyd D

Columbus

Clatworthy Jr, H.W

Kakos, Gerard S

Kilman, James W.

Meckstroth, Charles

Vasko, John S.

Williams Jr., Thomas

Dayton

Dewall, Richard A.

Pepper Pike

Mendelsohn, Harvey J

OKLAHOMA

Oklahoma City

Elkins, Ronald C.

Felton II, Warren L.

Fisher, R. Darryl

Greer, Allen E.

Munnell, Edward R.

Wilder, Robert J.

Williams, G. Rainey

Zuhdi, M.Nazih

Young Jr, W.Glenn

Tulsa

McPhail, Jasper L.

OREGON

Days Creek

Miller, Arthur C.

Portland

Krause, Albert H

Okies, J.Edward

Poppe, J. Karl

Starr, Albert

PENNSYLVANIA

Abington

Frobese, Alfred S.

Bethlehem

Snyder, John M.

Buck Hill Falls

Thompson, Samuel A.

Carlisle

Demuth Jr., William

Darby

McKeown Jr., John J.

Fairfield

McClenathan, James E

Gladwyne

Johnson, Julian

Hamburg

Judd, Archibald R

Hershey

Pierce, William S.

Waldhausen, John A.

Lancaster

Bonchek, Lawrence I.

Witmer, Robert H.

Norwood, William I

Parr, Grant V.S

Rosemond, George P.

Stephenson, Larry W

Templeton III, John

Wallace, Herbert W.

Pittsburgh

Bahnson, Henry T.

Ford, William B.

Magovern, George J

Pontius, Robert G.

Rams, James J.

Ravitch, Mark M.

Sayre

Sewell, William H.

Villanova

Lemmon, William M.

Yardley

Sommer Jr., George N

RHODE ISLAND

Providence

Karlson, Karl E.

Moran, John M.

Simeone, Fiorindo A.

SOUTH CAROLINA

Charleston

Bradham, Randolph R.

Hairston, Peter

Parker, Edward F.

Sade, Robert M.

Columbia

Almond, Carl H

Lumberville

O'Neill, Thomas J.E.

Philadelphia

Brockman, Stanley K.

Donahoo, James

Dunn, Jeffrey M

Eddie, Richard N.

Edmunds Jr, L. Henry

Fineberg, Charles

Haupt, George J.

Lemole, Gerald M.

MacVaugh III, Horace

Mendelssohn, Edwin

Mundth, Eldred D.

Nemir Jr., Paul

Memphis

Cole, Francis H.

Eastridge, Charles E

Garrett, H. Edward

Howard Jr, Hector S

Hughes Jr, Felix A

McBurney, Robert P.

Pate, James W.

Robbins Sr, S. Gwin

Rosensweig, Jacob

Skinner, Edward F.

Nashville

Alford Jr., William

Bender Jr., Harvey W

Dale, W. Andrew

Foster, John H.

Gobbel Jr., Walter G

Johnson, Hollis E.

Sawyers, John L.

Landrum

Stayman, Joseph W.

Spartanburg

Utley, Joe R.

TENNESSEE**Chattanooga**

Adams Jr., Jesse E.

Hall, David P.

Johnson City

Bryant, Lester R.

Lefemine, Armand A.

Knoxville

Blake, Hu Al

Brott, Walter H

Domm, Sheldon E.

Houston

Beall Jr., Arthur C.

Burdette, Walter J.

Cooley, Denton A.

Crawford, E. Stanley

De Bakey, Michael E.

Mailman, Grady L

Henly, Walter S.

Lawrie, Gerald M.

Mattox, Kenneth L.

Morris Jr., George C

Mountain, Clifton F.

Ott, David A

Overstreet, John W.

Reul Jr., George J.

Walker, William E

Wukasch, Don C.

Lubbock

Bricker, Donald L.

Scott Jr., Henry W.

Stoney, William S

Thomas Jr, Clarence

Sewanee

Thrower, Wendell B

TEXAS

Amarillo

Sutherland, R. Duncan

Burnet

Ross, Raleigh R.

Dallas

Adam, Maurice

Crosby, Ivan K.

Davis, Milton V.

Holland, Robert H.

Lambert, Cary J

Mills, Lawrence J

Mitchel Jr., Ben F.

Paulson, Donald L.

Platt, Melvin R.

Razzuk, Maruf A.

Seybold, William D.

Shaw, Robert R.

Sugg, Winfred L

Urschel Jr, Harold

Dilley

Hood Jr., Richard H.

Ft Sam Houston

Treasure, Robert L.

Galveston

Derrick, John R.

VIRGINIA
Arlington

Feola, Mario

San Antonio

Dooley, Byron N.

French III, Sanford

Grover, Frederick L.

Heaney, John P.

Trinkle, J. Kent

Temple

Brindley Jr., G. V.

Woodville

Harrison, Albert W

UTAH

Salt Lake City

Cutler, Preston R.

Doty, Donald B.

Gay Jr., William A.

Liddle, Harold V.

Mortensen, J. D.

Nelson, Russell M.

Wolcott, Mark W.

VERMONT

Brattleboro

Gross, Robert E.

Burlington

Coffin, Laurence H

Miller, Donald B

Chester Depot

Adams, Herbert D.

West Dover

Humphreys II, G. H.

White River Jet

Tyson, M. Dawson

Spokane

Berg Jr, Ralph

Conrad, Peter W.

Klepser, Roy G.

Charlottesville

Dammann, John F.

Minor, George R.

Muller Jr., William

Nolan, Stanton P.

Lynchburg

Moore, Richmond L.

Richmond

Bosher Jr, Lewis H

Brooks, James W.

Cole, Dean B.

Greenfield, Lazar J.

Gwathmey, Owen

Johns, Thomas N. P.

Lower, Richard R.

WASHINGTON

Bellingham

Varco, Richard L.

Friday Harbor

Fox, Robert T.

Lawrence, G. Hugh

Mercer Island

Mills, Waldo O.

Seattle

Anderson, Richard P.

Dillard, David H.

Hill III, Lucius D.

Jarvis, Fred J.

Jones, Thomas W.

Manhas, Dev R.

Mansfield, Peter B.

Miller Jr, Donald W

Pinkham, Roland D.

Rittenhouse, Edward A

WEST VIRGINIA

Daniels

Littlefield, James B

East Charleston

Walker, James H.

Morgantown

Warden, Herbert E.

WISCONSIN

La Crosse

Gundersen, Erik A.

Madison

Berkoff, Herbert A

Chopra, Paramjeet S.

Kroncke, George M

Young, William P.

Marshfield

Myers, William O.

Ray III, Jefferson F

Sautter, Richard D.

Milwaukee

Flemma, Robert J

Hausmann, Paul F.

Johnson, W. Dudley

Litwin, S. Bert

Mullen, Donald C.

Narodick, Benjamin

Olinger, Gordon N

Tector, Alfred J.

Wausau

Davila, Julio C.

West Bend

Gardner, Robert J.

WYOMING

Teton Village

Sauvage, Lester
Thomas, George I.

Kaunitz, Victor H.

CANADA

Newfoundland

Brownrigg, Garrett M

Alberta

Calgary

Miller, George E.

Edmonton

Callaghan, John C.

Gelfand, Elliot T

Meltzer, Herbert

Sterns, Laurence P.

British Columbia

Kelowna

Couves, Cecil M.

Vancouver

Allen, Peter

Ashmore, Phillip G.

Harrison, Elliott

Jamieson, W.R. Eric

Tyers, G. Frank O.

Victoria

Stenstrom, John D.

W. Vancouver

Robertson, Ross

Manitoba

Winnipeg

Barwinsky, Jaroslaw

Cohen, Morley

Nova Scotia

Halifax

Murphy, David A.

Kentville

Quinlan, John J.

Mabou

Ottawa

Keon, Wilbert J.

Sudbury

Field, Paul

Walker, George R.

Toronto

Baird, Ronald J.

Bigelow, Wilfred G.

Cooper, Joel D.

Ginsberg, Robert J.

Goldberg, Melvyn

Goldman, Bernard S.

Henderson, Robert D

Joynt, George H. C.

Mcintosh, Clarence A

Pearson, F. Griffith

Salerno, Tomas A

Scully, Hugh E.

Trimble, Alan S.

Trusler, George A.

Weisel, Richard D

Westbrook

Lynn, R. Beverley

Woodbridge

Laird, Robert C

Province Of Quebec

Montreal

Blundell, Peter E.

Chiu, Chu-Jeng (Ray)

Dobell, Anthony R

Grondin, Claude M.

Lepage, Gilles

Maclean, Lloyd D.

Thomas, Gordon W.

Ontario

Dorset

Mustard, William T.

Hamilton

Sullivan, Herbert J.

Kingston

Charrette, Edward J. P

London

Heimbecker, Raymond

Nottawa

Key, James A.

Morin, Jean E.

Mulder, David S.

Scott, Henry J.

Outremont

Bruneau, Jacques

Quebec

Gravel, Joffre-Andre

Sainte-Foy

Deslauriers, Jean

Westmount

Vineberg, Arthur M.

OTHER COUNTRIES

ARGENTINA

Buenos Aires

Favaloro, Rene G.

AUSTRALIA

So Australia

Piccadilly

Sutherland, H. D'Arcy

BANGLADESH

Dacca Dist.

McCord, Colin W.

BRAZIL

Sao Paulo

Jatene, Adib D

Zerbini, E. J.

ENGLAND

Bath, Avon

Belsey, Ronald

Buckinghamsh.

Sellors, Sir Thomas

Dunmow Essex

IRELAND

Dublin

O'Malley, Eoin

ISRAEL

Haifa

Fishman, Noel H.

JAPAN

Saga

Miyamoto, Alfonso T

Tokyo

Wada, Juro J

Ube

Mohri, Hitoshi

NETHERLANDS

Leiden

Brom, A. Gerard

NEW ZEALAND

Auckland

Barratt-Boyes, Sir Brian

P.R.CHINA

Beijing

Kennedy, John H.

Wu, Ying-Kai

Hereford

Thompson, Vernon C

PORTUGAL

Herefordshire

Smith, Mr Roger Abbey

Lisbon

Macedo, Manuel E. M

London

Lennox, Stuart C

S ARABIA

Ross, Donald N

Riyadh

FRANCE

Merendino, K. Alvin

Bordeaux-Pessac

Fontan, Francis M

SCOTLAND

Edinburgh

Paris

Logan, Andrew

Binet, Jean-Paul

SPAIN

Carpentier, Alain F

Santander

Dubost, Prof. Charles

Duran, Carlos Gomez

GUATEMALA

Guatemala City

Herrera, Rodolfo

SWITZERLAND

Genolier

Hahn, Charles J.

INDIA

Zurich

Senning, Prof Ake

Raiputana

Van Allen, Chester M

VENEZUELA

Caracas

Tricerri, Fernando E

W GERMANY

Aachen

Messmer, Bruno J.

Hannover

Borst, Hans G

THE AMERICAN ASSOCIATION FOR THORACIC SURGERY
Charter Members
June 7, 1917

E. Wyllis Andrews	Arthur A. Law
John Auer	William Lerche
Edward R. Baldwin	Howard Lilienthal
Walter M. Boothby	William H. Lockett
William Branower	Morris Manges
Harlow Brooks	Walton Martin
Lawrason Brown	Rudolph Matas
Kenneth Bulkley	E. S. McSweeney
Alexis Carrel	Samuel J. Meltzer
Norman B. Carson	Willy Meyer (Founder)
J. Frank Corbett	James Alexander Miller
Armistead C. Crump	Robert T. Miller
Charles N. Dowd	Fred J. Murphy
Kennon Dunham	Leo S. Peterson
Edmond Melchior Eberts	Eugene H. Pool
Max Einhorn	Walther I. Rathbun
Herman Fischer	Martin Rehling
Albert H. Garvin	B. Merrill Ricketts
Nathan W. Green	Samuel Robinson
John R. Hartwell	Charles I. Scudder
George J. Heuer	William H. Stewart
Chevalier Jackson	Franz Torek
H. H. Janeway	Martin W. Ware
James H. Kenyon	Abraham O. Wilensky
Adrian V. S. Lambert	Sidney Yankauer

BY-LAWS OF
THE AMERICAN ASSOCIATION
FOR THORACIC SURGERY

ARTICLE I. Name

The name of this Corporation is The American Association for Thoracic Surgery (hereinafter the "Association").

ARTICLE II. Purposes

The purposes of the Association shall be:

To associate persons interested in, and carry on activities related to, the science and practice of thoracic surgery, the cure of thoracic disease and the related sciences.

To encourage and stimulate investigation and study that will increase the knowledge of intrathoracic physiology, pathology and therapy, and to correlate and disseminate such knowledge.

To hold scientific meetings featuring free discussion of problems and developments relating to thoracic surgery, and to sponsor a journal for the publication of scientific papers presented at such meetings and other suitable articles.

To succeed to, and continue to carry on the activities formerly conducted by, The American Association for Thoracic Surgery, an unincorporated association.

ARTICLE III. Membership

Section 1. There shall be four classes of members: Honorary, Senior, Active and, for a time, Associate. Admission to membership in the Association shall be by election. Membership shall be limited, the limits on the respective classes to be determined by these By-Laws. Only Active and Senior Members shall have the privilege of voting or holding office, except as provided by these By-Laws.

Section 2. Honorary Membership shall be reserved for such distinguished persons as may be deemed worthy of this honor by the Council with the concurrence of the Association.

Section 3. The number of Senior Members shall be unlimited. Active Members automatically advance to Senior Membership at the age of sixty years. In addition, a younger Active Member may be eligible for Senior Membership if incapacitated by disability, but for no other reason.

Section 4. Active Membership shall be limited to six hundred. A candidate to be eligible must be a citizen of the United States of America or Canada, unless in unusual cases this citizenship requirement shall have been waived by the Council. The candidate shall have achieved distinction in the thoracic field or shall have made a meritorious contribution to knowledge pertaining to thoracic disease or its surgical treatment.

Section 5. Election to Honorary, Senior or Active Membership shall be for life, subject to the provisions of Section 9 following. There shall be no further additions to the Associate Membership. All new members shall be elected directly to Honorary or Active status.

Section 6. Associate Membership for those members elected after 1960 shall be limited to a five year period. During this limited period, an Associate Member, if properly qualified, may be elected to Active Membership. After the expiration of this limited period an Associate Member, if not yet qualified for Active Membership, must either be re-elected to an additional period of Associate Membership or dropped from the rolls of the Association.

Section 7. Candidates for membership in this Association must be formally nominated and seconded, in an approved manner, by not less than three Active or Senior Members. Such nomination must have been in the hands of the Membership Committee for not less than four months, and the name of the candidate must have been distributed to all members of the Association before final action may be taken on any new candidate for election to Active Membership. Provided the foregoing requirements have been met and the candidates have been approved by the Membership Committee and by the Council, their names shall be presented to the Association at a regularly convened annual meeting for final action. A three-fourths vote of those present and voting shall be required to elect. Any candidate for membership in this Association who has failed of election for three successive years shall automatically cease to be a candidate and may not be renominated until after a lapse of three years.

Section 8. The report of the Membership Committee shall be rendered at the second executive session of each annual meeting of the Association. Candidates shall be presented in groups in the following order: Candidates for Honorary Membership; retirement of Active Members to Senior Membership; Candidates for Active Membership, Associate Members for re-election; members dropped from the rolls of the Association.

Section 9. Membership may be voluntarily terminated at any time by members in good standing. The Council, acting as a Board of Censors, may recommend the expulsion of a member on the grounds of moral or professional delinquency,

and submit his name, together with the grounds of complaint, to the Association as a whole at any of the regularly convened meetings, after giving such member ample opportunity to appear in his own behalf.

Section 10. The Council shall recommend that any Active or Associate Member whose dues are in arrears for two years, or who has been absent, without sufficient excuse, from three consecutive annual meetings, shall have his membership terminated.

Section 11. Notwithstanding Section 10, any member of the Association over 60 years of age is excused from the attendance requirement and upon his specific request may likewise be excused from the payment of dues.

ARTICLE IV. Board of Directors ("Council")

Section 1. The Board of Directors of the Association shall be called the Council and shall be composed of the President, Vice-President, Secretary, Treasurer and Editor of the Association, and five Councilors. All members of the Council must be Active or Senior Members of the Association, except that the Editor may be an Honorary Member.

Section 2. The Council shall be the governing body of the Association, and shall have full power to manage and act on all affairs of the Association, except as follows:

- a. It may not alter the initiation fees or annual dues, or levy any general assessments against the membership, except that it may, in individual cases, waive annual dues or assessments.
- b. It may not change the Articles of Incorporation or By-Laws.
- c. It may neither elect new members nor alter the status of existing members, other than to apply the provisions of Article III, Section 9.
- d. It may not deplete the principal of the Endowment Fund.

Section 3. At the conclusion of the annual meeting, the retiring President shall automatically become a Councilor for a one-year term of office. One of the other four Councilors shall be elected at each annual meeting of the Association to serve for a four-year term of office in the place of the elected Councilor whose term expires at such meeting, but no Councilor may be reelected to succeed himself. Any Councilor so elected shall take office upon the conclusion of the annual meeting at which he is elected.

Section 4. Vacancies in the office of Councilor shall be temporarily filled by the Council subject to approval of the Association at the next annual meeting of the Association.

ARTICLE V. Officers

Section 1. The officers of the Association shall be a President, a Vice-President, a Secretary, and a Treasurer. All officers must be Active or Senior Members of the Association. Said officers shall be ex officio members of the Council of the Association.

Section 2. The Council may, for the purposes of Article IX, give status as officers of the Association to the individual members of any ad hoc Committee appointed by the Council.

Section 3. The President, Vice-President, Secretary and Treasurer shall be elected at the annual meeting of the Association and shall take office upon conclusion of the meeting. The President and the Vice-President shall be elected for a one-year term of office and neither may be reelected to succeed himself in the same office, unless such officer is filling the unexpired term of an officer previously elected to such office. The Secretary and the Treasurer shall be elected for a one-year term of office and may be reelected indefinitely.

Section 4. The President of the Association shall perform all duties customarily pertaining to the office of President. He shall preside at all meetings of the Association and at all meetings of the Council.

Section 5. The Vice-President of the Association shall perform all duties customarily pertaining to the office of the Vice-President, both as to the Association and the Council. In the event of a vacancy occurring in the office of President, the Council shall advance the Vice-President to the Presidency and appoint a new Vice-President.

Section 6. The Secretary of the Association shall perform all duties customarily pertaining to the office of Secretary. He shall serve as Secretary of the Association and as Secretary of the Council. When deemed appropriate, an Active or Senior Member may be elected to serve as an understudy to the Secretary in anticipation of the latter's retirement from office.

Section 7. The Treasurer of the Association shall perform all duties customarily pertaining to the office of Treasurer. He shall serve as Treasurer of the Association and shall also serve as custodian of the Endowment Fund.

Section 8. The Editor of the Association is not an officer of the Association. He shall be appointed by the Council at its annual meeting; provided, however, that such appointment shall not become effective until approved by the Association at the annual meeting of the Association. The Editor shall be appointed for a five-year term and may not be appointed to

more than two successive terms; provided, however, that an Editor completing two years or less of the unexpired term of a previous Editor may be appointed for two successive five-year terms. The Editor shall serve as the Editor of the official Journal and shall be ex officio the Chairman of the Editorial Board and a member of the Council of the Association. Section 9. Vacancies occurring among the officers named in Section 1 or a vacancy in the position of Editor shall be temporarily filled by the Council, subject to approval of the Association at the next meeting of the Association.

ARTICLE VI. Committees

Section 1. The Council is empowered to appoint a Membership Committee, a Program Committee, a Necrology Committee and such other committees as may in its opinion be necessary or desirable. All such committees shall render their reports at an executive session of the Association, except that no ad hoc committee need report unless so directed by the Council.

Section 2. The Membership Committee shall consist of seven Active or Senior Members. The Council may appoint not more than one of its own members to serve on this Committee. The duties of the Membership Committee are to investigate all candidates for membership in the Association and to report its findings as expeditiously as possible to the Council through the Secretary of the Association. This Committee is also charged with searching the literature of this and other countries to the end that proper candidates maybe presented to the Association for consideration. Appointment to this Committee shall be for a period of one year, and not more than five of the members may be reappointed to succeed themselves. This Committee is also charged with maintaining a record of membership attendance and participation in the scientific programs and reporting to the affected members and to the Council any deviations from the requirement of Article VIII, Section 4, of these By-Laws.

Section 3. The Program Committee shall consist of at least, six members: the President, the Vice President, the Secretary and the Editor of the Association, and at least two members-at-large appointed by the President. The duties of this Committee shall be to arrange, in conformity with instructions from the Council, the scientific program for the annual meeting.

Section 4. The Necrology Committee shall consist of one or more Active or Senior Members. Appointments to this Committee shall be for a one-year term of office. Any or all members of this Committee may be reappointed to succeed themselves. The Council may, if it so desires, appoint one of its own members to serve as Chairman of this Committee. The duties of the Necrology Committee shall be to prepare suitable resolutions and memorials upon all deaths of members of the Association and to report such deaths at every annual meeting.

Section 5. The Nominating Committee shall consist of the five (5) immediate Past Presidents of the Association. The most senior Past President shall serve as Chairman. This Committee shall prepare a slate of nominees for Officers and Councilors upon instruction from the Council as to the vacancies which are to be filled by election and shall present its report at the Second Executive Session of the Annual Meeting.

Section 6. The Association as a whole may authorize the Council to appoint Scientific or Research Committees for the purpose of investigating thoracic problems and may further authorize the Council to support financially such committees to a limited degree. When Scientific or Research Committees are authorized by the Association, the Council shall appoint the Chairmen of these Committees, with power to organize their committees in any way best calculated to accomplish the desired object, subject only to the approval of the Council. Financial aid rendered to such Committees shall not exceed such annual or special appropriations as may be specifically voted for such purposes by the Association as a whole. Members are urged to cooperate with all Scientific or Research Committees of the Association.

Section 7. The Evarts A. Graham Memorial Traveling Fellowship Committee shall consist of six members: the President, Secretary, and Treasurer of the Association and three members-at-large, one member being appointed by the President each year to serve a term of three years. The Chairman shall be the member-at-large serving his third year. The duties of the committee shall be to recommend Fellowship candidates to the Graham Education and Research Foundation and to carry out other business pertaining to the Fellowship and the Fellows, past, present, and future.

Section 8. The Editorial Board shall be appointed by the Editor, subject only to the approval of the Council. The Editor shall be, ex officio, the chairman of this board and shall be privileged to appoint and indefinitely reappoint such members of the Association, regardless of class of membership, and such non-members of the Association as in his opinion may be best calculated to meet the editorial requirements of the Association.

Section 9. The Ethics Committee shall consist of five members appointed by the Council. No member shall serve more than four years. The Ethics Committee shall advise the Council concerning alleged breaches of ethics. Complaints regarding alleged breaches of ethics shall be received in writing by the Ethics Committee and shall be investigated by it. In addition, the Ethics Committee may investigate on its own initiative.

Section 10. The Committee on Manpower shall be a Joint Committee of this Association and The Society of Thoracic Surgeons. The Committee shall consist of two members of this Association, two members of The Society of Thoracic Surgeons, and a Chairman who shall be a member of this Association and The Society of Thoracic Surgeons. The duties of

this Committee, and the manner of appointment and term of its members and chairman, shall be determined jointly by the Council of this Association and the Council of The Society of Thoracic Surgeons.

ARTICLE VII Finances

Section 1. The fiscal year of the Association shall begin on the first day of March and end on the last day of February each year.

Section 2. Members shall contribute to the financial maintenance of the Association through initiation fees, annual dues, and special assessments. The amount of the annual dues and the initiation fees shall be determined by these By-Laws. If, at the end of any fiscal year, there is a deficit in the current funds of the Association, the Council may send out notices to that effect and invite Active members to contribute the necessary amount so that no deficit is carried over from one fiscal year to another. The Association may, in any regularly convened meeting, vote a special assessment for any purpose consistent with the purposes of the Association, and such special assessment shall become an obligatory charge against the classes of members affected thereby.

Section 3. To meet the current expenses of the Association, there shall be available all revenue derived by the Association subject to the provisions of Section 4, following.

Section 4. Funds derived from the payment of initiation fees shall not be available for current expenses and shall be placed in a special fund, to be invested and reinvested in legal securities, to be held intact, and to be known as the Endowment Fund. The Council is responsible for the proper management of the Endowment Fund, and may divert any surplus in the current funds of the Association into this fund, but may not withdraw any of the principal of the Endowment Fund except in accordance with the provisions of Section 6, following.

Section 5. The income from the Endowment Fund shall be expended as the Council directs.

Section 6. The principal of the Endowment Fund may be withdrawn, in whole or in part, under the following conditions only: The amount of principal to be withdrawn shall have been approved by the Council; it shall have been approved by a majority of the members present and voting at a regularly convened annual meeting; it shall have been tabled for one year; it shall have been finally passed by a three-fourths vote of the members present and voting at the next regularly convened annual meeting.

Section 7. In the event of the dissolution of the Association, the Endowment Fund shall be distributed among national institutions of the United States and Canada in a proportion equal to the then existing ratio between the numbers of citizens of the two nations who are members of the Association.

ARTICLE VII. Meetings

Section 1. The time, place, duration, and procedure of the annual meeting of the Association shall be determined by the Council and the provisions of these By-Laws.

Section 2. Notice of any meeting of the Association shall be given to each member of the Association not less than five nor more than forty days prior to any annual meeting and not less than thirty nor more than forty days prior to any special meeting by written or printed notice delivered personally or by mail, by or at the direction of the Council, the President or the Secretary. Such notice shall state the place, day and hour of the meeting and in the case of a special meeting shall also state the purpose or purposes for which the meeting is called.

Section 3. A special meeting of the Association may be called by the Council or on the written request of fifteen members delivered to the Council, the President or the Secretary. The specific purposes of the meeting must be stated in the request.

Section 4. Attendance at annual meetings and participation in the scientific programs shall be optional for all Honorary and Senior Members, but it shall be expected from all Active and Associate Members.

Section 5. Each annual meeting shall have at least two executive sessions.

Section 6. When the Association convenes for its annual meeting, it shall immediately go into the first executive session, but the business at this session shall be limited to:

1. Appointment of necessary committees.
2. Miscellaneous business of an urgent nature.

Section 7. The second executive session of the Association shall be held during the afternoon of the second day of the meeting. The business at this session shall include, but is not limited to:

1. Reading or waiver of reading of the minutes of the preceding meetings of the Association and the Council.

2. Report of the Treasurer for the last fiscal year.
3. Audit Report.
4. Report of the Necrology Committee.
5. Report of the Program Committee.
6. Action on amendments to the Articles of Incorporation and By-Laws, if any.
7. Action on recommendations emanating from the Council.
8. Business.
9. New Business.
10. Report of the Membership Committee.
11. Election of new members.
12. Report of the Nominating Committee.
13. Election of officers.

Section 8. Except where otherwise required by law or these By-Laws, all questions at a meeting of the members shall be decided by a majority vote of the members present in person and voting. Voting by proxy is not permitted.

Section 9. Fifty voting members present in person shall constitute a quorum at a meeting of members.

Section 10. While the scientific session of the annual meeting is held primarily for the benefit of the members of the Association, it may be open to non-members who are able to submit satisfactory credentials, who register in a specified manner, and who pay such registration fee as may be determined and published by the Council from year to year.

Section 11. There shall be an annual meeting of the Council held during the annual meeting of the Association. Additional meetings of the Council may be called on not less than seven days' prior written or telephonic notice by the President, the Secretary or any three members of the Council.

Section 12. Five members of the Council shall constitute a quorum for the conduct of business at any meeting of the Council, but a smaller number may adjourn any such meeting.

Section 13. Whenever any notice is required to be given to any member of the Council, a waiver thereof in writing, signed by the member of the Council entitled to such, notice, whether before or after the time stated therein, shall be deemed equivalent thereto.

Section 14. Any action which may be or is required to be taken at a meeting of the Council may be taken without a meeting if a consent in writing, setting forth the action so taken, shall be signed by all of the members of the Council.

Any such consent shall have the same force and effect as a unanimous vote at a duly called and constituted meeting.

ARTICLE IX. Indemnification of Directors and Officers

Section 1. The Association shall indemnify any and all of its Councilors (hereinafter in this Article referred to as "directors") or officers or former directors or officers, or any person who has served or shall serve at the Association's request or by its election as a director or officer of another corporation or association, against expenses actually and necessarily incurred by them in connection with the defense or settlement of any action, suit or proceeding in which they, or any of them, are made parties, or a party, by reason of being or having been directors or officers or a director or officer of the Association, or of such other corporation or association, provided, however, that the foregoing shall not apply to matters as to which any such director or officer or former director or officer or person shall be adjudged in such action, suit or proceeding to be liable for willful misconduct in the performance of duty or to such matters as shall be settled by agreement predicated on the existence of such liability.

Section 2. Upon specific authorization by the Council, the Association may purchase and maintain insurance on behalf of any and all of its directors or officers or former directors or officers, or any person who has served or shall serve at the Association's request or by its election as a director or officer of another corporation or association, against any liability, or settlement based on asserted liability, incurred by them by reason of being or having been directors or officers or a director or officer of the Association or of such other corporation or association, whether or not the Association would have the power to indemnify them against such liability or settlement under the provisions of Section 1.

ARTICLE X. Papers

Section 1. All papers read before the Association shall become the property of the Association. Authors shall leave original copies of their manuscripts with the Editor or reporter, at the time of presentation, for publication in the official Journal.

Section 2. When the number of papers makes it desirable, the Council may require authors to present their papers in abstract, and may set a time limit on discussions.

ARTICLE XI. Initiation Fees, Dues and Assessments

Section 1. Honorary Members of the Association are exempt from all initiation fees, dues, and assessments.

Section 2. Annual dues for Active Members shall be \$75.00 and shall include a year's subscription to THE JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY.

Section 3. Annual dues for Associate Members shall be \$75.00 and shall include a year's subscription to THE JOURNAL OK THORACIC AND CARDIOVASCULAR SURGERY.

Section 4. Senior Members are exempt from dues.

Section 5. The initiation fee for those elected directly to Active Membership shall be \$15.00.

Section 6. If and when an Associate Member is elected to Active Membership, he shall pay an additional \$5.00 initiation fee.

Section 7. Associate and Active Members must subscribe to THE JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY to retain their membership status.

Section 8. Subscription to THE JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY is optional for Senior Members.

Section 9. Bills for membership dues and for subscriptions to THE JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY will be mailed to members by the Treasurer after the annual meeting.

ARTICLE XII. Parliamentary Procedure

Except where otherwise provided in these By-Laws or by law, all parliamentary proceedings at the meetings of this Association and its Council and committees shall be governed by the then current Sturgis Standard Code of Parliamentary Procedure.

ARTICLE XIII. Amendments

Section 1. These By-Laws may be amended by a two-thirds vote of the members present and voting at an executive session of a properly convened annual or special meeting of the Association provided that the proposed amendment has been moved and seconded by not less than three members at a prior executive session of that meeting or a prior meeting of the Association.

Section 2. These By-Laws may be suspended in whole or in part for a period of not more than twelve hours by a unanimous vote of those present and voting at any regularly convened meeting of the Association.

Meetings of the American Association for Thoracic Surgery

1918-Chicago.....	President, Samuel J. Meltzer
1919-Atlantic City.....	President, Willy Meyer
1920-New Orleans.....	President, Willy Meyer
1921-Boston.....	President, Rudolph Matas
1922-Washington.....	President, Samuel Robinson
1923-Chicago.....	President, Howard Lilienthal
1924-Rochester, Minn.....	President, Carl A. Hedblom
1925-Washington.....	President, Nathan W. Green
1926-Montreal.....	President, Edward W. Archibald
1927-New York.....	President, Franz Torek
1928-Washington.....	President, Evarts A. Graham
1929-St. Louis.....	President, John L. Yates
1930-Philadelphia.....	President, Wyman Whittemore
1931-San Francisco.....	President, Ethan Flagg Butler
1932-Ann Arbor.....	President, Frederick T. Lord
1933-Washington.....	President, George P. Muller
1934-Boston.....	President, George J. Heuer
1935-New York.....	President, John Alexander
1936-Rochester, Minn.....	President, Carl Eggers
1937-Saranac Lake.....	President, Leo Eloesser
1938-Atlanta.....	President, Stuart W. Harrington
1939-Los Angeles.....	President, Harold Brunn
1940-Cleveland.....	President, Adrian V. S. Lambert
1941-Toronto.....	President, Fraser B. Gurd
1944-Chicago.....	President, Frank S. Dolley
1946-Detroit.....	President, Claude S. Beck
1947-St. Louis.....	President, I. A. Bigger
1948-Quebec.....	President, Alton Ochsner
1949-New Orleans.....	President, Edward D. Churchill
1950-Denver.....	President, Edward J. O'Brien

1951-Atlantic City..... President, Alfred Blalock
1952-Dallas..... President, Frank B. Berry
1953-San Francisco..... President, Robert M. Janes
1954-Montreal..... President, Emile Holman
1955-Atlantic City..... President, Edward S. Welles
1956-Miami Beach..... President, Richard H. Meade
1957-Chicago..... President, Cameron Haight
1958-Boston..... President, Brian Blades
1959-Los Angeles..... President, Michael E. De Bakey
1960-Miami Beach..... President, William E. Adams
1961-Philadelphia..... President, John H. Gibbon, Jr.
1962-St. Louis..... President, Richard H. Sweet (Deceased 1-11-62)
..... President, O. Theron Clagett
1963-Houston..... President, Julian Johnson
1964-Montreal..... President, Robert E. Gross
1965-New Orleans..... President, John C. Jones
1966-Vancouver, B. C..... President, Herbert C. Maier
1967-New York..... President, Frederick G. Kergin
1968-Pittsburgh..... President, Paul C. Samson
1969-San Francisco..... President, Edward M. Kent
1970-Washington, D. C..... President, Hiram T. Langston
1971-Atlanta..... President, Thomas H. Burford
1974-Las Vegas..... President, Lyman A. Brewer, III
1975-New York..... President, Wilfred G. Bigelow
1976-Los Angeles..... President, David J. Dugan
1977-Toronto..... President, Henry T. Bahnson
1978-New Orleans..... President, J. Gordon Scannell
1979-Boston..... President, John W. Kirklin
1980-San Francisco..... President, Herbert Sloan
1981-Washington, D.C..... President, Donald L. Paulson
1982-Phoenix, Arizona..... President, Thomas B. Ferguson

1983-Atlanta..... President, Frank C. Spencer
 1984-New York..... President, Dwight C. McGoon

EVARTS A. GRAHAM MEMORIAL TRAVELING FELLOWS

1st	1951-52	L. L. Whytehead, M.D., F.R.C.S. 790 Sherbrooke St., Winnipeg, Manitoba, R3A 1M3 CANADA
2nd	1953-54	W B Ferguson MB F R C S Royal Victoria Infirmary, Newcastle-upon-tyne, ENGLAND
3rd	1954-55	Lance L. Bromley, M.Chir., F.R.C.S. St. Mary's Hospital, London, W.2, ENGLAND
4th	1955-56	Raymond L. Hurt, F.R.C.S. The White House, 8 Loom Lane, Radlett Herts, ENGLAND
5th	1956-57	Mathias Paneth, F.R.C.S. Brompton Hospital, London, S.W. 3, ENGLAND
6th	1957-58	Peter L. Brunnen, F.R.C.S. Department of Thoracic Surgery, Woodend General Hospital Aberdeen, SCOTLAND
7th	1958-59	N. G. Meyne, M.D. University of Amsterdam, Wilhelmina-Gasthuis, Amsterdam, HOLLAND
8th	1960-61	Godrej S. Karai, M.D. Calcutta, INDIA
9th	1961-62	Fritz Helmer, M.D. Second Surgical Clinic, University of Vienna, Vienna, AUSTRIA
10th	1962-63	Theodor M. Scheinin, M.D. Oulun Laaninsairaala, Oulu, FINLAND
11th	1963-64	Masahiro Saigusa, M.D. National Nakano Chest Hospital, 3-14-20 Egata, Nakano-Ku, Tokyo 165, JAPAN
12th	1963-64	Adar J. Hallen, M.D. Department of Thoracic Surgery, University Hospital Uppsala, SWEDEN
13th	1964-65	Stuart C. Lennox, M.D. Marlowe House, 103 Dulwich Village,, London, SE21 7BJ, ENGLAND
14th	1964-65	Elias Carapistolis, M.D., F.A.C.S. University Hospital A.H.E.P.A., Surgical Clinic Department Aristotelian University of Thessaloniki, Thessaloniki, GREECE
15th	1965-66	Gerhard Friehs, M.D. Chirurgische University Klinik, Graz A-8036, AUSTRIA
16th	1965-66	Ary Blesovsky, M.D. London, ENGLAND
17th	1966-67	C. Peter Clarke, F.R.A.C.S. Ste. #4, 6th Floor, 55 Victoria Parade, Fitzroy 3065 AUSTRALIA
18th	1966-67	G. B. Parulkar, M.D. K.E.M. Hospital & Seth G.S., Medical College, Bombay 400 012, INDIA
19th	1967-68	Claus Jessen, M.D. Surg. Dept. D, Rigshospitalet, Blegdamsvej 9, Copenhagen, DENMARK
20th	1969-70	Peter Bruecke, M.D. AM Steinbruch 29 Linz-Puchenau, A-4020, AUSTRIA
	1970-71	Michel S. Slim, M.D. Department of Surgery, American University Hospital, Beirut, LEBANON
21st		
22nd	1971-72	Severi Pellervo Mattila, M.D. Department of Thoracic Surgery, Helsinki University Central Hospital, Helsinki 29, FINLAND
23rd	1972-73	Yasuyuki Fujiwara, M.D. Department of Cardiovascular Surgery, Tokyo Medical College Hospital, Shinjuku, Tokyo, JAPAN
24th	1973-74	Marc Roger deLeval, M.D. 8 Thornton Way, Hampstead Garden Suburb, London NW 11, ENGLAND
25th	1974-75	J. J. DeWet Lubbe, M.D. Dept. of Cardio-Thoracic Surgery, University of Stellenbosch P.O. Box 53, Bellville, REPUBLIC OF SOUTH AFRICA

26th	1975-76	Mieczyslaw Trenkner, M.D. c/o Dr. Sidney Levitsky, P.O. Box 6998, Chicago, IL 60680
27th	1976-77	Bum Koo Cho, M.D. Yonsei University, P.O. Box 71 Severance Hospital, Seoul, KOREA
28th	1977-78	Alan William Gale, M.D., FRACP, FRACS 171 Sutherland, Paddington 2021 Sidney, AUSTRALIA
29th	1978-79	Eduardo Otero Coto, M.D. Servicio de Cirugia Cardiovascular, Ciudad Sanitaria "Le Fe" Valencia, SPAIN
30th	1981-82	Richard Firmin, M.D. The London Chest Hospital, Bonner Road London E2 9JX ENGLAND
31st	1981-82	Claudio A. Salles, M.D. Rua Niquel 237 Belo Horizonte MG, BRAZIL
32nd	1982-83	Yasuhisa Shimazaki, M.D. First Department of Surgery Osaka University Medical School Fukushima-ku, Osaka 553 Japan
33rd	1983-84	Georg S. Kobinia, M.D. 1 .Surgical Unit City Hospital Linz Krankenhausstrasse 9 A-4020 Linz, Austria
34th	1984-85	Aram Smolinsky, M.D. 175 Freeman Steet, #320 Brookline, Massachusetts 02146
35th	1985-86	Florentino J. Vargas, M.D. San Martin 1353 1828 Banfield Buenos Aires, Argentina