1990 ANNUAL MEETING PROGRAM

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American Association
for Thoracic Surgery

70TH ANNUAL MEETING
MAY 7-9, 1990

Scientific Program
MONDAY MORNING, May 7, 1990

8:30 a.m. BUSINESS SESSION (Limited to Members)

8:45 a.m. SCIENTIFIC SESSION - Sheraton Ballroom

1. Valvuloplasty for Aortic Insufficiency

DELOS M. COSGROVE, ELIOT R. ROSENKRANZ,*

WILLIAM J. STEWART and WILLIAM G. HENDREN**

Cleveland, Ohio

Aortic valvuloplasty has been less successful than reparative procedures on the atrioventricular valves and has been employed mainly to alleviate aortic stenosis. To evaluate the efficiency of aortic valvuloplasty to eliminate insufficiency, 21 consecutive patients who underwent a new method of aortic valvuloplasty including annular plication at the commissures and triangular leaflet resection were reviewed.

Nineteen (90.5%) were males. Mean age was 56 ± 16.7 years (range 22-82). Ten valves (47.6% were bicuspid and 11 (52.4%) were tricuspid. Aortic valvuloplasty was the only procedure in 11 (52.4%) cases; 10 patients had associated procedures. Aortic valvuloplasty included annular plication at the commissures in all cases and a triangular leaflet resection in 13 (61.9%).

The amount of aortic insufficiency was documented by angiography and echo Doppler preoperatively and by echo Doppler on two occasions postoperatively. Aortic insufficiency was graded on a scale of 0-4 +.

Postoperatively, the maximum instantaneous gradient across the valve determined by echo Doppler was 18.5 ± 9.9 mmHg.

There was one non valve-related hospital mortality (4.8%) and no late deaths. At a mean follow-up of ± 4.9 months, 19 patients were New York Heart Association Functional Class I and one was NYHAFC II. There were no postoperative cardiac or valve-related events.

Aortic valve repair is an attractive alternative for aortic insufficiency with leaflet resection and annular plication at the commissures and 1) eliminates aortic insufficiency without causing aortic stenosis, and 2) results in excellent functional status without evidence of postoperative insufficiency.

*By invitation

2. Valvular Extension With Autologous Pericardium Preserved With Glutaraldehyde. Results in Mitral Valve Repair

SYLVAIN M. CHAUVAUD, J. CARLOS CHACHQUES*,*

SERBAN MIHAILEANU, ERIC ARNAUD-CROZA T*,*

*FRANCINE LECA * and ALAIN CARPENTIER*

Paris, France

Autologous pericardium has already been used in the past for mitral valve extension. This technique, however, has been abandoned because of either patch shrinkage or distension.

Experimental studies in our laboratory have shown that preservation of autologous pericardium with Glutaraldehyde prevents late deterioration and calcification.

From 1986 to 1989, 35 patients operated upon for mitral valve insufficiency required a patch extension of the posterior leaflet. Age ranged from 2.5 to 58 years (mean 16 ± 14). The posterior leaflet was fibrotic in 29 cases (rheumatic fever), hypoplastic in 6 cases (congenital). A large, losangic, Glutaraldehyde preserved autologous patch was placed on the posterior leaflet in order to enlarge the surface area. The autologous patch has been previously placed in a 0.62% Glutaraldehyde solution for 10 minutes and rinsed in saline for an additional 10 minutes. Associated lesions of the mitral valve, namely leaflet prolapse, present in 20 cases were treated according to techniques previously described. A Carpentier ring was mandatory in 30 of the 35 cases because of annulus deformation. Associated lesions of the aortic valves, present in 10 cases were treated by valve repair.

There was no operative death. Two patients (6%) were reoperated upon, for annulus distention in one (primary repair without prosthetic ring) and patch detachment in the other. In both cases, the pericardial patch was pliable without thickening or calcification and a second valve repair was possible.

Follow up is available in all the patients for a period comprised between 0.5 to 3 years (mean 2.1). Mitral valve function was assessed by bidimention-nal echo and color echo Doppler. Mitral valve insufficiency was trivial or absent in 28 cases (80%) and mild in the remaining cases. The motion of the pericardial patch was normal in 27 cases (77%) billowing in 6 (17%) and restricted in 2 (6%).

We conclude that:

1) Mitral valve extension is a simple and reliable technique to treat posterior leaflet restricted motion or to increase surface area in children requiring a prosthetic ring.

2) Glutaraldehyde prevents mid term retraction and calcification of the autologous pericardium.

*By Invitation

3. Mitral Valve Repair With Replacement of Chordae Tendineae With Goretex® Sutures

TIRONE E. DAVID, JOANNE BOS and HARRY RAKOWSKI**

Toronto, Ontario, Canada

We have used 4-0 or 5-0 expanded tetrafluoroethylene (Goretex®) sutures for replacement of diseased chordae tendineae during reconstructive procedures of the mitral valve (MV). A double-armed suture is passed twice through the papillary muscle head and tied down. Each arm of the suture is then brought up to the free margin of the leaflet and passed through the area where the native chorda was attached and, after adjusting their lengths, the ends are tied together.

Thirty-one pts have undergone MV repair with replacement of one or more chordae tendineae with Goretex sutures. There were 21 men and 10 women whose mean age was 53 years, range 27 to 74. Most pts (84%) were in NYHA class III or IV before operation. Twenty-four pts had mitral regurgitation (MR), 3 had a stenosis and 4 had mixed lesions. The MV pathology was degenerative disease in 21 pts, rheumatic in 8 and ischemic in 2. Eleven pts had had infective endocarditis of the MV. Chordal replacement was necessary because of rupture or elongation of flimsy chordae tendineae of the anterior leaflet (17 pts) or commissural areas (10 pts), or excessively fibrotic or calcified chordae (9 pts). In addition, many pts required shortening of other chordae tendineae, resection of portion of the posterior leaflet or com-missurotomy. A ring annuloplasty was performed in 28 pts. Other procedures included aortocoronary bypass in 3 pts, aortic valve replacement in 2 and tricuspid valve repair in 4.

There were no operative deaths and no serious postoperative complications. Patients have been followed from 2 to 54 months, mean of 10. All pts have had Doppler echocardiographic studies before surgery and at 2, 6, 12 months and annually thereafter. Twenty pts have no postoperative MR, 8 have mild MR and 3 have moderate MR. At 2 months after operation, the left atrial size decreased from 54 ± 6 mm preop to 43 ± 4 mm postop ($p < 0.02$), and the left ventricular end-diastolic diameter decreased from 60 ± 7 mm preop to 49 ± 6 mm postop ($p < 0.01$) in pts who had MR preoperatively. The echocardiographic excursion of the anterior leaflet appears normal and does not seem to change with time. One pt with Barlow's disease of the MV suffered 2 episodes of TIAs early after surgery in spite of adequate oral an-ticoagulation. There have been 2 late deaths, neither one was valve-related. All 29 survivors improved symptomatically and are in NYHA class I or II.

Replacement of chordae tendineae with Goretex sutures is simple and provides good functional results. This technique allows for reconstruction of the MV in many pts who would otherwise require MV replacement. We presently prefer this technique instead of chordal transfer in pts with MR secondary to ruptured chordae tendineae of the anterior leaflet.

*By Invitation

4. A Comparison of the Aortic Homograft and Pulmonary Autograft for Aortic Valve or Root Replacement in Children

*GINO GEROSA *, ROXANE McKA Y*, JILL DAVIES* and*
DONALD N. ROSS
London and Liverpool, England

In order to assess late results of aortic homograft and pulmonary autograft valves implanted into the left ventricular outflow tract of children, we have reviewed our experience of 122 patients 18 years of age or younger, who underwent aortic valve or root replacement between November 1964 and December 1988. Eighty-eight patients (mean age 11.9 ± 4 years) received an aortic homograft (Group I), while thirty-four patients (mean age 14.0 ±4 years) had their own pulmonary valve transferred to the aortic position (Group II). There were 44 valve and 44 root replacements in Group I, and 31 valve and 3 root replacements in Group II. Indications for operation were left ventricular outflow obstruction in 51 patients (42%), aortic regurgitation in 50 (41%), mixed valve disease in 14 (11%), prosthetic valve endocarditis in 4 (3%), prosthetic valve malfunction in 2 (2%), and homograft degeneration in 1 (1%). Fifty-three patients (43%) had undergone previous operations on the left ventricular outflow tract.

Hospital mortality was 13% (12 patients) in Group I and 12% (4 patients) in Group II. Survivors in Group I and Group II have been followed up for a total of 524 and 214 patient-years, respectively. Late mortality was 17% (2.5% per patient-year) in Group I and 13% (1.8% per patient-year) in Group II, while the incidence of reoperation per patient-year was 3.8% in Group I and 1.8% in Group II. At 16 years, actuarial rates for freedom from reoperation were 43.0 ±13% (Group I) and 74.0 ± 11% (Group II); freedom from endocarditis, 92.0 ±4% (Group I) and 74.0 ±11% (Group II); and late survival, 55.0 ± 14% (Group I) and 77.2 ± 10% (Group II). Valve degeneration occurred in 15 homografts (2.8% per patient-year), whereas there was no instance of primary tissue failure among the pulmonary autografts.

This experience would indicate that either the homograft or autograft valve can be used in children with acceptable results. However, the pulmonary autograft gives better long-term performance, and, if growth potential is realized, may represent the ideal valve substitute in children.

INTERMISSION - VISIT EXHIBITS

*By Invitation

10:35 a.m. SCIENTIFIC SESSION - Sheraton Ballroom

5. Primary Soft-Tissue Sarcoma of Chest Wall: Results of Surgical Resection

MARK S. GORDON, STEVEN I HAJDU*,*

*MANJIT S. BAINS and MICHAEL BURT**

New York, New York

Primary soft tissue sarcomas of chest wall are uncommon and data concerning treatment and results are sparse. Most studies have categorized these tumors as truncal sarcomas and inferred a poor prognosis. In order to assess the results of surgical treatment we reviewed our forty year experience. **Methods:** Records of 189 patients admitted to our institution from 1948 to 1988 were reviewed. Pathologic material was available for review in 149 (79%) and comprise this report. Survival was calculated by Kaplan-Meier method; comparisons by log rank analysis; significance

defined as $p<0.05$. **Results:** Age: 3 wk to 86 yr (median 38); M:F 2:1. Presenting complaint was mass or pain in 97%. 90 (60%) were high grade and 59 (40%) low. Histologic types: desmoid (n = 32), liposarcoma (n = 23), rhabdomyosarcoma (n = 18), fibrosarcoma (n = 17), embryonal rhabdomyosarcoma (n = 14), malignant peripheral nerve sheath tumor (n = 13), malignant fibrous histiocytoma (n = 11), spindle cell sarcoma (n=4), synovial sarcoma (n = 3), heman-giopericytoma (n = 3), alveolar soft part sarcoma (n = 3), and others (n = 8). Resection was the primary treatment in 140 (94%). Local recurrence occurred in 26%. Metastases occurred in 52 (35%) (metachronous in 42, synchronous in 10), and were more common in high grade (46/90, 51%) than low (6/59, 10%). Overall 5 year survival was 62%. Five year survival in high grade sarcomas (55%) was significantly less than low (90%) ($p<0.0001$). Tumor size, age or sex were not prognostic. **Conclusions:**Survival of patients with primary soft tissue sarcomas of chest wall after resection is similar to that of patients with extremity sarcomas. Resection alone is adequate for low grade (5 year survival: 90%) but adjuvant treatments should be considered for high grade sarcomas of chest wall.
*By Invitation

6. Long Term Follow-Up After Prosthetic Replacement of the Superior Vena Cava Combined With Resection of Mediastinal Pulmonary Malignant Tumors

PHILIPPE G. DARTEVELLE, ALAIN R. CHAPELIER*,*

BERNARD LENOT, PIERRE CORBI* and*

*JACQUES CERRINA**

LePlessis Robinson, France

Sponsored by: Arthur D. Boyd, Mamaroneck, New York

Major invasion of the Superior Vena Cava (SVS) by tumors is a classical contra-indication to surgery. The use of vascular prostheses suitable for venous replacement enables the radical resection of such tumors.

Between 1979 and 1989, 19 patients underwent complete resection of lung cancer (n = 6) or malignant mediastinal tumors (n = 13) involving the SVC with concomitant venous reconstruction with Polytetrafluoroethylene (PTFE) grafts. Bronchogenic carcinoma (4 T4 Nl and 2 T4 N2) required pneumonectomy extended to the SVC with reconstruction using a PTFE graft (size 18) interposed between the origin of the SVC and the right atrium.

The removal of malignant mediastinal tumors (4 undifferentiated cancers, 2 carcinoid tumors, 2 thymomas, 2 lymphoblastomas, 1 adenocarcinoma, 2 germinal tumors) needed the resection of the SVC and innominate veins (n = 13) pericardium (n = 12) lung (upper lobectomy n = 4, Wedge resection n = 5) and right phrenic nerve (n = 12). Venous reconstruction was performed by interposition of a PTFE graft (size 13) between innominate vein and the right atrium.

One patient died in the postoperative course (5.2%).

Additional chemotherapy was given to 6 patients, radiotherapy to 5 and combined treatment to 7 other patients.

The cumulative survival rate is 44%at 5 years.

Nine patients are alive, at 91 and 97 months (undifferentiated mediastinal cancers), 6 and 45 months (bronchogenic carcinoma), 23 and 39 months (carcinoid tumors), 29 months (thymoma),

12 and 20 months (germinal tumors). One died at 68 months (thymoma) from myasthenis gravis without recurrence of the tumor.

Late graft patency was proved by angiogram or CT Scan in all patients but one at 32 ± 9 months (mean ± standard error).

Conclusions:

- Radical surgery of malignant tumors involving the SVC provides an acceptable survival rate.

- PTFE grafts used to replace SVC maintain long term patency.

11:15 a.m. PRESIDENTIAL ADDRESS

F. Griffith Pearson, Toronto, Ontario, Canada

12:00 p.m. ADJOURN FOR LUNCH - VISIT EXHIBITS

*By Invitation

MONDAY AFTERNOON, MAY 7, 1990

Back to Annual Meeting Program

MONDAY AFTERNOON, MAY 7, 1990
1:30 p.m. SCIENTIFIC SESSION - Sheraton Ballroom

7. Heart and Lung Transplantation for Terminal Cystic Fibrosis. A Four Year Experience

MARC R. deLEVAL‡, JOHN WALLWORK,*

ROSALIND SMYTH", BRUCE WHITEHEAD",

MARTIN ELLIOTT and TIMOTHY HIGENBOTTAM**
Cambridgeshire, United Kingdom

Sponsored by: Jaroslav Stark, London, United Kingdom

The management and outcome of 85 CF patients (pts) assessed for HLT are reviewed. 62 pts were accepted, 18 died while waiting for HLT and 27 aged 5-37 years (mean 19.3 years) had HLT. All had bacterial infection at the time of HLT. All donor organs were from distal procurement. Immunosup-pression was maintained with cyclosporin and azathioprine. Rejection episodes (RE) were treated with methylprednisolone. Daily monitoring of lung function (FEV1) was found to be a non-specific early indicator of infection or RE. Diagnosis was then established by transbronchial biopsy (TBB). There were 7 deaths (5 within 3 months of HLT). Causes of death were: early graft failure (1), aspiration pneumonia (1), Candida septicaemia (1), acute respiratory distress syndrome (1) and obliterative bronchiolitis (3). Actuarial probability of surviving to 1 year was 72%. Compared to other pts, CF pts (1) have no more RE (mean of 2 at 3 months and 0.3 per 3 months thereafter). (2) have no more infections. (3)require 5-10 times more cyclosporin. (4) have a greater

instance of diabetes (9 pts). Contributory factors to successful HLT include: (1) careful recipient selection; (2) meticulous donor selection and management; (3) use of aprotinin to reduce intra-operative bleeding; (4) better understanding of peri-operative ventilatory mechanics; and (5) mandatory use of TBB to diagnose and treat RE and infections.

*By Invitation

‡24th Evarts A Graham Memorial Traveling Fellow

8. Comparison of Outcomes of Double and Single Lung Transplant for Obstructive Lung Disease

JANET R. MAURER. G. ALEXANDER PATTERSON,*

TREVOR J. WILLIAMS, THOMAS R. TODD and*

THE TORONTO LUNG TRANSPLANT GROUP

Toronto, Ontario, Canada

Until recently it was thought that single lung transplantation (SLT) was contraindicated in patients with end stage obstructive lung disease (OLD) and that OLD required double lung (DLT) or combined heart-lung transplantation. We have compared the early post operative results of SLT in 4 patients having OLD with results obtained in 9 patients with OLD previously treated by DLT. The four SLT's were all female, mean ages 44 ± 3.7. Diagnoses were alpha I antitrypsin deficiency emphysema 2, idiopathic emphysema 2. Six of nine DLT's were female; the mean age was 43 ± 6.7. Four patients had alpha I antitrypsin deficiency, 1 had bron-chiolitis obliterans, 4 had idiopathic emphysema. Two of 9 DLT's died perioperatively. There were no SLT deaths. Preoperative, early (3 mos.) and post operative vital capacity (VC), forced 1 sec. expiratory volume (FEV,) and Six Minute Walk (SMW) tests for operative survivors are summarized:

	VC*		**FEV_1***		**SMW****	
	Preop	Postop	**Preop**	**Postop**	**Preop**	**Postop**
SLT n = 4	50 ± 10.5	59 ± 16	21 ± 10	52 ± 4	43.4 ± 15.1	92.5± 3.6
DLT n = 7	51 ± 4	75 ± 8	22 ± 8	82 ± 15	63.3 ± 12.4	99.7 ± 7.9

*% Predicted **metres/minute

All DLT's and SLT's had lormal postoperative ABG's on room air without exercise desaturation. SLT's achieve

a smaller increment in VC and FEV, than DLT's, but improvement in SMW is comparable. Our early results suggest that SLT is associated with lower operative mortality and equivalent functional results in comparison to DLT for OLD.
*By Invitation

9. Right and Left Ventricular Performance Following Single and Double Lung Transplantation

G. ALEXANDER PATTERSON, TREVOR J. WILLIAMS, JANET R. MAURER*, PETER LIU*, RON CARRERE* and THE TORONTO LUNG TRANSPLANT GROUP*

Toronto, Ontario, Canada

Combined heart/lung transplantation has been employed in patients with pulmonary disease when right ventricular (RV) function was impaired. By decreasing RV afterload and increasing RV ejection fraction (RVEF) single (SLT) or double (DLT), would be effective. We assessed RVEF and LVEF before and after SLT and DLT. Eight SLT recipients (7 idiopathic pulmonary fibrosis, 1 Eisenmengers Syndrome 6M, 2F;48.8±5.2Y) and 10 DLT recipients (7 obstructive lung disease, 3 bronchiectasis; 5M, 5F; 41.8±7.4Y) were studied pre transplant, 3 months and 1-2 years post transplant. RVEF and LVEF was measured under equilibrium conditions at rest and exercise using radionuclide imaging. Statistical analysis was performed using the paired "t" test. The results (mean % ±S.D.) are summarized:

	SLT (n=8)		DLT (n=10)	
	Rest	Exercise	Rest	Exercise
RVEF				
Pre	27.0 ± 7.8	26.6 ± 8.3	33.8 + 13.3	31.4 ± 15.4
3 month	36.5 ± 13.1	39.8 ± 17.1	44.0 ± 11.0	45.5 + 11.0
1-2 year	37.5 ± 10.6	36.4 ± 15.0	34.1 + 8.7	40.2 ± 7.9

Improved resting RVEF was noted initially and 1-2 years post SLT ($P<0.025$). Initial improvement was observed in resting RVEF post DLT ($P<0.05$), however, this improvement is not sustained. Preoperative LVEF

(57.0 ± 9.2) for SLT and (55.8 ± 13.6) for DLT did not change postoperatively. The improvement in RVEF following SLT is likely attributable to the excessive pulmonary vascular resistance in this patient group in comparison to the DLT group. Marked impairment of RV function can significantly improve by isolated lung transplantation.
*By Invitation

10. The Importance of Acquired Diffuse Bronchomalacia in Heart-Lung Transplant Recipients with Obliterative Bronchiolitis

RICHARD J. NOVICK, DILDAR AHMAD*,*

ALAN H. MENKIS, KEN R. REID*,*

PETER W. PFLUGFELDER, WILLIAM J. KOSTUK**

*and F.N. McKENZIE**

London, Ontario, Canada

Sponsored by: Tomas A. Salerno, Toronto, Ontario, Canada

A progressive decline in pulmonary function has been reported in heart-lung transplant (HLT) recipients exhibiting obliterative bronchiolitis (OB) on transbronchial or open lung biopsy. We have performed 14 HLTs, with 1 month, 1 year, and 2 year actuarial survivals of 93±7%, 85±11%, and 62±18%, respectively. Three early recipients died of OB, and 4 of the 9 patients currently being followed have OB. All recipients have undergone serial bronchoscopies using topical analgesia. Four OB patients have developed diffuse bronchomalacia (BM), readily seen on bronchoscopy. BM usually involved the entire tracheo-bronchial tree, below the level of the tracheal anastomosis. In all cases, the bronchial mucosa appeared less vascular than usual; in 1 patient who died two and a half years postoperatively, diffuse ischemia and destruction of bronchial cartilage was confirmed histologically. All patients had significant retention of bronchial secretions beyond the collapsing main bronchi at bronchoscopy. Transbronchial biopsies revealed marked concentric narrowing of pulmonary arterioles and severe bronchiolar scarring, but no evidence of acute lung rejection or opportunistic infection. All 4 patients had marked functional airflow obstruction, with an FEV1 of 26±2% predicted, FVC of 51±4% predicted and a peak expiratory flow rate of 44±8% predicted at the time of bronchoscopic diagnosis of BM.

We conclude that diffuse BM occurs frequently in HLT recipients who have OB. Both BM and OB may cause airflow obstruction after HLT, and their effects may be additive. Diffuse BM may be a result of long-standing bronchial ischemia or due to chronic rejection, and may play an important role clinically in the declining respiratory status of HLT recipients with OB.

2:45 p.m. BASIC SCIENCE LECTURE

"ADVANCES IN CANCER RESEARCH - BENCH TO BEDSIDE

Louis Siminovitch, Toronto, Ontario, Canada

3:30 p.m. INTERMISSION - VISIT EXHIBITS

4:00 p.m. SCIENTIFIC SESSION - Sheraton Ballroom

11. Effect of Hypothermic Cardiopulmonary Bypass and Total Circulatory Arrest on Cerebral Blood Flow and Metabolism in Neonates and Small Infants

WILLIAM J. GREELEY, ROSS M. UNGERLEIDER*, FRANK H. KERN*, TIMOTHY J. QUILL* and JOSEPH G. REVES**

Durham, North Carolina

Sponsored by: David C. Sabiston, Jr., Durham, North Carolina

Cerebral blood flow (CBF) and cerebral metabolic rate of oxygen consumption ($CMRO_2$) were measured in 25 infants undergoing repair of congenital heart defects. $Xenon^{133}$ clearance (to measure CBF) and jugular venous bulb sampling methodology (to measure $CMRO_2$) were used to examine the effects of bypass and circulatory arrest on CBF and $CMRO_2$. Patients were grouped based on bypass conditions: 1) moderate hypothermic cardiopulmonary bypass (MHCPB) at 25-28°C and continuous flow, 2) deep hypothermic bypass (DHCPB) at 18-20°C with continuous flow and 3) deep hypothermic bypass with total circulatory arrest (DHCA). CBF and $CMRO_2$ measurements were made before bypass (A); during stable hypothermic bypass (B + C) or at similar sampling times immediately before and after DHCA; rewarmed on bypass (D); and after bypass (E).

Measurements were made at similar hematocrit, $PaCO_2$, and pump flow rate during bypass.

RESULTS:

MHCPB GROUP (n = 7)

	A	B	C	D	E
CBF	38 ± 8	20 ± 7*	27 ± 11	30 ± 9	45 ± 21
CMRO2	2.00 ± 0.59	0.61 ± 0.39*	0.96 ± 0.74	1.05 + 0.64	2.10 + 0.57

DHCPB GROUP (n = 5)

	A	B	C	D	E
CBF	27 ± 14	15 ± 4*	12 ± 5	33 ± 18	38 ± 14
CMRO2	1.12 ± 0.74	0.21 ± 0.12*	0.20 ± 0.24	1.51 ± 0.86	1.58 ± 0.81

DHCA GROUP (n = 13)

	A	B	C	D	E
CBF	17 ± 6	10 + 6*	13 ± 9	14 ± 7	12 ± 6**
CMRO2	1.04 ± 0.58	0.11 ± 0.09*	0.23 ± 0.19	0.60 ± 0.49	0.74 ± 0.41**

Mean values ± S.D.: CBF and CMRO2 = ml/100gm/min *p < 0.001 Stage B vs A; **p < 0.01 Stage E vs A.

DISCUSSION:

These data indicate that CBF and $CMRO_2$ are significantly reduced during hypothermic bypass, principally related to temperature reduction. During hypothermic bypass, regardless of temperature or whether continuous flow or DHCA is used, the ratio of supply (CBF) to demand ($CMRO_2$) favors flow, suggesting luxury perfusion of the brain. However, after rewarming from DHCA, CBF and $CMRO_2$ remain reduced, suggesting post-ischemic hypoperfusion and a metabolic disturbance in oxygen utilization. Because oxygen extraction by the brain (defined as CaO_2-CvO_2/CaO_2) was the same in all groups, the CBF changes after DHCA appear to be related to altered metabolism, where flow is coupled to reduced metabolism. These data could explain the known transient neurophysiologic changes associated with DHCA. Future studies will evaluate the

relationship of the duration of DHCA as well as varying reperfusion techniques to these findings.

*By Invitation

12. Low Flow Hypothermia Cardiopulmonary Bypass Protects the Brain

JULIE A SWAIN, THOMAS MCDONALD*,*

PATRICK GRIFFIN, ROBERT S. BALABAN*,*

*RICHARD E. CLARK and TONI CECKLER**
Bethesda, Maryland

Cerebral protection during surgical procedures requiring circulatory arrest or low flow remains the factor that most limits the time for the critical part of the operative procedure. In-vivo "P-nuclear magnetic resonance spec-troscopy (NMR) was used to assess the metabolic state of the brain by measuring the concentration of adenosine triphosphate (ATP) and the in-tracellular pH (pHj). The degree of cerebral protection during deep hypothermic cardiopulmonary bypass (CPB) at low flow rates was compared to that during circulatory arrest. Sheep were instrumented with a naso-pharyngeal temperature probe, an arterial pressure catheter, jugular vein and femoral arterial CPB cannulae, and a radiofrequency coil over the skull. The animals were placed in the bore of a 4.7T magnet and NMR spectra were continuously recorded. The animals were cooled on CPB to 15°C, at which time either circulatory arrest (CA)(n = 5) or flows of 5ml/kg/min (n = 6) or lOml/kg/min (n = 7) were instituted for 2 hours. CA or a flow of 5ml/kg/min both resulted in severe intracellular acidosis and depletion of ATP. A flow of lOml/kg/min nearly completely preserved ATP and pHi.

Conclusions: Deep hypothermia with CPB flows as low as 10ml/kg/min can maintain brain high energy phosphate concentrations and intracellular pH for 2 hours in sheep. Previous studies from our laboratory have shown

that these NMR findings positively correlate with improved survival and preservation of neurological function.

*By Invitation

13. "Cold Cerebroplegia" A New Technique of Cerebral Protection During Surgery of the Transverse Aortic Arch

JEAN BACHET. DANIEL GUILMET*,*

BERTRAND GOUDOT. JEAN LUC TERMIGNON*,*

GILLES DREYFUS and GIOVANNI TEODORI**

Suresnes, France

Sponsored by: Christian Cabrol, Paris, France

Profound Hypothermia (PH) associated with circulatory arrest (CA) is the commonest method of cerebral protection during surgery of the aortic arch. However, this technique allows a limited time to perform the aortic repair. It also often necessitates prolonged Cardio-pulmonary Bypass (CPB) to rewarm the patient. This may be the cause of coagulation disorders or infection.

Selective perfusion of the carotid arteries can also be used. But, when the perfusion is derived from the main arterial line, it requires that the aorta be cross-clamped and supresses the possibility of "bloodless, open" distal repair.

To avoid the disadvantages of both techniques, we have developed a new technique of cerebral protection: after a regular CPB has been instituted, the carotid arteries are cannulated and perfused with blood cooled at 6 to 10°C. through a separate heath exchanger, and the core temperature is maintained at moderate hypothermia (25 to 28°C. rectal). To perform the "open" distal aortic repair, the CPB is discontinued while the carotid perfusion alone is maintained (300 ml/minute). When the distal repair is completed, CPB is resumed and carotid perfusion is discontinued.

Between 1984 and September 1989, fifty-three patients (mean age: 55 years) were operated on with this method (44 elective operations, 9 emergency procedures). Mean duration of CPB was 121 mn; (65-248) and of CA: 22 mn (10-51). The Electro-encephalogram, routinely recorded, showed return of the cerebral activity

after a mean of 12 min. and normal activity after a mean of 60 min. There was no intraoperative death. Hospital mortality rate was 13% (7/53). One death was related to neurologic disorders. All patients, but one, awakened normally within eight hours after surgery. Two patients (4.3%)experienced a transient neurologic trouble (lateral hemianopsia). There was no hemorrhagic complication (24 hours average bleeding: 840 ±540 ml.)

In our experience the technique of "Cold cerebroplegia" has demonstrated to provide excellent cerebral protection. It needs no prolonged CPB, and does not limit the time necessary to perform the aortic repair. It may be considered as a safe alternative to PH associated with CA.

*By Invitation

14. Arterial Switch for TGA and VSD, 106 Patients

CLAUDE PLANCHE, ALAIN SERRAF*,*

FRANCOIS LACOUR-GAYET,*

JACQUELINE BRUNIAUX, DANIEL SIDI**

*and JEAN KACHANER **

Le Plessis Robinson and Paris, France

Sponsored by: Aldo R. Castaneda, Boston, Massachusetts

One hundred and six patients, 90 with TGA and 16 with DORV and sub-pulmonary VSD, underwent an arterial switch associated to a patch closure of the VSD, from January 1983 to October 1989.

Aortic coarctation (CoA) was associated in 28 patients and subaortic obstruction in 9. Ten patients had multiple VSD. Malalignment of the conal septum was constant in the 16 patients with DORV and present in 15 additional patients with TGA. According to Yacoub's classification of coronary arteries, there were 72 type A, 21 type D; 12 type E and 1 type C. The great vessels were side by side in 15% of the patients. Age at operation ranged from 4 days to 4 years (mean = 2.8 months ± 5.2). Thirty-two infants were less than one month of age. Thirty-three patients underwent previous surgery including: 9 pulmonary artery (PA) banding alone, 12 PA banding and CoA repair and 12 CoA repair alone. Mean time between the first procedure and the switch was 2.2 months. Four patients with associated CoA underwent a one stage repair through sternotomy.

The VSD was first closed and approached through the RV in 50%, the RA in 40% and PA in 10%. The arterial

switch was then performed according to the technique followed in our institution and the Lecompte maneuver was always done.

Early mortality was 15.1% (70 CL = 11.5% - 18.7%). Causes of death were either related to coronary artery kinking (8 patients) or to anatomy and size discrepancy of great vessels (8 patients). Univariate analysis could not find any significant risk factor of early mortality.

Mean follow up of 24 months ± 21.5 was achieved in all but 2 survivors. There was one late death. Eleven patients (12.2%) underwent successful reoperation for: 7 pulmonary stenosis, 2 residual VSD, 2 recurrent coarctation and 1 SVC stenosis.

Actuarial survival and freedom from reoperation at 4 years were respectively 82.7% and 85.6%.

In conclusion, arterial switch in complex TGA is a safe procedure which provides satisfactory early and mid-term results.

*By Invitation

TUESDAY AFTERNOON, MAY 8, 1990

Back to Annual Meeting Program

TUESDAY AFTERNOON, May 8, 1990
1:45 p.m. SCIENTIFIC SESSION - Sheraton Ballroom

20. Surgery for Limited Small Cell Lung Cancer: The University of Toronto Lung Oncology Group Experience

FRANCES A. SHEPHERD, ROBERT J. GINSBERG,*

RONALD FELD, WILLIAM K. EVANS* and*

ELSE JOHANSEN Toronto, Ontario, Canada*

Since 1977, 119 patients with limited SCLC have undergone including surgery at our institution. Seventy-nine patients (58 male, 21 female; median age 63) had surgery first, and 67 of these had adjuvant chemotherapy. Forty (27 male, 13 female; median age 59) had chemotherapy first and

94% achieved complete or partial response before surgery. Pre-treatment staging revealed 69 stage I, 27 stage II, and 23 stage III tumors. Twenty-six patients required pneumonectomy, 88 lobectomy, and 5 had no resection. Four patients had gross and six had microscopic residual disease. Post-operative pathology showed SCLC only (95), non-SCLC (3), mixed (17), and no residual tumor (4). Post-operative staging revealed 35 state I, 36 stage II, and 48 stage IIIa. The median survival of the entire group is 111 weeks and projected five year survival 39"%. No survival difference was seen between patients treated with chemotherapy before surgery and those undergoing initial surgery followed by chemotherapy (p=0.756). The median survival for pathologic stage I patients has not been reached, and the projected five year survival is 51%. This is significantly better than stage II (median 82 weeks, p=0.001) or stage III (median 83 weeks, p=0.001) patients who have projected five year survivals of 28% and 19% respectively. Seven of the 12 patients who had no adjuvant chemotherapy remain alive 6+ to 48+ months. Sixty-seven patients have died (11 were NED). Only 10 patients relapsed in the primary site alone, seven at the primary and distant sites, and 39 only in distant sites.

In summary, resection improves control at the primary site, and a significant proportion of patients with stage I (NO) disease achieve long-term survival and cure with combined modality therapy including surgery. Stage II and IIIa patients have survival predictions similar to equivalent stage non-SCLC carcinoma treated surgically.

*By Invitation

21. The Response of Pulmonary Vascular Resistance to Cardiac Transplantation

JAMES K. KIRKLIN, ROBERTO. SOURCE,*

DAVID C. NAFTEL, DELORES MASON* and*

*ANDREW E. EPSTEIN**

Birmingham, Alabama

Elevated pulmonary vascular resistance (PVR) is a known risk factor for early death from acute right ventricular failure following orthotopic cardiac transplantation (C Tx). Patients with an elevated PVR due primarily to increased left atrial pressure ("reactive") frequently have normalization of PVR following transplantation, but few studies have detailed the time course and magnitude of these changes. To analyze the response of PVR to C Tx, data from 3,574 right heart catheterizations on all 161 patients undergoing cardiac transplantation between 1981 and January 1, 1989 were analyzed. Before transplantation 16% of pts. had a PVR ‰¥ 4 Wood Units (WU), 21% a pulmonary artery systolic pressure (PA Sys) ‰¥ 60 mmHg, and 25% a transpulmonary gradient (TPG; PA mean - pulmonary capillary wedge pressure) > 12mmHg.

In the **overall group,** PVR decreased within 1 week (wk) (2.65 WU ± 0.19 pre-Tx vs 1.43 WU ± 0.07 at 1 wk, p(paired t-test) < 0.001) and was essentially unchanged at one year (p = 0.6). PA Sys fell within 1 wk (50mmHg ± 1.5 vs 29mmHg ± 0.66, p < 0.0001) with a further decline at 1 year (p<0.001). TPG did not significantly change postoperatively.

Among the 15 patients with a **pre-Tx PVR** >4.0 WU (range 4.0 - 11.3, mean 5.79 ± 0.61) the PVR was greatly reduced among surviving patients at 1 wk (n = 13, 5.79 ± 0.61 vs 1.91 ± 0.19, p<.0001) without further change at 1 year (p= .11). Similar changes were noted in PA Sys (60mmHg ± 3.7 vs 33mmHg ± 2.4, p = .0003) but changes in TPG were likely due to chance (17 ± 2.5 vs 10 ± 0.78, p = .9). Comparing the high PVR group (>4 WU) to the low PVR group (<4 WU), PVR remained slightly higher in pre-op high PVR patients at 1 wk (1.8 WU ± 0.24 vs 1.4 WU ± 0.10, p = .07) and 1 month (1.9 WU ± 0.19 vs 1.4 WU ±

0.46, p = .02), but differences at 1 year were likely due to chance (1.9 WU ± 0.34 vs 1.4 WU ± 0.1,p=.11).

Inferences

* As a group, C Tx recipients have a normal PVR, PA Sys and TPG within 1 wk after C Tx with little change thereafter for at least the first year.
* Surviving patients with elevated pre-Tx PVR, PA Sys, and/or TPG undergo near normalization of these parameters within 1 wk of transplantation.

* Patients with "reactive" elevation of PVR are likely to survive orthotopic C Tx if appropriate preservation of the RV is accomplished and support techniques are available if necessary for about the first wk following C Tx, after which a nearly normal PVR can be expected.
*By Invitation

22. Monitoring of Mononuclear Cells from Coronary Sinus Blood and Right Atrium in Patients Following Heart Transplantation

*CHRISTOPH HOLZINGER *, ANDREAS ZUCKERMANN*,*

RAINALD SEITELBERGER, GUNTHER LAUFER*,*

AXEL LACZKOVICS and ERNST WOLNER*

Vienna, Austria

In the present study we investigate, whether patterns of mononuclear cell (MNC)-subpopulation isolated from coronary sinus blood (CS) in patients following cardiac transplantation undergo changes during graft-rejection.

79 endomyocardial biopsies (EB) in 36 patients were performed. Grading of graft rejection was classified by the Billighamscheme. 32 biopsies showed

grade-0, 33 a mild grade-1 and 14 a moderate grade-2 rejection.

After EB, heparinized blood samples were withdrawn from right atrium (RA) and the CS. Grade-0 and -1 EB showed no difference between the patterns of MNC-subpopulation from CS- and RA- blood. In the CS blood, however, a significant, 1.56 fold, increase of MNCs was assessed. Grade-2 rejections showed a 4.2 fold augmentation of MNC in the CS. In addition T helper/inducer increased from 27.1% in RA and to 41.2% in SC, natural killercells (NK) from 17.7% to 31.8% and the Interleukin-2-receptor bearing cells from 6.6% to 15.3%, respectively. Pan-T cells, T cytotoxic/suppressor cells and monocytes did not show any statistically significant changes in their percentage.

These findings correlated with grading according to EB. In two patients EB showed a mild rejection, which was not treated specifically. One patient died of autopsy-confirmed acute rejection soon after EB and the other patient recovered after administration of OKT3 moab.<="" p="">

The accumulation of mononuclear cells (MNC) in the graft and the reaction of the antigen recognizing cells with the foreign tissue, leads to changes in MNC-count and to differnt patterns of MNC subpopulations isolated from coronary sinus (CS) blood than those in the right atrium (RA). Consequently, immunologic changes caused by heart rejection can be detected by comparison of MNC from CS to cells from RA.

EB is the best proven method in diagnosing acute graft rejection. The most important disadvantage is the fact that EB allows only an examination of a rather small area of the heart. However, local discrepancies of immunological reactions in the heart may sometimes lead to false gradings of rejections and focal rejections may even be missed or understated.

In contrary, CSIM allows an excellent survey of the immunological situation of the

whole heart. Preparation and examination of EB takes at least 6 hours, whereas the results of CSIM are available within one to two hours. Consequently, adequate antirejection therapy can be started earlier. EB and CSIM are both invasive methods and their combination delivers an excellent insight into immunological processes during heart rejection and acceptance.

INTERMISSION - VISIT EXHIBITS

*By Invitation

3:30 p.m. SCIENTIFIC SESSIONS - Sheraton Ballroom

23. The Effect of Muscle Sparing Versus Posterolateral Thoracotomy on Pulmonary Function, Muscle Strength and Postoperative Pain

STEPHEN R. HAZELRIGG,*

RODNEY J. LANDRENEAU. THERESA M. BOLEY*,*

MEREDYTH L. PRIESTMEYER, RICHARD A.*

SCHMALTZ, WEERACHAI NAWARA WONG*,*

JOSEPH T. WALLS and JACK J. CURTIS*
Columbia, Missouri

We conducted a prospective, randomized, blinded study of 35 consecutive patients to compare the standard posterolateral (SP) thoracotomy to that of the "muscle sparing" (MS) thoracotomy with respect to pulmonary function, shoulder strength and range of motion and postoperative pain. Pulmonary function was evaluated with FEV, and FVC measured preopera-tively, at one week and one month postoperatively. Shoulder strength and range of motion were measured at these same time intervals. Width of thoracotomy opening, postoperative narcotic consumption and wound complications were recorded. Pain was quantitated by use of a visual analogue scale (VAS) obtained every six hours for two

days and then every twelve hours for a total of seven days. This was augmented by the McGill Pain Questionnaire which was administered at one week and one month postoperatively. Length of hospital stay and mortality were also examined.

The extent of lung resection was comparable in the two groups (p = .975). Although the MS group required an additional 10 mins. to enter the chest, total operative time was not significantly different. The opening (maximal) width of the rib retractor was comparable between groups (p = .7064). There were no significant differences in pulmonary function, range of motion, or shoulder strength between the groups at one week or one month. There was significant improvement in comfort in the MS group at 48 hours postop (Mean VAS: MS = 33.1, SP=16.5; p = .0498) and for days 3 through 7 postop (Mean VAS: MS = 56.2, SP =43.8; p = .0022). This finding was reinforced with a suggestion of less narcotic requirement by the MS group in the postoperative period (Mean morphine use: MS = 22mg, SP = 35mg; p = .07). Length of hospital stay and mortality were not significantly different between the groups. Incisional seromas developed in 3/16 (19%) of patients in the MS group and 0/19 in the SP group.

In conclusion, there does not appear to be a functional difference between the muscle sparing or standard posterolateral thoracotomy. Patient comfort does appear to be superior with the muscle sparing technique.

*By Invitation

24. Single Lung Transplantation - Alternative Indications and Technique

J. KENT TRINKLE, JOHN H. CALHOON.*

CHARLES L. BRYAN, WILLIAM J. GIBBONS*,*

DAVID J. COHEN and FREDERICK L, GROVER*

San Antonio, Texas

Ten patients had a single lung transplant (SLTX) since March 1988 with one early and one late death and **no bronchial complications.** One patient had primary pulmonary hypertension, two had secondary pulmonary hypertension and two had COPD due to an Alpha I antitrypsin deficiency - each of which was previously thought to **contraindicate** SLTX. The other five had various types of restrictive lung disease. Several bedridden patients on preoperative Prednisone underwent successful operation. The only absolute contraindications to SLTX were infection or a life-limiting systemic disease. Cardiovascular dysfunction and cachexia uniformly resolved postoperatively. Donor selection was based on a PO_2/FIO_2 greater than 300, chest circumference ± 10 cm, clear chest x-ray, negative sputum gram strain and 4 hr estimated ischemic time. Harvest technique included donor PGE, 500 µg and pulmonoplegia with cold modified Eurocollins solution. The heart and lung were **separated in situ** rather than removing a heart-lung block. A **telescoping** bronchial anastomosis was performed with 4-0 Prolene (NOT absorbable sutures) **without** an omental wrap. PEEP, Pavulon and Lasix were used to minimize the postoperative reperfusion response especially in patients with pulmonary hypertension. **Corticosteroids were not withheld** pre or postoperatively. Postoperative immunosuppression included OKT_3, Methylprednisolone and Prednisone, followed by Cyclosporine and Imuran or postoperative day #8. Dyspnea on exertion without a productive cough or fever suggested rejection which was confirmed by desaturation during exercise oximetry. We conclude that SLTX has

evolved into a simple operation which requires meticulous pre an postoperative care. It can be performed on a wide spectrum of critically ill patients, not just those with pulmonary fibrosis, with a relatively low morbidity and mortality.

*By Invitation

25. Contribution of the Bronchial Circulation to Lung Preservation

JOSEPH LoCICERO, MALEK MASSAD*,*

JUN MATANO, RODNEY GREENE*, MARC DUNN**

and LAWRENCE L. MICHAELIS

Chicago, Illinois

Short preservation time still severely limits lung transplantation. To determine the effect of bronchial arterial (BA) flush preservation we studied 54 dogs using the isolated perfused working lung model. Following intact animal baseline measurements, lungs were flushed with lactated Ringer's solution (60ml/kg at 8°C; 250ml/min at ISmmHg) by one of three methods: pulmonary artery (PA) perfusion, BA through a 15cm closed aortic segment, or simultaneous PA + BA. These groups were further subdivided and tested after 0, 4 or 17 hrs of cold storage at 4°C (n = 6 each). Lungs were ventilated (140ml/kg/min @ FIO_2 = 0.21) and continuously reperfused with nor-mothermic deoxygenated autologous blood in a closed loop. Measured variables were: hemodynamics, aerodynamics, leukocytes in bronchoalveolar lavage, and shunt fraction. Survival time was determined from initial reper-fusion to failure of the lung to oxygenate. After 0 and 4 hrs storage, there was no significant difference in survival times. At 17 hrs, PA + BA lungs survived longer than PA or BA alone (120 ±24 vs 38 ±14 or 52 ±16 min;

p<0.01). PA pressure and resistance in all groups, except at failure, were never different intact animal baseline. Shunts in PA ± BA groups were closest to baseline at outset (12 ± 5% vs 13 ±4%)and remained lower throughout reperfusion than PA or BA alone. After 17 hrs, static compliance of PA lungs worsened compared to baseline (1.1 ± 0.2E-2 vs 3.2 ± 0.7E-2 L/cm H_2O/sec; p<0.05) while PA + BA remained constant (3.6 ± 1.5E-2L/cm HiO/sec). Likewise, elastic work significantly decreased with time for PA group over baseline (225 ± 46 vs 394 ± 84g-m/min; p<0.05). Bronchoalveolar lavage in PA + BA after 17 hrs demonstrated leukocyte counts similar to intact lungs (45 ± 5 vs 29 ± 8/mm^3) and significantly less than PA or BA (137+18 or 82±10/$mm^{!}$ respectively). We conclude that simultaneous PA + BA perfusion is superior to PA or BA perfusion alone in preserving lungs for extended storage. This may also be achieved by core cooling of the donor.

4:30 p.m. EXECUTIVE SESSION (Members Only)

7:00 p.m. PRESIDENT'S RECEPTION (Tickets Required) Dominion Ballroom (2nd Floor)

*By Invitation

WEDNESDAY MORNING, MAY 9, 1990

Back to Annual Meeting Program

WEDNESDAY MORNING, May 9, 1990

7:30 a.m. SIMULTANEOUS SYMPOSIA

SYMPOSIUM I - THE DILEMMA OF ATRIAL FIBRILLATION - Sheraton Ballroom

Moderator: James L. Cox, St. Louis, Missouri

MECHANISMS OF ATRIAL FIBRILLATION

John P. Boineau*, St. Louis, Missouri

THROMBOEMBOLIC COMPLICATIONS OF ATRIAL FIBRILLATION

David G. Sherman*, San Antonio, Texas

SURGICAL TREATMENT OF ATRIAL FIBRILLATION

James L. Cox, St. Louis, Missouri

ATRIAL FIBRILLATION AS A COMPLICATION FOLLOWING CARDIAC SURGERY

Norman A. Silverman, Detroit, Michigan

7:30 a.m. SYMPOSIUM II - MANAGEMENT OF AIRWAY PROBLEMS - Dominion Ballroom - 2nd Floor

Moderator: Joel D. Cooper, St. Louis, Missouri

PANELISTS:

Hermes C. Grille, Boston, Massachusetts

Patrick Gullane*, Toronto, Ontario, Canada

James Harrell*, San Diego, California

*By Invitation

9:00 a.m. SCIENTIFIC SESSIONS - Sheraton Ballroom

26. Emergency Cardiopulmonary Bypass Support in Patients With Cardiogenic Shock and Cardiac Arrest

KIT V. AROM, JODI FISHMAN MOONEY, IRVIN F. GOLDENBERG*, DAVID W. MATHIAS*,*

ROBERT W. EMERY and MICHAEL R. MOONEY**

Minneapolis, Minnesota

Emergency percutaneous cardiopulmonary bypass support (ECPS) was instituted in 8 male pts (mean age 59 years) with severe hemodynamic decompensation due to ischemic heart disease refractory to conventional resuscitation measures. ECPS was utilized in the catheterization lab for 3 pts failing cardiopulmonary resuscitation, 3 pts in cardiogenic shock, and in 2 pts for hemodynamic collapse following failed coronary angioplasty (PTCA). ECPS required 3-20 minutes to institute. A 20F cannulae and a 17F cannulae were percutaneously inserted into the femoral vein and artery. Flow rates between 3-5 1/min were achieved with restoration of mean arterial pressure to 70 mmHg (range 50-75). All 8 pts were initially clinically and hemodynamically improved with ECPS. The two pts with failed PTCA underwent successful emergent coronary bypass surgery, one of whom required biventricular assist devices for 3 days. Three pts had anatomy unsuitable for PTCA or bypass, could not be weaned from ECPS, and expired. Three pts had successful coronary bypass surgery. Cannulae removal and femoral vessel repair was performed surgically in all pts. All 5 pts with correctable disease were discharged from the hospital. At follow-up (range 1-10 months, mean 6.2), all 5 pts are free of angina and have resumed to normal activity. In conclusion, ECPS is a powerful resuscitative tool which may stabilize pts with cardiogenic shock and cardiac arrest to allow for definitive intervention.

27. Controlled Reperfusion Avoids Transmural Infarction in Patients After PTCA Failure

FRIEDHELM BEYERSDORF, KOPPANY SARAI*,*

THOMAS WENDT, FRANK D. MAUL**

*and PETER SATTER**

Frankfurt, West Germany

Sponsored by: G.D. Buckberg, Los Angeles, California

Hypothesis: Transmural infarction after emergency revascularization after PTCA failure can be avoided by modification of the initial reperfusion.

Methods: 31 consecutive patients with acute coronary occlusion secondary to PTCA failure were reperfused after operative revascularization under two different conditions: In 23 patients the reperfusate was normal blood and systemic pressure was used

("uncontrolled reperfusion"); in 8 patients the ischemic segment was reperfused during the initial 20 min with a modified blood cardioplegia (substrat-enriched, hyperosmotic, hypocalcemic, alkalotic, diltiazem-containing) at 37 °C and at a pressure of 50 mmHg. Thereafter the heart was allowed to beat empty for additional 30 min before extracorporeal circulation was stopped ("controlled reperfusion"). Assessment of regional contractility (echocardiography, radionuclidven-triculography), EKG, release of CK-MB enzyme and clinical parameters were performed. Regional contractility was graded with a score from 0 (nor-mokinesis) to 4 (akinesis) on the 5th postoperative day. Data are mean ± standard deviation.

Results: Preoperative data (age, sex, coronary status) were comparable between groups. However, the interval between coronary occlusion and reperfusion was significantly longer in the controlled reperfusion-group (4.0 ± 1.6 vs 2.3 ± 1.0 hr, $p < 0.05$). Regional contractility returned to normal in all patients treated by controlled reperfusion (wall motion score = 0.8 ± 0.9, normokinesis = 0, slight hypokinesis = 1). In contrast regional contractility remained depressed severely after uncontrolled reperfusion with normal blood (score 2.5 ± 0.8, $p < 0.05$ vs controlled reperfusion) with only 4/23 patients with a score < 2 (2 = severe hypokinesis). Postoperatively enzymes and EKG were similar in both groups. One patient died of chronic mitral insufficiency in the controlled reperfusion-group, despite complete recovery of wall motion in the PTCA related artery. Conversely 4/23 deaths of uncontrolled reperfusion occurred in patients sustained infarct in the area of coronary occlusion (12 vs 17%, $p>0.05$).

Conclusions: These preliminary clinical results indicate that transmural infarction can be avoided if the composition of the reperfusate and the conditions of reperfusion are controlled during the initial reperfusion. Further clinical studies comparing controlled and uncontrolled reperfusion after acute coronary occlusion in a large cohort of patients are necessary.

*By Invitation

28. A Clinical Trial of Warm Induction Glutamate-Aspartate Blood Cardioplegia for Urgent Revascularization

KEVIN H. TEOH, JOAN IVANOV*,*

RICHARD D. WEISEL, DONALD A.G. MICKLE and the*
CARDIOVASCULAR SURGEONS AT THE TORONTO

GENERAL HOSPITAL Toronto, Ontario, Canada

Although the results of elective coronary artery bypass grafting (CABG) are excellent, patients (pts) who require urgent CABG because of uncontrolled angina face an increased risk. Metabolic resuscitation prior to urgent CABG may reduce the risks.

One hundred and ten pts requiring urgent CABG were randomized to receive either blood cardioplegia **(CONTROL,** 53 pts) or blood cardioplegia enriched with the Krebs cycle intermediates **glutamate** and **asparlate** delivered as a **warm** (37 °C) **induction** before blood cardioplegia and as a **terminal warm** infusion (**G** + **A**, 57 pts).

The patients required urgent revascularization because of prolonged (> 15 min) rest angina resistent to nitroglycerine in the coronary care unit (65 pts), pain persisting after a myocardial infarction (36 pts), or complications at catheterization (9 pts). Eighteen of these pts required an intraaortic balloon pump (IABP) preoperatively to control pain.

RESULTS: **G** + **A** blood cardioplegia reduced the amount of **CK-MB** released postoperatively.

CK-MB (mmol/L)	2 hrs.	24 hrs	30 hrs
CONTROL	39 ± 9	41 ± 9	20 ± 2
G + A	24 ± 2*	23 ± 2*	12 ± 1*

*Different than **CONTROL p < 0.05**

The perioperative mortality (40%) and the incidence of postoperative low output syndrome (LOS, the need for inotropic support or **IABP,** 9%) was not reduced with G + A in the entire group. However, **LOS** was reduced in patients who had left main stenosis **(CONTROL** 17%, **G** + **A** 0%, p **<** .05) and those who had impaired preoperative ventricular function

(ejection fraction < 40%, **CONTROL** 40%, **G** + **A** 29%, p < .05).

CONCLUSION: Blood cardioplegia provided excellent protection for patients requiring urgent revascularization, but the addition of *glutamate* and *aspartate* during a *warm induction* and terminal *"hot shot"* further reduced perioperative ischemic injury. **Low output syndrome** was reduced only in high risk patients.

*By Invitation

29. Impact of Unstable Angina on Operative Mortality at Varying Intervals Following Myocardial Infarction

JACK J. CURTIS, JOSEPH T. WALLS,*

NAZIH H. SALAM, RICHARD A. SCHMALTZ*,*

WEERACHAI NAWARA WONG,*

RODNEY J. LANDRENEAU, THERESA M. BOLEY**

and RICHARD MADSEN Columbia, Missouri*

A retrospective study of patients (pts) undergoing isolated coronary artery bypass grafting following myocardial infarction (MI) was performed to test the hypothesis that the anginal syndrome i.e., stable or unstable, is a major predictor of operative mortality. Unstable angina was defined as persisting chest pain following MI or chest pain at rest and crescendo angina in pts more remote from their MI. There were 1,488 pts with an age range of 29-90 (mean 61) reviewed. There was no significant difference in the operative mortality in pts who had experienced a prior MI, 38 of 840 (4.5%) and those who had not, 26 of 634 (4.1%), p = 0.65. However, when pts were grouped according to the timing of operative intervention and recency of MI, a very significant trend of operative mortality was observed as detailed in the table below (p<.001).

	OPERATIVE MORTALITY	
Time from MI	**Stable Angina**	**Unstable Angi**
0 hr - 1 day	0/4 (0.0%)	6/25 (24.0%)
1 day - 1 week	0/3 (0.0%)	8/87 (9.2%)
1 - 3 weeks	1/27 (3.7%)	5/95 (5.3%)

3 wks - 3 months	1/100 (1%)	5/102 (4.9%)
> 3 months	0/184 (0.0%)	12/213 (5.6%
No MI	4/265(1.5%)	22/369 (5.9%

Ligistic regression analysis of multiple risk factors including recency of MI, age, sex, ejection fraction, left main coronary artery stenosis and the presence of unstable angina revealed that unstable angina was the most important predictor of operative mortality (p<.001). We conclude that while operative mortality is increased in pts undergoing coronary artery bypass grafting with a recent MI, this is secondary to ongoing or intermittent myocardial ischemia as generally reflected in the clinical syndrome of unstable angina. In this study we observed that pts with a recent MI (<3 months) who were stable have a mortality of 1.5% while all pts without prior MI have a mortality of 4.1%.

INTERMISSION - VISIT EXHIBITS

*By Invitation

11:00 a.m. SCIENTIFIC SESSIONS - Sheraton Ballroom

30. Extracorporeal Membrane Oxygenation for Peri-Operative Support in Pediatric Heart Transplantation

MARK E. GALANTOWICZ and*

*CHARLES J.H. STOLAR**
New York, New York

Sponsored by: Thomas C. King, New York, New York

Extracorporeal membrane oxygenation (ECMO) has demonstrated effectiveness for cardiopulmonary support in a variety of clinical situations. This report reviews the cases of ECMO used as an adjunct to pediatric cardiac transplantation collected from the International ECMO Registry, the International Society for Heart Transplantation Registry, and Combined Registry of Mechanical Ventricular Assist Devices and Total Artificial Hearts, as well as case reports.

Twenty children, 7 days to 17 years old, with cardiac failure refractory to conventional therapy underwent ECMO support for 6 - 192 hours. In four, ECMO was used as a bridge to transplantation. In ten, ECMO facilitated resuscitation of the cardiac allograft in the immediate

post-operative period. In six, ECMO complemented therapy for severe rejection in the late postoperative period.

ECMO successfully bridged four patients to cardiac transplantation without related morbidity. Subsequently, three patients died of allograft failure and one survived.

The patients in the immediate post-transplant group were placed on ECMO within 24 hours post-operatively. Four of the ten patients are long-term survivors. Three patients were placed on ECMO in the operating room. They, like all the deaths in this group, had irrecoverable cardiac allograft function.

In the rejection group, patients were placed on ECMO one to eleven months post-transplantation. Three of the six patients survived. The deaths were due to intractable cardiac allograft dysfunction.

Cannulation sites were thoracic (10), cervical (7), and femoral (3). Complications included mediastinal bleeding requiring re-exploration (4), renal insufficiency (7), neurologic injury (5), and significant infection (3).

Twelve of twenty patients survived ECMO, seven of whom were long-term survivors with excellent cardiac allograft function.

The pediatric heart transplant recipient may be salvaged by the cardiac support capability of ECMO for one or more indications including: bridging to transplantation, supplementing immediate post-operative cardiac allograft resuscitation, or as an adjuvant therapy for treating a rejecting heart. Adequate functional recovery can be anticipated in some patients so treated, but there is significant associated morbidity and mortality in these desperately ill children.

*By Invitation

31. Pediatric Heart Transplantation Following Surgery Involving the Pulmonary Arteries

MATTHEW M. COOPER, LASZLO FUZESI*,*

LINDA J. ADDONIZIO, DAPHNE T. HSU*,*

CRAIG R. SMITH and ERICA. ROSE*

New York, New York

A prohibitive perioperative mortality has been previously ascribed to pediatric heart transplantation following palliative surgery for congenital heart disease (CHD) involving the pulmonary arteries. Of 40 children who have undergone heart transplantation at our institution since 1984, 6 (15%; mean age 9 ± 3 years; range 1-18 years) have previously undergone such surgery: first stage Norwood procedure for hypoplastic left heart syndrome (1), right ventricle (RV) to pulmonary artery (PA) conduit for corrected transposition of the great vessels with pulmonary stenosis (PS) (1), Waterston shunt for tricuspid and pulmonary atresia (1), PA banding followed by Fon-tan procedure for univentricular heart with double inlet left ventricle (1), atrial septectomy and PA banding for univentricular heart with mitral atresia (1), and classical Blalock-Taussig shunt for A-V canal with PS (1). All patients were transplanted successfully.

At operation, individualized pulmonary arterial reconstruction was employed including angioplasty (with and without pericardial patches) and use of a previously created RV-PA conduit. All patients had RV-PA gradients postoperatively (mean 17 ± 6 mmHg; range 2-46 mmHg) with a tendency for these gradients to decrease with time. Two patients developed critical RV failure postoperatively, one of whom required support with extracorporeal membrane oxygenation (ECMO).

Techniques borrowed from the repair of congenital cardiac lesions can be applied to subgroups of children undergoing heart transplantation. Additional length of donor aorta and PA should be harvested for possible use in designing PA connections. Previous palliative surgery involving the pulmonary arteries with associated complex PA anatomy is not of itself an insurmountable obstacle to successful heart transplantation.

*By Invitation

32. Intermediate Term Results of Infant Orthotopic Cardiac Transplantation From Two Centers

CARL L. BACKER, VINCENT R. ZALES*,*

HAROLD L. HARRISON, FAROUK S. IDRISS*

and CONSTANTINE MAVROUDIS

Chicago, Illinois

Infant orthotopic cardiac transplantation (OCT) has been established for patients with conventionally untreatable forms of congenital heart disease. The purpose of this study is to review the combined experience and intermediate term results of infant OCT from Children's Memorial Hospital, Chicago, and Kosair Children's Hospital, Louisville.

From June 1986 through October 1989, 17 OCT were performed in 16 patients. Fourteen had variants of hypoplastic left heart syndrome, 1 had anomalous origin of the left coronary artery. One patient with severe endocardia! fibroelastosis had extracorporeal membrane oxygenation as a bridge to transplantation. Immunosuppression included Cyclosporine, Im-uran and corticosteroids with an effort to wean the steroids by 6 months to 2 years.

Three early deaths resulted from technical errors in 2, and rejection in 1 patient at 3 days. Technical refinements to decrease the ischemic time have improved operative results. Two late deaths occurred, one at 2 months from rejection and one unexplained at 14 months. The remaining 11 patients are surviving 5 to 40 months (mean 14 months) after 12 transplants. Rejection surveillance in the first 6 months continues by clinical signs supplemented by echocardiography, EKG, and cell cycle analysis; endomyocardial biopsy is used after 6 months of age. Twelve episodes of suspected rejection in 8 patients were treated with I.V. Solumedrol in all and OKT3 rescue therapy in 2. One patient underwent successful retransplantation at 15 months for chronic rejection. Serious post-transplant infections including endocarditis, meningitis, and colonic perforation were successfully treated in 3 patients. Subjectively, their quality of life is excellent as documented by normal growth and developmental milestones and a low hospital readmission rate (< 2 episodes per patient per year).

These encouraging intermediate term results warrant continued application of infant OCT for severe forms of congenital heart disease.

12:00 p.m. ADJOURN FOR LUNCH

*By Invitation

WEDNESDAY MORNING, MAY 9, 1990

Back to Annual Meeting Program

1:30 p.m. SCIENTIFIC SESSION - Dominion Ballroom

33. Efficacy of Dynamic Cardiomyoplasty in Dilated Cardiomyopathy

K. FRANCIS LEE, REBECCA J. DIGNAN*,*

CORNELIUS L. DYKE, JITENDRA M. PARMAR*,*

THOMAS YEH, JR, GARY BENTON*. ANWAR S. ABD-ELFATTAH**

and ANDREW S. WECHSLER

Richmond, Virginia

Although dynamic Cardiomyoplasty (CMP) has entered the phase of active clinical trials, its direct effects on the failing heart have not been thoroughly documented. The deterioration in congestive heart failure is associated with progressive enlargement of the left ventricular chamber, decrease in cardiac output, and increased work load on the heart. We tested the hypothesis that dynamic Cardiomyoplasty may produce beneficial changes in the functional mechanics of the dilated, failing left ventricle (LV).

A model of chronic dilated Cardiomyopathy was induced in seven mongrel dogs by rapid ventricular pacing (260 b.p.m.) for three to four weeks. After the induction period, dynamic Cardiomyoplasty was performed with left latissimus dorsi, which was paced synchronously with the R-waves of the EKG (Medtronics SP1005). Instrumentation included an aortic flow probe, a LV Millar pressure catheter and piezoelectric ultrasonic crystals on the LV for measurements of wall thickness, minor axis, and major axis dimensions. Data were obtained during control (CMP-OFF) vs. study conditions (CMP-ON). Differences were analyzed with paired t-tests.

	Cardiac	LV Pressure (mmHg, mmHg, mmHg/Sec)			LV Wall Thickness (mm)		
	Output						
CMP	(ml/min.)	Peak Sys	Dias	Peak dP/dt	Dias	Sys	Thick'ng
OFF	966 ± 124	94 ± 4	18 ± 1	867 ± 38	10.1 ± 1.2	11.8 + 1.1	1.7 ± 0.2
ON	1166 ± 112	104 ± 4	15 ± 1	1254 ± 96	10.4 ± 1.1	12.7 ± 1.1	2.3 ± 0.2
P =	< 0.01	<0.01	<0.01	<0.01	N.S.	<0.01	<0.01

	Minor Axis Dimension (mm)			Major Axis Dimension (mm)		
CMP	Dias	Sys	Short'ng	Dias	Sys	Short 'ng
OFF	54.3 ± 1.6	51.3 ± 1.4	3.1 ± 0.3	90.2 ± 3.5	85.6 ± 3.3	4.6 ± 0.3
ON	53.9 ± 1.7	49.2 ± 1.8	4.7 ± 0.3	86.3 ± 2.8	7.9 ± 2.3	7.3 ± 0.9
P =	N.S.	<0.01	<0.01	<0.05	<0.05	<0.05

[All values are represented as means ± S.E.M. PEAK SYS, peak systole; SYS, end-systole; DIAS, end-diastole; SHORT'NG, shortening; THICK'NG, thickening. Statistical analysis is by paired t-test. N.S., not significant.]

Dynamic CMP increased the forward output of the failing heart. Systolic shortening of both minor axis and major axis dimensions were increased. Improved emptying of the congested left

ventricle was associated with beneficial changes in the loading conditions of the dilated LV. Preload, as determined by LV end-diastolic pressure, decreased by 16% ($p < 0.05$). Although skeletal muscle contraction increased the pressure development in the LV chamber, wall stress was diminished by concomittant changes in the LV dimensions. Systolic wall thickness increased by 8% ($p < 0.01$); minor axis dimension decreased by 2% ($p < 0.01$); and major axis dimension decreased by 8% ($p < 0.05$). Our detailed evaluation of LV chamber mechanics suggest that dynamic cardiomyoplasty may have a role in ameliorating the functional and mechanical derangements associated with progression of dilated car-diomyopathy both by augmenting cardiac performance and by diminishing determinants of myocardial oxygen consumption.

*By Invitation

34. Left Ventricular Function Changes After Cardiomyoplasty in Patients With Dilated Cardiomyopathy

ADIB D. JATENE, NOEDIR A.G. STOLF,*

LUIZ F.P. MOREIRA, EDIMAR A. BOCCHI*,*

PAULO M.P. FERNANDES and PEDRO SEFERIAN**
SÃ£o Paulo, Brazil

Stimulated skeletal muscle flaps, contracting synchronously with the heart, have been proposed to reinforce or partially replace the ventricular walls in the treatment of irreversible myocardial failure. Between May 1988 to September 1989, latissimus dorsi Cardiomyoplasty was performed in 11 patients with dilated cardiomyopathy who were in N.Y.H.A. class III or IV despite maximal medical therapy. Mean cardiothoracic index was 58 ± 2%, resting left ventricular ejection fraction (Thechnetium 99m scintigraphy) ranged from 15 to 28% and mean cardiac index (thermodilution) was 1.78 ± 0.25 lit./min. m^2.

The reinforcement technique was realized without cardiopulmonary bypass and using two different incisions to muscle dissection and to cardiac access. There were no operative deaths and the prophylactic use of sym-pathomimetic amines and vasodilators provided an adequate hemodynamic condition during the surgical procedure and in the immediate postoperative period. Loss of muscle flap contraction occurred in 1 patient due to latissimus dorsi ischemia and this patient died two months after the operation in congestive heart failure. The other 10 patients followed a progressive muscle stimulation protocol for a period of three months.

Two patients remain in the course of muscle conditioning period and 8 patients were followed from 4 to 18 months with an average of 10.2 months. Four of these patients are in N.Y.H.A. class I, 3 in class II and 1 in class III. Echocardiographic evaluation showed that left ventricular (LV) segmental wall shortening increased from 11.5 ± 2.8 to 17 ± 3.9% ($p<0.01$) at the 3rd postoperative month and was maintained at the same levels 6 months after the operation. Similarly, Technetium 99m scintigraphy documented a LV ejection fraction improvement of 31 ± 14% ($p<0.04$) after the muscle conditioning period. Significant increments of LV stroke index were determined by Doppler-echocardiography and by thermodilution 3 and 6 months after Cardiomyoplasty. Values of mean pulmonary wedge pressure of 24 ± 4.2, 18.1 ± 6.5 and 17.5 ± 6.9 mmHg and LV stroke work indexes of 14 ±3.5, 23.1 ±7.5 and 21.5 ±6.8 gm.m/m^2 were documented by cardiac catheteriza-tion at the preoperative evaluation and at the 3rd and 6th

postoperative months, respectively. In addition, the three patients who had a left ventricular end diastolic diameter greater than 80mm presented a less evident variation of the left ventricular function and the presence of moderate mitral regurgitation represented also a limitation for a better hemodynamic performance in another patient.

In conclusion, cardiomyoplasty may be performed with acceptable immediate mortality and may improve left ventricular function in patients with dilated cardiomyopathy, providing a better control of congestive heart failure state. However, the benefits of this new surgical technique seems to be less important in patients with greater left ventricular compromise.

*By Invitation

35. Clinical Experience With the Novacor Ventricular Assist System

PATRICK M. MCCARTHY, PEER M. PORTMER*,*

VAUGHN A. STARNES, H. GARETH TOBLER*,*

NARA YANAN RAMASAMY and PHILIP E. OYER*

Stanford and Oakland, California

At our institution, 12 patients (pts) had a Novacor electrical left ventricular assist system (LVAS) placed as a bridge to heart transplant (Tx) before 10/89. During the pre-LVAS hospitalization (mean 13 days), all pts were receiving inotropic support for biventricular failure (4 were also on the IABP), 10 had pulmonary edema (6 required intubation), 6 developed ventricular arrhythmias (4 had cardiac arrest), 5 had liver dysfunction with coagulopathy, and 2 had renal failure requiring artificial support. The mean cardiac index (C.I.) before LVAS was 1.52. All LVAS survivors had a dramatic increase in cardiac output (mean C.I. = 3.07). In addition, the mean PA diastolic pressure decreased from 26.4 ± 9.1 mmHg pre-implant to 17.3 ± 8.1 mmHg 24 hours post LVAS ($p<0.005$). One pt with cardiac allograft rejection died at LVAS implantation from akinesis of the right ventricle. Two pts died of pulmonary sepsis 16 and 21 days post LVAS implantation. Five pts were able to ambulate in the hospital and ride stationary bicycles while awaiting transplantation. Nine patients (75%) were successfully transplanted after a mean of 16 (range 2 to 34) days on the LVAS. One patient died two days after Tx of presumed sepsis. Eight pts (89%) are alive one month to five years post Tx.

In the United States, 53 pts (as of 10/89) have had a Novacor LVAS implanted. Three patients are still supported, 30 were transplanted (60%), and 26 pts (87%) survived the transplant hospitalization (one died late). No instances of device failure have occurred. In conclusion, the Novacor LVAS provided effective bridging to Tx, with post Tx survival similar to results after routine Tx. The bridge to Tx experience has provided a preview of future applications of the device. Many of these critically ill patients recovered sufficiently to allow the early resumption of normal activities. Isolated left heart support with a fully implantable LVAS will be offered as an alternative to heart Tx for selected pts in the 1990's.

*By Invitation

36. Discriminate Use of Electrocautery on the Median Sternotomy: 0.16% Wound Infection

HIROSHINISHIDA, RONALD K. GROOTERS*,*

WON-PA KIM, HOOSHANG SOLTANZADEH*,*

KENT C. THIEMAN and ROBERT F. SCHNEIDER**

Des Moines, Iowa

Sponsored by: Ralph A. Dorner, Des Moines, Iowa

Between June, 1978, and June, 1989, superficial infection and/or deep mediastinitis developed in only 5 (0.16%) of 3,118 consecutive patients. All patients studied underwent open heart procedures through a median ster-notomy and survived more than seven postoperative days. The surgical team disciplined itself to divide presternal soft tissues with a scalpel, and used elec-trocautery only for pinpoint hemostasis to preserve tissue viability. This 0.16% incidence was statistically significantly lower than 28 previously published studies (Pearson's chi-square test, $p<0.05$). Twenty-five predisposing factors were evaluated by Fisher's exact test: age, sex, obesity, diabetes mellitus, smoking, chronic obstructive pulmonary disease, renal failure, malignant disease, steroid usage, the length of hospitalization before surgery, preoperative New York Heart Association classification, left ventricular end-diastolic pressure, ejection fraction, operative procedure, internal mammary artery usage, emergency operation, reoperation, duration of cardiopulmonary bypass, operating time, re-exploration, intraaortic balloon pumping, inotropic agents, perioperative myocardial infarction, stroke, and prophylactic antibiotics. Among these only the operating time longer than 3 hours is related to Sternotomy infections ($p = 0.02$). Statistical evidence strongly suggests that discriminate use of electrocautery minimized infection risk factors and has produced the lowest reported Sternotomy infection rate to date.

*By Invitation

37. Preservation of the Aortic Valve and Aortic Root in Ascending Aortic Dissection

JAMES I. FANN, DONALD D. GLOWER*,*

J. SCOTT RANKIN, NORMAN E. SHUMWAY,

WALTER G. WOLFE and D. CRAIG MILLER

Stanford, California and Durham, North Carolina

Surgery is the optimal approach to treatment of ascending aortic dissection; however, indications for concomitant replacement of the aortic valve and/or root remain to be defined fully. The operative approach and outcome of 282 patients admitted to two institutions with type A (ascending) aortic dissection were assessed. A total of 195 (69%) patients presented with acute and 87 (31%) with chronic type A dissections. Follow-up was complete in 98% of patients and extended to 20 years (mean 4 years). One hundred and twenty-four (44%) patients underwent aortic valve procedures: 49 (41 acute and 8 chronic) had aortic valve resuspension with an operative mortality of 10% (5/49); 75 (38 acute and 37 chronic) underwent aortic valve replacement (AYR) with an operative mortality of 21% (16/75) ($p = 0.14$ *vs.* resuspension); 16 (8 acute and 8 chronic) of these AYR patients had concomitant aortic root replacement (operative mortality of 6% [1/16]). The indications for valve replacement generally included underlying (non-acute) aortic valve disease, Marfan's syndrome, and annuloaortic ectasia. Only 2 of 49 patients

who initially underwent valve resuspension required late AYR at 72 and 77 months (freedom from late AYR: 100% and 80% at 5 and 10 years). Four patients (4/75) who underwent initial AYR later required re-do AYR at 27, 81, 101, and 106 months (freedom from late re-do AYR: 98% and 70% at 5 and 10 years). Two patients (2/16) with AYR and aortic root replacement required subsequent root replacement at 48 and 71 months (freedom from late aortic root replacement: 100% and 83% at 5 and 10 years). Overall late survival rates for patients with initial AYR were 68%, 40%, and 16% at 5, 10, and 15 years, respectively. Overall late survival rates for patients with resuspension were 65% and 42%, and 21% at 5, 10, and 15 years, respectively (p = 0.5 vs.AYR). Multivariate Cox model analysis revealed that advanced age (p = 0.0001), previous cardiac or aortic operation (p = 0.0003), more preoperative complications (p = 0.0005), and earlier operative date (p = 0.006) were significant independent risk factors for late death. Preservation of the aortic valve or aortic root at initial operation was not associated with increased risk of late death or late replacement of aortic valve or aortic root. **Conclusion:** A conservative surgical approach to patients with type A aortic dissections favoring preservation of the native aortic valve and aortic root yields satisfactory long-term results; therefore, attempts should be made to resuspend the valve and preserve the root, whenever possible, in patients with aortic regurgitation and type A dissection.

*By Invitation

38. Effect of Right Atrial Appendectomy on the Release of Atrial Natriuretic Hormone

BASSAM O. OMARI. RONALD J. NELSON*
*and JOHN M. ROBERTSON**

Torrance and Los Angeles, California

Atrial Natriuretic Hormone (ANH) is released from the right atrial appendage in response to atrial distension. During open heart surgery the right atrial appendage is usually partially removed or ligated for venous cannulation.

To evaluate the effect of right atrial appendectomy on the release of ANH and its natriuretic and diuretic responses we prospectively randomized 23 patients undergoing elective coronary artery bypass surgery into two groups. There were 16 males and 7 females with a mean age of 62 ± 7 years. Group A (n = 11) had their right atrial appendage removed and Group B (n = 12) had their right atrial appendage preserved and venous cannulation was done lateral to the appendage. Both groups were comparable for sexual distribution, age, number of grafts, and extracorporeal bypass time. All patients had normal left ventricular and renal functions, and they did not receive any diuretics during the study period.

The patients were studied both preoperatively and postoperatively whereby the ANH serum levels, urine volume/min (V), fractional excretion of sodium (FENa), amount of sodium excreted (UNaV) and central venous pressure (CVP) were measured before and after volume expansion with 7.5 cc/kg of 5% albumin. There was no statistical difference in these parameters preoperatively. However, in the postoperative period Group B patients had higher ANH levels after volume expansion that Group A patients (376 ± 84 vs 184 ± 31 pg/ml)*, higher V (4.4 ± 1.0 vs 2.0 ± 0.4 cc/min)*, higher FENa (2.30 ± 0.66 vs 0.64 ± 0.19)** and higher UNaV (511.1 ± 150.9 vs 83.9 ± 22.8 mmoles/min)**. The CVP was similar both before (10 ± 1 vs 9 ± 1 cm H_2O) and after volume expansion (16 ± 1 vs 15 ± 1 cm H_2O) in both groups.

We conclude that preserving the right atrial appendage during open heart surgery significantly increases the release of ANH, resulting in increased urinary sodium excretion and better diuresis in the post operative period. *P < 0.05 **P < 0.02.

3:30 p.m. ADJOURN

*By Invitation

GEOGRAPHICAL ROSTER

Back to Annual Meeting Program

NECROLOGY

David P. Boyd, M.D., Burlington, MA
Edward J. P. Charrette, M.D., Kingston, ON
Andre Cournand, M.D., New York, NY
Walter B. Crandell, M.D., Hanover, NH
Morris M. Culiner, M.D., Burlingame, CA
John H. Foster, M.D., Nashville, TN
Frederick R. Harper, M.D., Denver, CO
Robert D. Henderson, M.D., Toronto, ON
William W. Heroy, M.D., Southampton, NY
Charles A. Hufnagel, M.D., Washington, DC
Hollis E. Johnson, M.D., Nashville, TN
James B. Littlefield, M.D., Daniels, WV
D. J. Magilligan, Jr., M.D., San Francisco, CA
Francis J. Phillips, M.D., Anchorage, AK
Mark M. Ravitch, M.D., Pittsburgh, PA
David H. Watkins, M.D., Des Moines, IA

The American Association for Thoracic Surgery, 1989-1990
(Listed by Countries, States, Provinces and Cities)
Geographical - UNITED STATES

USA
ALABAMA
Birmingham
Blackstone, Eugene H
Blakemore, William S
Kahn, Donald R
Kessler, Charles R
Kirklin, James K
Kirklin, John W
McElvein, Richard B
Pacifico, Albert D
Montgomery
Simmons, Earl M
ALASKA
Anchorage
Fisk, R. Leighton
ARIZONA
Green Valley
McClenathan, James E
Paradise Valley
Nelson, Arthur R
Phoenix
Brown, Lee B
Cornell, William P
Scottsdale
Pluth, James R
Sun City
Read, C Thomas
Tucson
Burbank, Benjamin

CALIFORNIA
Anaheim
Main, F Beachley
Burlingame
Ullyot, Daniel J
Chico
Becker, Ronald M
Coronado
Silver, Arthur W
Covina
Carter, P Richard
Del Mar
Angell, William W
El Macero
Andrews, Neil C
Escondido
Mannix, Edgar P, Jr
Flintridge
Penido, John R F
Fresno
Evans, Byron H
Indian Wells
Salyer, John M
Inglewood
Lee, Myles E
Irvine
Connolly, John E
Miller, Don R
La Canada
Meyer, Bert W

Copeland, Jack G, III
Sanderson, Richard G
Sethi, Gulshan K

ARKANSAS

Jasper
Hudson, W A

Little Rock
Campbell, Gilbert S
Read, Raymond C
Williams, G Doyne

La Jolla
Fosburg, Richard G
Hutchin, Peter

La Mesa
Long, David M, Jr

Loma Linda
Bailey, Leonard L
Wareham, Ellsworth E

Long Beach
Bloomer, William E
Carlson, Herbert A
Stemmer, Edward A

Los Angeles
Buckberg, Gerald D
Davis, Lowell L
Fonkalsrud, Eric W
Holmes, E Carmack
Hughes, Richard K
Kay, Jerome Harold
Khonsari, Siavosh
Laks, Hillel
Lindesmith, George G
Longmire, William, Jr
Maloney, James V, Jr
Mandal, Ashis K
Matloff, Jack M
Morton, Donald L
Mulder, Donald G
Stiles, Quentin R
Waters, Paul F

Los Osos
Aronstam, Elmore M

Martinez
Guernsey, James M

Montebello
Lui, Alfred H F

Oakland
Ecker, Roger R
Iverson, Leigh I G
May, Ivan A

Orange
Gazzaniga, Alan B
Mason, G Robert
Wakabayashi, Akio

Oxnard
Dart, Charles H, Jr
Palm Springs
Goldman, Alfred

Palo Alto
Conn, Roy B
Fogarty, Thomas J
Jamplis, Robert W
McFadden, Paul M
Wilson, John L

Pasadena
Ingram, Ivan N
Newman, Melvin M

Pebble Beach
Ramsay, Beatty H

Rancho Mirage
Bjork, Viking O

Sacramento
Benfield, John R
Berkoff, Herbert A
Follette, David M
Harlan, Bradley J
Hurley, Edward J
Miller, George E, Jr
Smeloff, Edward A
Tyson, Kenneth R T

San Bernadino
Flynn, Pierce J

San Diego
Baronofsky, Ivan D
Chambers, John S, Jr
Daily, Pat O
Kaye, Michael P
Lamberti, John J, Jr
Moreno-Cabral, Ricardo
Peters, Richard M
Trummer, Max J

San Francisco
Ellis, Robert J
Gardner, Richard E
Grimes, Orville F
Hill, J Donald
Leeds, Sanford E
McEnany, M Terry
Richards, Victor
Roe, Benson B
Thomas, Arthur N
Turley, Kevin

San Jose
Oakes, David D

San Marino
Tsuji, Harold K

Santa Ana
Pratt, Lawrence A

Santa Barbara
Higginson, John F
Jahnke, Edward J, Jr
Lewis, F John
Love, Jack W

Santa Cruz
Fishman, Noel H

Santa Monica
Nelson, Ronald J

Santa Rosa
Neville, William E

Seal Beach
Baisch, Bruce F

South Laguna
Oatway, William H, Jr

St Helena
Dugan, David J

Stanford
Mark, James B D
Miller, D Craig
Oyer, Philip E
Shochat, Stephen J
Shumway, Norman E
Stinson, Edward B
Tiburon
Heydorn, William H
Torrance
Carey, Joseph S
Cukingnan, Ramon A
Moore, Thomas C
State, David
COLORADO
Aspen
Zaroff, Lawrence I
Colorado Springs
Yee, Edward S
Denver
Brown, Robert K
Clarke, David R
Condon, William B
Eiseman, Ben
Grow, John B
Harken, Alden H
Hopeman, Alan R
Paton, Bruce C
Pomerantz, Marvin
Rainer, W Gerald
Waddell, William R
Wright, George W
Englewood
Kovarik, Joseph L
Lakewood
Swan, Henry
Littleton
Pappas, George
Pueblo
Bartley, Thomas D
Steamboat Springs
Burrington, John D
Vail
Fuller, Josiah
CONNECTICUT
Avon
Maier, Herbert C
Bridgeport
Rose, Daniel M
Hartford
Kemler, R Leonard
New Haven
Baldwin, John C
Glenn, William W L
Hammond, Graeme L
Kopf, Gary S
Lindskog, Gustaf E
Stansel, Horace C, Jr
Stern, Harold
New Milford
Okinaka, Arthur J
Norwich
Kelley, Winfield O
Sharon
Wylie, Robert H
Wilton
Pool, John L
DELAWARE
Newark
Lemole, Gerald M
Wilmington
Pecora, David V
DISTRICT OF COLUMBIA
Washington
Aaron, Benjamin L
Bowles, L Thompson
Katz, Nevin M
Keshishian, John M
Midgley, Frank M
Randolph, Judson G
Simmons, Robert L
Wallace, Robert B
FLORIDA
Atlantic Beach
Stranahan, Allan
Belleair
Lasley, Charles H
Boca Raton
Seley, Gabriel P
Clearwater
Wheat, Myron W, Jr
Coconut Grove
Center, Sol
Coral Gables
Cooke, Francis N
Gainesville
Alexander, James A
Jacksonville
Barnhorst, Donald A
Roster, J Kenneth, Jr
Stephenson, Sam, Jr
Lakeland
Brown, Ivan W, Jr
Marathon
Mangiardi, Joseph L
Miami
Bolooki, Hooshang
Chesney, John G
Daughtry, Dewitt C
Gentsch, Thomas O
Jude, James R
Kaiser, Gerard A
MacGregor, David C
Papper, Emanuel M
Reis, Robert L
Subramanian, S
Thurer, Richard J
Miami Beach
King, Richard
Lee, Arthur B, Jr
Logan, William D, Jr
Mansour, Kamal A
Miller, Joseph I
Rivkin, Laurence M
Symbas, Panagiotis
Williams, Willis H
Augusta
Ellison, Robert G
Rubin, Joseph W
Chickamanga
Hall, David P
Macon
Sealy, Will C

Greenberg, Jack J
Grondin, Pierre
Ripstein, Charles B

Naples
Battersby, James S
Linberg, Eugene J
Smyth, Nicholas P D

North Miami Beach
Spear, Harold C

North Palm Beach
Dorsey, John M

Orlando
Scott, Meredith L
Sherman, Paul H

Ponte Vedra Beach
Gilbert, Joseph, Jr

Punta Gorda
Taber, Rodman E

St Petersburg
Clerf, Louis H
Daicoff, George R
DeMatteis, Albert

Tallahassee
Kraeft, Nelson H

Tampa
Connar, Richard G
Seiler, Hawley H

Winter Haven
Maurer, Elmer P R

Winter Park
Bloodwell, Robert D

GEORGIA

Atlanta
Graver, Joseph M
Guyton, Robert A
Hatcher, Charles, Jr
Hopkins, William A
Jones, Ellis L

Savannah
Langston, Hiram T
Yeh, Thomas J

HAWAII

Honolulu
Ching, Nathaniel P
Gebauer, Paul W
McNamara, Joseph J

IDAHO

Boise
Herr, Rodney H

ILLINOIS

Chicago
Barker, Walter L
Breyer, Robert H
Campbell, Charles D
Ebert, Paul A
Faber, L Penfield
Ferguson, Mark K
Goldin, Marshall D
Hanlon, C Rollins
Head, Louis R
Hunter, James A
Idriss, Farouk S
Ilbawi, Michel N
Karp, Robert B
Kittle, C Frederick
Leininger, Bernard J
Mavroudis, Constantine
Michaelis, Lawrence
Najafi, Hassan
Raffensperger, John
Replogle, Robert L
Shields, Thomas W
Thomas, Paul A, Jr
Vanecko, Robert M

Evanston
Anderson, Robert W
Fry, Willard A
Tatooles, Constantine

Glencoe
Rubenstein, L H

Maywood
Keeley, John L
Pifarre, Roque
Sullivan, Henry J

Oak Brook
Hudson, Theodore R
Javid, Hushang
Jensik, Robert J
Nigro, Salvatore L

Oaklawn
DeLeon, Serafin Y

Park Ridge
Baffes, Thomas G
Weinberg, Milton, Jr

Peoria
DeBord, Robert A

Springfield
Wellons, Harry A, Jr

Winnetka
Mackler, S Allen

INDIANA

Indianapolis
Brown, John W

Shawnee Mission
Adelman, Arthur

Wichita
Tocker, Alfred M

KENTUCKY

Lexington
Crutcher, Richard R
Dillon, Marcus L, Jr
Todd, Edward P J

Louisville
Gray, Laman A, Jr
Mahaffey, Daniel E
Norman, John C
Ransdell, Herbert, Jr

LOUISIANA

Alexandria
Knoepp, Louis F

Baton Rouge
Berry, B Eugene
Beskin, Charles A

Marrero
O'Neill, Martin J, Jr

Metairie
Ochsner, Alton, Jr

New Orleans
Blalock, John B
DeCamp, Paul T
Hewitt, Robert L
Lindsey, Edward S

King, Harold
King, Robert D
Mandelbaum, Isidore
Shumacker, Harris B, Jr
Siderys, Harry

IOWA

Cedar Rapids
Lawrence, Montague S

Council Bluffs
Sellers, Robert D

Des Moines
Dorner, Ralph A
Phillips, Steven J
Zeff, Robert H

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Behrendt, Douglas M
Ehrenhaft, Johann L
Rossi, Nicholas P
Stanford, William

KANSAS

Cunningham
Allbritten, Frank F, Jr

Mills, Noel L
Moulder, Peter V
Ochsner, John L
Pearce, Charles W
Rosenberg, Dennis M
Schramel, Robert J
Webb, Watts R

MAINE

Liberty
Hurwitz, Alfred

Portland
Bredenberg, Carl E
Drake, Emerson H
Hiebert, Clement

Rockport
Swenson, Orvar

MARYLAND

Annapolis
Blair, Emil

Baltimore
Attar, Safuh
Baker, R Robinson
Baumgartner, William A
Cowley, R Adams
Dodrill, Forest D
Gardner, Timothy J
Gott, Vincent L
Haller, J Alex, Jr
Hankins, John R
McLaughlin, Joseph S
Michelson, Elliott
Reitz, Bruce A
Turney, Stephen Z
Watkins, Levi, Jr

Bethesda
Clark, Richard E
Jones, Michael

Chevy Chase
Iovine, Vincent M
Mills, Mitchell

Potomac
Zajtchuk, Rostik

Towson
Brawley, Robert K

Worton
Walkup, Harry E

MASSACHUSETTS

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Boyd, Thomas F

Boston
Akins, Cary W
Austen, W Gerald
Barsamian, Ernest M
Berger, Robert L
Bougas, James A
Braunwald, Nina S
Buckley, Mortimer J
Burke, John F
Castaneda, Aldo R
Cleveland, Richard J
Cohn, Lawrence H
Collins, John J
Daggett, Willard M
Daly, Benedict D T
Mathisen, Douglas J
Moncure, Ashby C
Neptune, Wilford B
Overholt, Richard H
Rheinlander, Harold F
Russell, Paul S
Scannell, J Gordon
Schuster, Samuel R
Shemin, Richard J
Starkey, George W B
Thurer, Robert L
Weintraub, Ronald

Brookline
Madoff, Irving M

Burlington
Ellis, F Henry, Jr
Watkins, Elton, Jr

Cambridge
Harken, Dwight E

Chestnut Hill
Laforet, Eugene G
Strieder, John W

Concord
Soutter, Lamar

Dover
Black, Harrison

Lynnfield
Wesolowski, Sigmund A

Medford
Desforges, Gerard

Methuen
Wilson, Norman J

North Andover
Cook, William A

Shrewsbury
Moran, John M

So Weymouth
Malcolm, John A

Springfield
Engelman, Richard M
Rousou, John A

Wellesley Hills
Mayer, John E

West Roxbury
Bernhard, William F

Deterling, Ralph, Jr
Frank, Howard A
Gaensler, Edward A
Grillo, Hermes C
Hilgenberg, Alan D
Jonas, Richard A
Levitsky, Sidney

Worcester
Vander Salm, Thomas J

MICHIGAN

Ann Arbor
Bartlett, Robert H
Bove, Edward L
Gago, Otto
Greenfield, Lazar J
Kirsh, Marvin M
Morris, Joe D
Neerken, A John
Orringer, Mark B
Prager, Richard L
Sloan, Herbert

Birmingham
Timmis, Hilary H

Detroit
Arbulu, Agustin
Arciniegas, Eduardo
Day, J Claude
Levine, Frederick H
Silverman, Norman A
Steiger, Zwi
Stephenson, Larry W
Wilson, Robert F

Farmington Hills
Lam, Conrad R

Grand Rapids
Harrison, Robert W
Meade, Richard H
Rasmussen, Richard A
Tomatis, Luis A

Grosse Pointe
Benson, Clifford D

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Gerbasi, Francis S

MINNESOTA

Minneapolis
Arom, Kit V
Bolman, R Morton, III
Emery, Robert W
Foker, John E
Gannon, Paul G
Garamella, Joseph J
Helseth, Hovald K
Humphrey, Edward W
Jamieson, Stuart W
Johnson, Frank E
Kiser, Joseph C
Molina, J Ernesto
Nicoloff, Demetre M

Flye, M Wayne
Kaiser, George C
Kouchoukos, Nicholas T
Lewis, J Eugene, Jr
Pennington, D Glenn
Roper, Charles L
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Khuri, Shukri F

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Wilkins, Earle W, Jr

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Taylor, Warren J

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Clagett, O Theron
Danielson, G K
McGoon, Dwight C
Olsen, Arthur M
Orszulak, Thomas A
Pairolero, Peter C
Payne, W Spencer
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J Schaff, Hartzell V

St Paul
Lillehei, C Walton
Miller, Fletcher A
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Johnston, J Harvey, Jr
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Silver, Donald

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Reed, William A
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Cooper, Joel D
Cox, James L
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Parr, Grant V S

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MacKenzie, James W
Scholz, Peter M

Weldon, Clarence S
Willman, Vallee L

MONTANA

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Oury, James H

NEBRASKA

Omaha
Demeester, Tom R
Fleming, William H
Moulton, Anthony L
Schultz, Richard D

NEVADA

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NEW HAMPSHIRE

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Holswade, George R

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Jurado, Roy A

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Belmar
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Browns Mills
Fernandez, Javier

Camden
Camishion, Rudolph C

Cherry Hill
Pierucci, Louis, Jr

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Auerbach, Oscar

Hackensack
Hutchinson, John E, III

Jersey City
Demos, Nicholas J

Millburn
Parsonnet, Victor

Moorestown
Morse, Dryden P

Newark
Abel, Ronald M
Amato, Joseph J
Gielchinsky, Isaac
Hochberg, Mark S
Swan, Kenneth G

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Wychulus, Adam R

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Wallsh, Eugene

Paterson
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Short Hills
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Summit
Donahoo, James

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Thai, Alan P

Santa Fe
Davila, Julio C

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Ryan, Bernard J

Bronx
Altai, Lari A
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Prater, Robert W M
Hirose, Teruo
Rubin, Morris

Brooklyn
Cunningham, J N, Jr
Levowitz, Bernard S
Sawyer, Philip N

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Adler, Richard H
Andersen, Murray N
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MacManus, Joseph E
Mentzer, Robert M, Jr

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Blumenstock, David A

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Strevey, Tracy E, Jr

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Effler, Donald B

Floral Park
Crastnopol, Philip

Lido Beach
Hines, George L

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Alley, Ralph D

New Hyde Park
Tyras, Denis H
Van De Water, Joseph M
McCormack, Patricia M
Nealon, Thomas F, Jr
Redo, S Frank
Reemtsma, Keith
Rose, Eric A
Skinner, David B
Spencer, Frank C
Spotnitz, Henry M
Steichen, Felicien M
Subramanian, Valavanur A
Tice, David A
Veith, Frank J
Wichern, Walter, Jr
Wolff, William I

Patchogue
Finnerty, James

Plattsburg
Potter, Robert T

Rochester
Graver, William L
DeWeese, James A
Hicks, George L
Schwartz, Seymour I

New York
Acinapura, Anthony J
Adams, Peter X
Bains, Manjit S
Beattie, Edward, Jr
Bloomberg, Allan E
Bowman, Frederick, Jr
Boyd, Arthur D
Cahan, William G
Clauss, Roy H
Conklin, Edward F
Cracovaner, Arthur J
Culliford, Alfred T
Ergin, M Arisan
Friedlander, Ralph
Ginsberg, Robert J
Green, George E
Griepp, Randall B
Holman, Cranston W
Isom, O Wayne
Jaretzki, Alfred, III
King, Thomas C
Kirschner, Paul A
Lambert, Adrian
Litwak, Robert S
Malm, James R
Martini, Nael
McCord, Colin W
Stewart, Scott
Roslyn
Thomson, Norman B, Jr
Wisoff, B George
Saranac Lake
Decker, Alfred M, Jr
Scarsdale
Robinson, George
Scottsville
Emerson, George L
Staten Island
Garzon, Antonio A
Stony Brook
Anagnostopoulos, C
Dennis, Clarence
Soroff, Harry S
Syracuse
Brandt, Berkeley, III
Meyer, John A
Parker, Frederick, Jr
Valhalla
Moggio, Richard A
Reed, George E
Westhampton Beach
Sarot, Irving A
NORTH CAROLINA
Asheville
Betts, Reeve H
Scott, Stewart M
Takaro, Timothy
Chapel Hill
Keagy, Blair A
Starek, Peter J K
Wilcox, Benson R
Charlotte
Robicsek, Francis
Selle, Jay G
Taylor, Frederick H
Durham
Jones, Robert H
Lowe, James E
Oldham, H N, Jr
Rankin, J Scott
Sabiston, David C
Wolfe, Walter G
Young, W Glenn, Jr
Oriental
Deaton, W Ralph, Jr
Pinehurst
Fischer, Walter W
Winston-Salem
Cordell, A Robert
Crosby, Ivan K
Hudspeth, Allen S
Johnston, Frank R
Meredith, Jesse H
Mills, Stephen A
NORTH DAKOTA
Grand Forks
James, Edwin C
OHIO
Akron
Falor, William H
Chagrin Falls
Cross, Frederick S
Cincinnati
Albers, John E
Kay, Earle B
Loop, Floyd D
Lytle, Bruce W
Snow, Norman J
Van Heeckeren, Daniel W
Columbus
Clatworthy, H W, Jr
Kakos, Gerard S
Kilman, James W
Meckstroth, Charles
Myerowitz, P David
Vasko, John S
Williams, Thomas E, Jr
Dayton
DeWall, Richard A
Pepper Pike
Mendelsohn, Harvey J
Toledo
Davis, John T
OKLAHOMA
Jenks
LeBeck, Martin B
Oklahoma City
Elkins, Ronald C
Felton, Warren L, II
Fisher, R Darryl
Greer, Allen E
Munnell, Edward R
Williams, G Rainey
Zuhdi, M Nazih
OREGON
Days Creek
Miller, Arthur C
Portland
Cobanoglu, Adnan
Krause, Albert H
Okies, J Edward

Callard, George M
Flege, John B, Jr
Gonzalez, Luis L
Helmsworth, James A
Hiratzka, Loren F
Ivey, Tom D
Wilson, James M
Wright, Creighton B

Cleveland
Ankeney, Jay L
Cosgrove, Delos M
Geha, Alexander S
Grondin, Claude M
Groves, Laurence K

Darby
McKeown, John J, Jr

Erie
Kerth, William J

Hamburg
Judd, Archibald R

Hershey
Campbell, David B
Pae, Walter E, Jr
Pierce, William S
Waldhausen, John A

Lancaster
Bonchek, Lawrence I
Witmer, Robert H

Philadelphia
Brockman, Stanley K
Dunn, Jeffrey M
Edie, Richard N
Edmunds, L Henry, Jr
Fineberg, Charles
Kolff, Jacob
MacVaugh, Horace, III
Mendelssohn, Edwin
Nemir, Paul, Jr
Norwood, William I
Rosemond, George P
Wallace, Herbert W

Pittsburgh
Bahnson, Henry T
Ford, William B
Griffith, Bartley P
Hardesty, Robert L
Magovern, George J
Pontius, Robert G
Rams, James J

Rosemont
Templeton, John, III

Sayre
Sewell, William H

Wayne
Lemmon, William M

Wilkes-Barre
Roberts, Arthur J

Yardley
Sommer, George N, Jr

RHODE ISLAND

Providence
Karlson, Karl E
Simeone, Fiorindo A
Singh, Arun K

Austin

Poppe, J Karl
Starr, Albert

PENNSYLVANIA

Abington
Frobese, Alfred S

Bethlehem
Snyder, John M

Bryn Mawr
Haupt, George J
Mundth, Eldred D

Camp Hill
Pennock, John L

Carlisle
DeMuth, William, Jr

SOUTH CAROLINA

Charleston
Bradham, R Randolph
Parker, Edward F
Sade, Robert M

Columbia
Almond, Carl H

Isle of Palms
Mullen, Donald C

Landrum
Stayman, Joseph W

Mount Pleasant
Crawford, Fred A, Jr

Spartanburg
Utley, Joe R

TENNESSEE

Knoxville
Blake, Hu Al
Brott, Walter H
Domm, Sheldon E

Memphis
Cole, Francis H
Eastridge, Charles E
Garrett, H Edward
Howard, Hector S, Jr
Hughes, Felix A, Jr
McBurney, Robert P
Pate, James W
Robbins, S Gwin, Sr
Rosensweig, Jacob
Skinner, Edward F
Watson, Donald C

Nashville
Alford, William, Jr
Bender, Harvey W, Jr
Dale, W Andrew
Gobbel, Walter G, Jr
Hammon, John W, Jr
Hoover, Eddie L
Johnson, Hollis E
Merrill, Walter H
Sawyers, John L
Scott, Henry W, Jr
Stoney, William S
Thomas, Clarence, Jr

Sparta
Labrosse, Claude C

TEXAS

Amarillo
Sutherland, R Duncan

San Antonio

Hood, R Maurice
Burnet
Ross, Raleigh R
Dallas
Adam, Maurice
Estrera, Aaron S
Holland, Robert H
Lambert, Cary J
Mills, Lawrence J
Paulson, Donald L
Platt, Melvin R
Razzuk, Maruf A
Ring, W Steves
Seybold, William D
Shaw, Robert R
Sugg, Winfred L
Urschel, Harold, Jr
Dilley
Hood, Richard H, Jr
El Paso
Glass, Bertram A
Galveston
Conti, Vincent R
Derrick, John R
Houston
Beall, Arthur C, Jr
Burdette, Walter J
Cooley, Denton A
Crawford, E Stanley
DeBakey, Michael E
Frazier, Oscar H
Hallman, Grady L
Henly, Walter S
Lawrie, Gerald M
Mattox, Kenneth L
Morris, George C, Jr
Mountain, Clifton F
Ott, David A
Overstreet, John W
Reul, George J, Jr
Roth, Jack A
Walker, William E
Wukasch, Don C
Irving
McPhail, Jasper L
Kaufman
Davis, Milton V
Lubbock
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French, Sanford, III
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Heaney, John P
Treasure, Robert L
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Temple
Brindley, G V, Jr
Woodville
Harrison, Albert W
UTAH
Salt Lake City
Cutler, Preston R
Doty, Donald B
Gay, William A, Jr
Liddle, Harold V
Mortensen, J D
Nelson, Russell M
Wolcott, Mark W
VERMONT
Burlington
Coffin, Laurence H
Miller, Donald B
Chester Depot
Adams, Herbert D
West Dover
Humphreys, G H, II
White River Junction
Tyson, M Dawson
VIRGIN ISLANDS
St Thomas
Wilder, Robert J
VIRGINIA
Annandale
Akl, Bechara F
Lefrak, Edward A
Arlington
Conrad, Peter W
Klepser, Roy G
Charlottesville
Dammann, John F
Kron, Irving L
Minor, George R
Muller, William, Jr
Nolan, Stanton P
Lynchburg
Moore, Richmond L
Richmond
Bosher, Lewis H, Jr
Brooks, James W
Cole, Dean B
Gwathmey, Owen
Lower, Richard R
Wechsler, Andrew S
WASHINGTON
Bellevue
Li, Wei-I
Manhas, Dev R
Bellingham
Varco, Richard L
Friday Harbor
Fox, Robert T
Lawrence, G Hugh
Kirkland
WEST VIRGINIA
Charlestown
Walker, James H
Huntington
Gonzalez-Lavin, Lorenzo
Morgantown
Graeber, Geoffrey M
Murray, Gordon F
Warden, Herbert E
Parkersburg
Tarnay, Thomas J
WISCONSIN
La Crosse
Gundersen, Erik A
Madison
Chopra, Paramjeet S
Kroncke, George M

Mills, Waldo O
Lacey
Fell, Egbert H
Poulsbo
Malette, William G
Seattle
Anderson, Richard P
Ashbaugh, David G
Dillard, David H
Hill, Lucius D, III
Jarvis, Fred J
Jones, Thomas W
Mansfield, Peter B
Miller, Donald W, Jr
Rittenhouse, Edward A
Sauvage, Lester
Thomas, George I
Spokane
Berg, Ralph, Jr
Young, William P
Marshfield
Myers, William O
Ray, Jefferson F, III
Sautter, Richard D
Milwaukee
Flemma, Robert J
Hausmann, Paul F
Johnson, W Dudley
Litwin, S Bert
Narodick, Benjamin
Olinger, Gordon N
Tector, Alfred J
West Bend
Gardner, Robert J
WYOMING
Cheyenne
Lefemine, Armand A
Teton Village
Kaunitz, Victor H

CANADA
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Calgary
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Edmonton
Callaghan, John C
Gelfand, Elliot T
Sterns, Laurence P
BRITISH COLUMBIA
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Couves, Cecil M
Vancouver
Allen, Peter
Ashmore, Phillip G
Jamieson, W R Eric
Tyers, G Frank O
Victoria
Stenstrom, John D
West Vancouver
Robertson, Ross
MANITOBA
Winnipeg
Barwinsky, Jaroslaw
Cohen, Morley
NEWFOUNDLAND
St John's
Brownrigg, Garrett M
NOVA SCOTIA
Halifax
Landymore, Roderick W
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ONTARIO
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Heimbecker, Raymond
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Sullivan, Herbert J
North York
Goldman, Bernard S
Nottawa
Key, James A
Ottawa
Keon, Wilbert J
Sudbury
Field, Paul
Walker, George R
Toronto
Baird, Ronald J
Bigelow, Wilfred G
David, Tirone E
Goldberg, Melvyn
Joynt, George H C
Mickleborough, Lynda L
Patterson, George A
Pearson, F Griffith
Salerno, Tomas A
Scully, Hugh E
Todd, Thomas R J
Trimble, Alan S
Trusler, George A
Weisel, Richard D
Williams, William G
Westbrook
Lynn, R Beverley
QUEBEC
Montreal
Blundell, Peter E
Chiu, Chu-Jeng (Ray)
Dobell, Anthony R
Duranceau, Andre C H
Lepage, Gilles
MacLean, Lloyd D
Morin, Jean E
Mulder, David S
Pelletier, Conrad L Scott, Henry J
Quebec
Gravel, Joffre-Andre
Sainte-Foy
DesLauriers, Jean

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INDIA

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VICTORIA
Melbourne
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AUSTRIA
Salzburg
Unger, Felix H
Vienna
Wolner, Ernst
BRAZIL
Sao Paulo
Jatene, Adib D
Zerbini, E J
ENGLAND
Bath, Avon
Belsey, Ronald
Hereford
Thompson, Vernon C
Herefordshire
Smith, Roger A
London
Braimbridge, Mark V
Kennedy, John H
Lennox, Stuart C
Lincoln, Christopher R
Ross, Donald N
Stark, Jaroslav F
Taylor, Kenneth M
FRANCE
Bordeaux-Pessac
Fontan, Francis M
Paris
Binet, Jean-Paul
Blondeau, Philip
Cabrol, Christian E A
Carpentier, Alain F
Dubost, Charles
GUATEMALA
Guatemala City
Herrera, Rodolfo
Raiputana
Van Allen, Chester M
IRELAND
Dublin
O'Malley, Eoin
ITALY
Bergamo
Parenzan, Lucio
Padova
Gallucci, Vincenzo
Peracchia, Alberto
JAPAN
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Iwa, Takashi
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Miyamoto, Alfonso T
Osaka
Kawashima, Yasunaru
Sendai
Mohri, Hitoshi
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NEW ZEALAND
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Duran, Carlos Gomez
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THE AMERICAN ASSOCIATION FOR THORACIC SURGERY
Charter Members
June 7, 1917

E. Wyllis Andrews
Arthur A. Law

John Auer
Edward R. Baldwin
Walter M. Boothby
William Branower
Harlow Brooks
Lawrason Brown
Kenneth Bulkley
Alexis Carrel
Norman B. Carson
J. Frank Corbett
Armistead C. Crump
Charles N. Dowd
Kennon Dunham
Edmond Melchior Eberts
Max Einhorn
Herman Fischer
Albert H. Garvin
Nathan W. Green
John R. Hartwell
George J. Heuer
Chevalier Jackson
H. H. Janeway
James H. Kenyon

Adrian V. S. Lambert

William Lerche
Howard Lilienthal
William H. Luckett
Morris Manges
Walton Martin
Rudolph Matas
E. S. McSweeney
Samuel J. Meltzer
Willy Meyer (Founder)
James Alexander Miller
Robert T. Miller
Fred J. Murphy
Leo S. Peterson
Eugene H. Pool
Walther I. Rathbun
Martin Rehling
B. Merrill Ricketts
Samuel Robinson
Charles I. Scudder
William H. Stewart
Franz Torek
Martin W. Ware
Abraham O. Wilensky

Sidney Yankauer

BYLAWS

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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. Purpose

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-five 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 65 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 re-elected 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 re-elected 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 re-elected 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 may be 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 VIII. 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. Unfinished 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 and 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 $150.00 and shall include a year's subscription to THE JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY.

Section 3. Annual dues for Associate Members shall be $150.00 and shall include a year's subscription to THE JOURNAL OF

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.

As amended, Tuesday, April 19, 1988.

ANNUAL MEETING DATES

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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
1985-New Orleans..... President, David C. Sabiston
1986-New York..... President, James, R. Malm
1987-Chicago..... President, Norman E. Shumway
1988-Los Angeles..... President, Paul A. Ebert
1989-Boston..... President, W. Gerald Austen

AWARDS

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GRAHAM EDUCATION AND RESEARCH FOUNDATION

13 Elm Street, Manchester, Massachusetts 01944, (508) 526-8330

President Martin F. McKneally, M.D., Albany, New York

Vice President William A. Gay, Jr., M.D., Salt Lake City, Utah

Secretary-Treasurer William T. Maloney, Manchester, Massachusetts

Director Mark B. Orringer, M.D., Ann Arbor, Michigan

EVARTS A. GRAHAM MEMORIAL TRAVELING FELLOWSHIP

The Evarts A. Graham Memorial Traveling Fellowship was established in 1958 by The American Association for Thoracic Surgery. Administered through the Graham Education and Research

Foundation, it provides grants to young surgeons from outside North America who have completed their formal training in general, thoracic, and cardiovascular surgery. The award allows the recipient to study a year in North America to intensify his training in a program of special interest and to travel to several sites to broaden his overall training and increase his contacts with North American thoracic surgeons. Awards are made to surgeons of unique promise who have been regarded as having the potential for later international thoracic surgical leadership. Since the inception of the Graham Fellowship, 40 young surgeons from 21 foreign countries have trained at thoracic surgical centers throughout North America.

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, M.B., 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. Tammisalonitie 20, Helsinki, 00830, Finland

11th	1963-64	Masahiro Saigusa, M.D.
		National Nakano Chest Hospital, 3-14-20 Egata, Nakano-Ku, Tokyo 165, JAPAN
	1963-64	Adar J. Hallen, M.D.
12th		Department of Thoracic Surgery, University Hospital
		Uppsala, SWEDEN
13th	1964-65	Stuart C. Lennox, M.D.
		18 Alexander Sq., 5W3 2AX, London, ENGLAND
14th	1964-65	Elias Carapistolis, M.D., F.A.C.S.
		Thessaloniki, GREECE
15th	1965-66	Gerhard Friehs, M.D.
		Chirugische 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-4040, AUSTRIA
21st	1970-71	Michel S. Slim, M.D.
		New York Medical College, Division of Pediatric Surgery
		New York, New York 10595 USA
22nd	1971-72	Severi Pellervo Manila, 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.
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