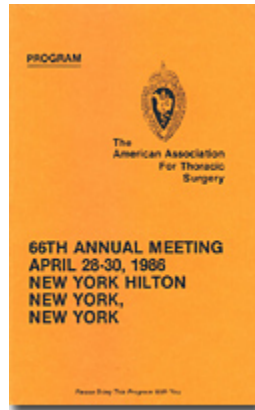


# 1986 ANNUAL MEETING PROGRAM



## THE AMERICAN ASSOCIATION FOR THORACIC SURGERY 1985 -1986

### *President*

James R. Malm, *New York, NY*

*Vice-President* Norman E. Shumway, *Stanford, CA*

*Secretary* Quentin R. Stiles, *Los Angeles, CA*

*Treasurer* Floyd D. Loop, *Cleveland, Ohio*

*Editor* Dwight C. McGoon, *Rochester, MN*

### *Council*

David C. Sabiston, Jr., (1986), *Durham, NC*

Earle W. Wilkins, Jr. (1986), *Boston, MA*

Charles Hatcher, Jr. (1987), *Atlanta, GA*

Anthony R. C. Dobell (1988), *Montreal, Quebec*

John R. Benfield (1989), *Duarte, CA*

### *Membership Committee*

William S. Stoney, *Chairman, Nashville, TN*

Richard P. Anderson, *Seattle, WA*

Joel D. Cooper, *Toronto, Ontario*

William A. Gay, Jr., *New York, NY*

Randall B. Griep, *Brooklyn, NY*

Noel L. Mills, *New Orleans, LA*

Walter G. Wolfe, *Durham, NC*

### *Association Representatives, The American Board of Thoracic Surgery*

Harvey W. Bender, Jr., *Nashville, TN*

Richard J. Cleveland, *Boston, MA*

Herbert Sloan, *Ann Arbor, MI*

Benson R. Wilcox, *Chapel Hill, NC*

### *Board of Governors, American College of Surgeons*

Robert B. Wallace (1987), *Washington, DC*

Anthony R. C. Dobell (1988), *Montreal, Quebec*

**THE AMERICAN ASSOCIATION**

**FOR THORACIC SURGERY**  
**1986 Annual Meeting**  
**COMMITTEES**

**LOCAL ARRANGEMENTS**

E. Foster Conklin, *Chairman*  
Peter X. Adams  
Joseph J. Amato  
Frederick Bowman, Jr.  
Arthur D. Boyd  
Joseph N. Cunningham, Jr.  
John E. Hutchinson, III  
O. Wayne Isom  
Robert S. Litwak  
James W. Mackenzie  
Nael Martini  
George Robinson  
Eugene Wallsh

**LADIES' HOSPITALITY COMMITTEE**

Mrs. E. Foster Conklin, (Carol) *Chairman*  
Mrs. Peter X. Adams (Cathy)  
Mrs. Joseph J. Amato (Debbie)  
Mrs. Frederick Bowman, Jr. (Betsy)  
Mrs. Arthur D. Boyd (Joan) Mrs. John E. Hutchinson, III (Ann)  
Mrs. O. Wayne Isom (Pam)  
Mrs. Robert S. Litwak (Doric)  
Mrs. James W. MacKenzie (Melinda)  
Mrs. James R. Malm (Connie)  
Mrs. Nael Martini (Robin)  
Mrs. George Robinson (Arline)  
Mrs. Eugene Wallsh (Julie)

**PROGRAM COMMITTEE**

Chairman, James R. Malm, M.D..... New York, New York  
Quentin R. Stiles, M.D..... Los Angeles, California  
Norman E. Shumway, M.D..... Stanford, California  
Dwight C. McGoon, M.D..... Rochester, Minnesota  
John R. Benfield, M.D..... Duarte, California  
L. Henry Edmunds, Jr., M.D..... Philadelphia, Pennsylvania  
Gerard A. Kaiser, M.D..... Miami, Florida  
Martin F. McNeally, M.D..... Albany, New York (Ex Officio)

**EVARTS A. GRAHAM MEMORIAL  
TRAVELING FELLOWSHIP COMMITTEE**

Chairman, Andrew S. Wechsler, M.D..... Durham, North Carolina  
D. Craig Miller, M.D..... Stanford, California  
William S. Pierce, M.D..... Hershey, Pennsylvania  
James R. Malm, M.D..... New York, New York  
Quentin R. Stiles, M.D..... Los Angeles, California  
Floyd D. Loop, M.D..... Cleveland, Ohio

**ETHICS COMMITTEE**

Chairman, Frederick Bowman, Jr., M.D..... New York, New York

Bert W. Meyer, M.D..... Los Angeles, California  
Donald L. Paulson, M.D..... Dallas, Texas  
Frank C. Spencer, M.D..... New York, New York  
George A. Trusler, M.D..... Toronto, Ontario

**LIAISON COMMITTEE FOR THORACIC SURGERY**

Chairman, Hermes C. Grillo, M.D..... Boston, Massachusetts  
John R. Benfield, M.D..... Los Angeles, California  
L. Penfield Faber, M.D..... Chicago, Illinois  
Donald G. Mulder, M.D..... Los Angeles, California  
F. Griffith Pearson, M.D..... Toronto, Ontario  
Richard M. Peters, M.D..... San Diego, California  
Benson B. Roe, M.D..... San Francisco, California

**MANPOWER COMMITTEE**

Chairman, Floyd D. Loop, M.D..... Cleveland, Ohio  
Joseph N. Cunningham, Jr., M.D..... New York, New York (1987)  
Richard G. Fosburg, M.D..... La Jolla, California (1989)  
Alexander S. Geha, M.D..... New Haven, Connecticut (STS)(1986)  
Benson R. Wilcox, M.D..... Chapel Hill North Carolina (STS) (1988)

**HISTORIAN**

Lyman A. Brewer, III, M.D..... Pasadena, California

**GOVERNMENT RELATIONS COMMITTEE (AATS/STS)**

Chairman, John E. Albers, M.D..... Cincinnati, Ohio (1986)  
John R. Benfield, M.D..... Duarte, California (1988)  
Milton V. Davis, M.D..... Dallas, Texas (1987)  
Joseph C. Donnelly, Jr., M.D..... Reading, Pennsylvania (1987)  
Alexander S. Geha, M.D..... New Haven, Connecticut (1986)  
Richard K. Hughes, M.D..... Los Angeles, California (1988)  
C. Frederick Kittle, M.D..... Chicago, Illinois (1986)  
James V. Maloney, Jr., M.D..... Los Angeles, California (1988)  
Joseph S. McLaughlin, M.D..... Baltimore, Maryland (1986)  
Nicholas P.O. Smyth, M.D..... Washington, DC (1988)

**REPRESENTATIVES  
1985-1986**

**AMERICAN COLLEGE OF SURGEONS - ADVISORY COUNCIL FOR  
CARDIOTHORACIC SURGERY**

Floyd D. Loop, M.D., Cleveland, Ohio (1988)  
Quentin R. Stiles, M.D., Los Angeles, California (1986)

**AMERICAN COLLEGE OF SURGEONS - REGENTAL COMMITTEE ON PHYSICIAN  
REIMBURSEMENT**

Thomas B. Ferguson, M.D., St. Louis, Missouri – Representative

**AMERICAN HEART ASSOCIATION - COUNCIL OF CARDIOPULMONARY  
DISEASE**

Harold C. Urschel, Jr., M.D., Dallas, Texas

**AMERICAN MEDICAL ASSOCIATION - HEALTH POLICY FOR AMERICAN PEOPLE**

George G. Lindesmith, M.D., Los Angeles, California – Representative

**AMERICAN MEDICAL ASSOCIATION - HOUSE OF DELEGATES**

Thomas D. Hartley, M.D., Gainesville, Florida - Delegate  
George G. Lindesmith, M.D., Los Angeles, California – Alternate

**ASSOCIATION FOR AMERICAN MEDICAL COLLEGES - COUNCIL OF ACADEMIC SOCIETIES**

Judson G. Randolph, M.D., Washington, DC - Representative  
Thomas C. King, M.D., New York, New York – Alternate

**ASSOCIATION FOR THE ADVANCEMENT OF MEDICAL INSTRUMENTATION (AAMI)**

Richard E. Clark, M.D., Bethesda, Maryland - Representative  
Robert H. Bartlett, M.D., Ann Arbor, Michigan – Alternate

**COMMITTEE FOR COORDINATING CONTINUING EDUCATION IN THORACIC SURGERY (CCCETS)**

Gordon F. Murray, M.D., Chapel Hill, North Carolina (1990)  
Mark B. Orringer, M.D., Ann Arbor, Michigan (1988)  
Robert W. Jamplis, M.D., Palo Alto, California (1986)

**EXTRACORPOREAL PERFUSION (AmSECT, ABCPT AND CAHEA)**

Richard P. Anderson, M.D., Seattle, Washington - Representative  
Stanton P. Nolan, M.D., Charlottesville, Virginia - Representative  
Hendrick B. Earner, M.D., St. Louis, Missouri - Alternate  
Richard G. Fosburg, M.D., LaJolla, California – Alternate

**NATIONAL ASSOCIATION OF BIOMEDICAL RESEARCH**

Sidney Levitsky, M.D., Chicago, Illinois

**AMERICAN ASSOCIATION FOR THORACIC SURGERY**

13 Elm Street  
Manchester, Massachusetts 01944  
(617) 927-8330

**The American Association for  
Thoracic Surgery**

# 66TH ANNUAL MEETING

## Scientific Program

MONDAY MORNING, April 28, 1986

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

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

### 1. Predictors of Reoperation after Myocardial Revascularization

*DELOS M. COSGROVE, FLOYD D. LOOP,*

*BRUCE W. LYTLE\*, CARL C. GILL\*,*

*LEONARD A.R. GOLDING\*, CHRISTOPHER GIBSON\*,*

*ROBERT W. STEWART\*, PAUL C. TAYLOR\**

*and MARLENE GOORMASTIC\**

*Cleveland, Ohio*

The first 1,000 patients undergoing primary isolated myocardial revascularization each year from 1971-1978 were analyzed to define the determinants of reoperation and reoperation-free survival. There were 79 operative deaths (1%). Mean follow-up was  $8.8 \pm 2.7$  years. Forty-one patients (0.5%) were lost to follow-up and 66,566 patient years of follow-up were available for analysis.

Reoperation occurred in 766 patients (9.7%) at a mean of  $6.8 \pm 3.2$  years (range 0-13) postoperatively. Ninety-six percent and 86% were reoperation-free at 5 and 10 years respectively. Reoperation-free survival was 90.8% and 70.8% at 5 and 10 years. The annual incidence of reoperation increased as the length of follow-up increased, being 0.9% and 2.7% at 5 and 10 years. The cumulative percent of reoperation was 18.9% at 12 years.

Reoperation-free percents at 5 and 10 years were 95.2% and 81.5% for patients <40 and 99.1% and 98.1% for patients >70,  $p < 0.0001$ .

Reoperation-free percents at 5 and 10 years were 98.4% and 92.2% for patients with internal mammary artery [IMA] grafts and 96.7% and 86.7% for patients with only vein grafts,  $p < 0.0001$ . Reoperation-free survival at 5 and 10 years was 94.0% and 79.4% for patients receiving an IMA graft and 89.1% and 66.7% for patients with vein grafts,  $p < 0.0001$ .

Univariately significant factors were entered into a Cox Model to determine the predictors of reoperation and reoperation-free survival. Young age is the most important factor influencing reoperations followed by no IMA and incomplete revascularization. No IMA is the most important risk factor influencing reoperation-free survival followed by smoking and incomplete revascularization. Type of conduit was the most important predictor of reoperation and reoperation-free survival for all age groups.

We conclude that IMA grafting reduces the incidence of reoperation and improves reoperation-free survival.

\*By Invitation

8:55 a.m.

## 2. Evaluation of Postoperative Flow Reserve in Internal Mammary Artery Bypass Grafts

*ALAN M. JOHNSON\**, *IRVING L. KRON\**,  
*DENNY D. WATSON\**, *ROBERTS. GIBSON\**  
and *STANTON P. NOLAN*

*Charlottesville, Virginia*

The internal mammary artery (IMA) has been advocated for use in bypass grafting due to its superior long-term patency when compared to saphenous vein. Concern exists that the flow through the IMA may be inadequate during periods of peak myocardial demand. To investigate this, 24 consecutive patients with a mean proximal LAD stenosis of 87.5% were selected for coronary bypass using the IMA. Within 8 weeks of operation, all underwent evaluation with exercise Thallium-201 (TL-201) scintigraphy. A mean maximum predicted heart rate of 101% and rate pressure product of  $29.9 \times 10^3$  were achieved at a mean workload of 8.1 METS. TL-201 activity, expressed as a ratio of antero-septal activity to posterolateral wall activity (or inferior wall activity if the posterolateral wall was deemed abnormal) was  $0.97 \pm 0.15$ . A second group of 25 patients, determined to be normal by either normal ventriculography and coronary angiography (16 patients) or a normal history, physical examination, graded exercise treadmill test, and myocardial distribution of TL-201 (9 patients), was similarly evaluated. This group reached a mean maximum predicted heart rate of 85.3% and a mean rate pressure product of  $23.7 \times 10^3$ , at a mean workload of 9.6 METS. The mean septal to posterolateral wall TL-201 activity ratio for these normal patients was  $1.0 \pm 0.15$ . No significant difference in relative post-exercise antero-septal TL-201 activity between normal patients and IMA bypass recipients can be demonstrated. A group of 34 patients who underwent percutaneous transluminal coronary angioplasty (PTCA) was compared to the IMA study group. TL-201 activity for the angioplasty group,  $0.92 \pm 0.16$ , was not significantly different from that for the IMA group. The internal mammary artery provides excellent coronary flow at peak myocardial demand and compares favorably to PTCA.

\*By Invitation

9:00 a.m.

## 3. Free (Aorto-Coronary) Internal Mammary Artery Graft: Late Results

*FLOYD D. LOOP*, *BRUCE W. LYTLE\**,  
*DELOS M. COSGROVE*, *LEONARD A.R. COLDING\**,  
*PAUL C. TAYLOR\** and *ROBERT W. STEWART\**

*Cleveland, Ohio*

Free internal mammary artery (IMA) grafts were performed in 156 patients (1971-1985). Preoperative clinical and angiographic variables were similar to those of other isolated coronary bypass series. Of 244 total IMA grafts, 166 were in the aorto-coronary position and were performed mainly because of unsuitable saphenous veins or to gain additional graft length. One patient (0.6%) died during hospitalization. Perioperative complications included respiratory dysfunction in 16 (10.3%), reoperation for bleeding in 14 (9.0%), stroke in 4 (2.6%), myocardial infarction in 3 (1.9%), and wound complications in 2 (1.3%). Morbidity occurred significantly more often in the 1971-1975 period. Subsequently, 5 (3.2%) had

reoperation (6-122 months; mean 91 months). After a 92-month mean follow-up, ten-year actuarial survival (including all causes of death) was 78.6%.

Of 44 *free* grafts restudied within 18 months of operation, 34 (77.3%) were patent. The higher rate of early closure is attributed to technical problems early in our experience, especially construction of the aortic anastomosis. However, 30 of 31 (96.8%) free grafts studied >18 months (mean 85 months) were open. Forty-nine of 58 (84.5%) free IMA grafts placed to the anterior descending coronary artery, 9 of 9 (100%) to the circumflex, and 6 of 8 (75.0%) to the right coronary artery were patent. Sequential catheterization showed that of 22 free grafts open at 10 months, 21 remained patent at 73 months; when 6 of these were restudied at 93 months (third catheterization) and 2 (fourth catheterization) at 125 months, all were patent. These late studies of free IMA grafts showed no evidence of graft atherosclerosis. Free IMA grafts, like *in situ* IMA grafts, appear to have relative immunity from atherosclerosis. These findings expand the versatility of IMA grafting and justify wider use of free IMA grafts.

\*By Invitation

9:05 a.m.

#### 4. Angiographic Assessment of Complex Mammary Artery Bypass Grafting

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

*THOMAS M. BASHORE\**, *LAWRENCE H. MUHLBAIER\**,

*VICTOR S. BEHAR\** and *DAVID C. SABISTON, JR.*

*Durham, North Carolina*

The internal mammary artery (IMA) has become the coronary bypass graft of choice in recent years because of enhanced long-term patency. Along with this trend, sequential, bilateral, and free IMA grafts have been employed more frequently in an effort to maximize the number of distal IMA anastomoses. This approach of maximally utilizing the IMA (complex mammary grafting, CMG) seems logical, but at present, little information is available about patency of the newer types of IMA grafts to justify this more complicated surgical procedure. Over a 15 month period, 207 patients underwent bypass graft angiography from 1-32 weeks postoperatively, representing an 85% restudy rate of a consecutive series of coronary bypass procedures. Patency was defined as complete filling of the graft and distal vessel bypassed. There were a total of 841 distal vessels grafted or 4.1 per patient; overall patency was 91% for 503 distal vein graft (VG) anastomoses and 99% for 338 IMAs. Individual patencies of distal anastomoses expressed as number patent/total (% patent) were: simple VG 262/285 (92%); sequential VG 196/218 (90%); left (L) IMA to LAD 109/110 (99%); LIMA to CMA 14/14 (100%); right (R) IMA to RCA 19/20 (95%); RIMA to LAD 10/10 (100%); RIMA to CMA via transverse sinus 18/20 (90%); sequential LIMA to LAD system 133/134 (99%); sequential LIMA to CMA system 15/15 (100%); free IMA 9/9 (100%); free sequential IMA 6/6 (100%). Of the 18 patent transverse sinus RIMA grafts to the CMA, 3 exhibited very slow flow and probably were not functional. Thus, based on postoperative graft patency data, expanded use of the more complicated types of IMA grafts seems justified. For whatever reason, function of the RIMA to CMA graft was suboptimal, and this method has been discontinued. All other CMG techniques had excellent patency rates as compared to vein grafts, and these differences may become even more significant late postoperatively. Based on these findings, CMG is proposed as the current procedure of choice for the surgical treatment of ischemic heart disease.

**9:10 a.m. Discussion**

\*By Invitation

**9:30 a.m.**

**5. Percutaneous Transluminal Coronary Angioplasty: A Growing Surgical Problem**

*U. SCOTT PAGE\*, J. EDWARD OKIES,  
LEON Q. COLBURN\*, JOHN C. BIGELOW\*,  
NEAL W. SALOMON\* and ALBERT H. KRAUSE*

*Portland, Oregon*

The incidence of PTCA pts who come to surgery is doubling yearly at our hospital. The incidence in 1985 has risen to 12.3% (52/420). Since the operative mortality and MI rates are 2.5 times higher in the PTCA group (5.5% vs 1.9% mortality, and 14% vs 5.5% MI) a careful analysis of this group is needed.

128 such pts are compared to 2236 non-PTCA pts. PTCA pts are younger (59 vs 61.3 years), have better ejection fractions (65 vs 63%), and require fewer grafts (1.9 vs 2.99). 21.9% of the PTCA pts were emergent cases and 4.7% were desperate (cardiac massage). The non-PTCA pts had 5.6% emergent and 0.4% desperate operations.

PTCA pts are divided into 4 groups. In Group I are 44 pts taken immediately to surgery (3 deaths and 17 MI's). Group II contains 46 pts operated from 1 to 20 days post-PTCA (11 MI's and 3 OP deaths). Group III contains 34 pts operated more than 20 days post-PTCA (1 MI and 1 OP death). 6 additional MI's occurred at the time of PTCA in this group. 13 Group III pts had 2 PTCA's prior to surgery. Group IV pts had an MI treated with streptokinase followed by PTCA that failed followed by surgery. All 4 of these pts had MI's but there were no deaths. Of 18 Group II pts who had a poor result at PTCA but delayed CABG, 10 developed an MI (55%) with 1 death.

Group I pts allow a detailed study of our ability to prevent infarction after acute occlusion of a coronary. 18 of 33 pts taken directly to surgery with occluded vessels survived without an MI. Of the remaining 15 there were 2 deaths.

There is increasing need to respond rapidly to the acute occlusion in the cath. lab and to proceed with surgery immediately if PTCA decreases the stability of the patient. A recent PTCA increases surgical risk.

**9:40 a.m. Discussion**

\*By Invitation

**9:50 a.m.**

**6. Early and Late Results of Coronary Endarterectomy: Analysis of 3,369 Patients**

*JAMES J. LIVESAY\*, DENTON A. COOLEY,*



GRADY L. HALLMAN, GEORGE J. REUL,  
DAVID A. OTT and J. MICHAEL DUNCAN\*

Houston, Texas

The effectiveness of coronary revascularization has been questioned in patients with diffuse coronary disease. Over a 14 year period (1970-1984), 30,464 patients have undergone surgical revascularization at one institution using coronary artery bypass (CAB) alone in 27,095 patients (Group I) or combined with coronary endarterectomy in 3,369 patients (12.4%) Group II. Analysis of preoperative variables has shown no significant difference between patient groups with respect to age, sex distribution, risk factors for atherosclerosis, or number of diseased vessels. Surgical indications for coronary endarterectomy included multi-segment disease, long diffuse stenosis, total occlusion, and plaque separation during arteriotomy. Coronary endarterectomy was performed in the right coronary artery (83%), in the left anterior descending (LAD) (9%), in the circumflex (4%), and in multiple vessels (4%).

The early results following revascularization indicate a small increase in surgical risk after coronary endarterectomy. (30 day mortality: Group I 2.6% vs. Group II 4.4%)\* Early mortality was significantly increased by endarterectomy in the LAD (8.5%) compared to non-LAD (4.2%)\* In a sample of 4,473 patients, myocardial complications were also found to be increased after coronary endarterectomy. (Perioperative myocardial infarction: Group I 2.5% vs. Group II 5.6%)\* Both fatal and non-fatal cardiac arrest increased (Group I 1.7% vs. Group II 3.5%)\* suggesting the failure mode of unsuccessful endarterectomy. Surgical results have improved significantly over the latter half of the study period since the introduction of cold cardioplegia and techniques for complete revascularization. Early mortality after coronary endarterectomy (Group II) decreased substantially from 1970-76 (6.4%) to 1977-84 (3.5%)\*. Actuarial analysis of long-term survival after endarterectomy has demonstrated the same sustained improvement in survival as seen after CAB alone. (5 year survival: Group I 90%, Group II 86% and 10 year survival: Group I 74%, Group II 67%).

Despite the small increase in surgical risk associated with coronary endarterectomy, the early and long-term results support the selective application of this procedure in patients with diffuse distal disease and demonstrate its beneficial effect on long-term survival.

\*P<0.01

**10:00 a.m. Discussion**

**10:10 a.m. Intermission - Visit Exhibits - Exhibit Hall**

\*By Invitation

**10:50 a.m. Scientific Session - Grand Ballroom**

**7. Early and Late Results of Operation Following Thrombolytic Therapy for Acute**

**Myocardial Infarction**

JOHN A. PETROVICH\*, JOEL A. SCHNEIDER\*,  
GEORGE J. TAYLOR\*, FRANK L. MIKELL\*,  
JOHN E. BATCHELDER\*, H. WESTON MOSES\*,  
JAMES T. DOVE\* and HARRY A. WELLONS

*Springfield, Illinois*

Recent reports have established the efficacy of thrombolytic therapy in limiting myocardial infarction. Between September 1981 and September 1984, we treated 355 patients with intracoronary (87) or intravenous (268) streptokinase (SK) within 6 hours of acute myocardial infarction. Thrombolysis was successful in 63% of intracoronary and 81% of intravenous treated patients. Because residual critical stenosis is usually present and predisposes the patient to reinfarction, revascularization procedures were investigated as an extension of thrombolytic therapy. One hundred ninety-one patients age  $56 \pm 10$  (25-77) years underwent early surgical revascularization  $4.1 \pm 3.6$  days after intracoronary SK or intravenous SK for acute MI. Eighty-nine percent (170/191) had a successful outcome to SK therapy. Thirteen patients (6.8%) underwent emergency coronary artery bypass grafting (CABG) for failed percutaneous angioplasty (PTCA). There were  $3.2 \pm 1.4$  grafts per patient and  $3.8 \pm 2.9$  units of blood administered in the perioperative period. Operative mortality was 4.2% (8/191) with a 15.4% mortality in the failed PTCA group (2/13). Mean hospitalization time following surgery was  $10.9 \pm 6.8$  days. Follow-up was  $27 \pm 8$  (12-48) months and was obtained on all patients. Late cardiac mortality was 1.0% (2/183). Ninety percent of the follow-up group was without angina and only 1.7% showed no improvement after surgery. Reinfarction rate was 2.2% with known graft failure in 2 patients. Our experience indicates that early revascularization after thrombolytic therapy may be performed with low operative mortality and morbidity and is associated with excellent late results.

**11:00 a.m. Discussion**

\*By Invitation

**11:10 a.m.**

**8. Superiority of Surgical Over Medical Revascularization in the Treatment of Acute Coronary Occlusion**

*BRADLEY S. ALLEN\*, GERALD D. BUCKBERG,  
MARCUS SCHWAIGER\*, LAWRENCE YEATMAN\*,  
JAN TILLISCH\*, NOBUYUKI KAWATA\*,  
JOHN MESSENGER\* and CURTIS LEE\**

*Los Angeles, California*

Functional recovery and avoidance of infarction are thought almost impossible after 6 hours of coronary occlusion in medical or surgical settings. This clinical study shows that surgical control of reperfusion using substrate enriched blood cardioplegia + total vented bypass after prolonged ischemia (>8 hours) allows consistent recovery while medical reperfusion (i.e. streptokinase  $\pm$  angioplasty) after shorter ischemia (<4.5 hours) does not.

**Methods:** Thirty-three consecutive patients with acute coronary occlusion underwent either medical or surgical revascularization. Medical reperfusion was with normal blood in 21 patients in the cath lab (i.e. streptokinase, n=11,  $\pm$ angioplasty, n=10). Surgical reperfusion was with substrate enriched (glutamate + aspartate) blood cardioplegia during CABG after naturally occurring coronary occlusion in 12 patients. The mean time to revascularization was comparable after streptokinase and/or angioplasty (4.5 vs 4.3 hours) but prolonged  $8.8 \pm 0.6$  hours\* in 12 patients undergoing CABG for acute natural occlusion (range 7.4-13.5 hours).

**Results:** Medical revascularization produced cardiogenic shock in 7 of 21 previously hemodynamically stable patients (5 with single vessel disease), whereas surgical revascularization reversed cardiogenic shock in 5 of 10 patients with pre-operative hemodynamic instability secondary to coronary occlusion. Surgical results were superior in incidence of ECG infarction (50% vs 100%)\*, severe ventricular tachyarrhythmias (0% vs 43%)\*, recovery of global injection fraction (47% vs 41 %), and recovery of significant regional contractility (100% vs 9%)\*, and hospitalization (8.8 vs 11 days)\* despite delay of surgical treatment for up to 13 hours. No patient died.

**Conclusions:** Surgical control of the composition and conditions of reperfusion decreases infarction, reduce arrhythmias, restores regional and global wall motion significantly more than medical reperfusion and shortens hospitalization. These preliminary findings imply that acute coronary occlusion is treated best surgically where a reperfusion injury can be avoided by controlling the conditions (bypass) and composition (cardioplegia) of reperfusion.

\*p<0.05

**11:20 a.m. Discussion**

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

**"New York, A Bellwether for Thoracic Surgery"**

James R. Malm, M.D., New York, New York

\*By Invitation

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

**9. The Diagnosis and Treatment of Gastroesophageal Reflux in Infancy**

*JOHN A. ST. CYR\*, THEODORE R. THOMPSON\*,*

*DANA E. JOHNSON\*, T. BRUCE FERRARA\**

*and JOHN E. FOKER*

*Minneapolis, Minnesota*

Many questions remain about the treatment of gastroesophageal (GE) reflux in infancy. Some degree of GE reflux is very common in infants and tends to reverse with time, therefore, the indications for early surgery are not well defined. Furthermore, the complication rate and the ability of the fundoplication to grow remains to be determined. To answer these questions, we reviewed the records of patients 6 mos of age or younger who underwent a Nissen fundoplication with gastrostomy tube placement between 1979 and 1985.

There were 41 patients (22 males, 19 females) with birth weights 0.65 to 4.3 kg. Signs and symptoms of GE reflux were more varied than in older children and often relatively subtle. Respiratory problems were common including recurrent aspiration with choking or chronic pneumonitis (61%) and apneic and bradycardic spells (17%). Failure to gain weight was present in 20% and intractable vomiting in 2.5%. As expected, in these patients, 56% also had congenital anomalies which, in many cases, were important to the prognosis. The diagnosis was conformed by barium swallow in all but one patient in whom gross reflux during feedings was present.

Initially, an attempt at positioning and thickened frequent feedings were tried in all patients for 3-4 wks. In one patient, however, the severity of the respiratory problems precluded trial beyond 12 days. Although all patients showed significant degrees of GE reflux, recommendation for surgery could only be based on the severity of symptoms.

Patients who failed medical management underwent Nissen fundoplication with gastrostomy tube placement. Operative age ranged from 2 wks to 6 mos and weight from 1.02 to 6.95 kg. The only surgical complication was one gastrostomy leak. Prematurity or preexisting anomalies led to 24% late deaths between 2 wks and 23 mos postoperatively. There was complete resolution of symptoms in all survivors with followups of 4-67 months. All were on a normal diet for their age except one child requiring gastrostomy feedings because of neurological dysfunction. We conclude: (1) significant GE reflux in infancy most frequently produces respiratory problems which can be life threatening, (2) Nissen fundoplication can be a safe and effective procedure in infants 6 mos of age or younger, and (3) fundoplication appears to have good growth potential and does not lead to late feeding problems. Consequently, because of the severity of problems associated with GE reflux, surgical correction can be recommended for infants not responding to conservative therapy.

## **2:10 p.m. Discussion**

\*By Invitation

**2:20 p.m.**

## **10. Reoperative Achalasia Surgery**

*F. HENRY ELLIS, JR., ROBERT E. CROZIER\**

*and S. PETER GIBB\**

*Burlington, Massachusetts*

We believe esophagomyotomy to be the treatment of choice for esophageal achalasia and, in a recent review (J. Thor & Cardio Surg), reported a 94% improvement rate in patients operated on primarily. Because reoperations were attended by less good results, we have reviewed our experience with reoperative achalasia surgery with emphasis on the indications for reoperation and the results of the various operative procedures employed.

Since January 1970, forty-six achalasia patients whose original operation was performed elsewhere in all but 6 have required reoperation for a variety of reasons including gastroesophageal reflux (14), inadequate myotomy (10), concomitant antireflux procedure (5), healed myotomy (5), incorrect diagnosis (4), carcinoma (4), megaesophagus (3), and paraesophageal hiatus hernia (1). Surgical management was individualized, a number of different operations being used. The overall improvement rate in patients followed longer than 1 year was 85% with the more radical procedures particularly esophagogastrectomy, antrectomy and Roux-Y-gastro-jejunostomy having the best symptomatic results when compared to the results of more conservative procedures (100% excellent or good results as compared to 55%).

These findings emphasize the need for accurate diagnosis, early myotomy before the development of megaesophagus, and attention to certain technical details of esophagomyotomy if the need for reoperation is to be minimized. They also suggest that under certain circumstances, a radical surgical procedure may be required in order for reoperative achalasia surgery to be successful.

## **2:30 p.m. Discussion**

\*By Invitation

## **2:40 p.m.**

### **11. Surgical Treatment of the Failed Anti-Reflux Operation**

*MACK C. STIRLING\* and MARK B. ORRINGER*

*Ann Arbor, Michigan*

In 11 years, 89 adult patients have been reoperated upon for recurrent gastroesophageal reflux or complications of prior anti-reflux procedures. 59 had a radiographic hiatal hernia (47 sliding and 12 paraesophageal), and 20 had distal esophageal obstruction (17 from reflux esophagitis and 3 from other causes, including 2 Angelchik prostheses). Operations performed included transthoracic Collis-Nissen procedure (58), Collis-Belsey repair (14), Nissen fundoplication (1), repair of acute postoperative paraesophageal hernia (1), division of obstructing crural suture (1), and esophageal resection (14).

Among the 72 patients undergoing an additional hiatal hernia repair, there were 2 postoperative deaths and 3 non-fatal esophageal leaks. Follow-up ranges from 1-118 months (average 28 months). Subjectively, results have been excellent or good (no or mild reflux symptoms or dysphagia) in 46 (64%); fair in 14 (19%) who have moderate dysphagia (8) or reflux symptoms controlled medically (6); and poor in 12 (17%) who have required additional surgery for either recurrent reflux or dysphagia. Early postoperative esophageal dilations have been required in 24 patients (33%) and regular dilations in 10 patients (14%). Objectively, pH probe reflux control has been unsatisfactory in 7 (10%).

Among the 14 patients undergoing esophageal resection, 2 had a distal esophagectomy and short segment colon interposition, and 11 had a trans-hiatal esophagectomy without thoracotomy, 8 with esophageal replacement using stomach and 3 using colon. There were no operative deaths. With follow-up of 1-84 months (average 17 months), 8 have had esophageal dilations (6 early and 2 regularly), and none has clinically significant reflux symptoms. The results of "redo hiatal hernia surgery" are far from ideal. Optimal surgical treatment of the failed anti-reflux operation requires a careful radiographic and endoscopic analysis of the existing anatomy, knowledge whenever possible of the type of initial procedure, and experience to decide when esophageal resection is a safer and more reliable approach than another hiatal hernia repair.

## **2:50 p.m. Discussion**

\*By Invitation

**3:00 p.m.**

**12. Intraoperative Coronary Angioscopy: Technique and Results in the Initial Forty Patients**

*AURELIO CHAUX\*, MYLES E. LEE,  
CARLOS BLANCHE\*, ROBERT M. KASS\*,  
TODD C. SHERMAN\*, ANN E. MICKEY\*,  
FRANK LITVACK\*, WARREN GRUNDEEST\*,  
JAMES S. FORRESTER\* and JACK M. MATLOEE*

*Los Angeles, California*

Coronary angioscopy provides images of intravascular detail with greater than 0.2 mm spatial resolution and excellent contrast resolution. Forty patients underwent intraoperative angioscopy of coronary artery and/or saphenous vein coronary bypass grafts. Using endoscopes of 1.5 and 1.8 mm O.D., 65 native coronaries and 28 vein grafts were examined. A clear viewing field was created by infusion of crystalloid cardioplegia through the aortic root on cardiopulmonary bypass. Technical details crucial for obtaining high quality images were: 1) sufficient coronary perfusion by cardioplegic solution to displace all blood; 2) adequate intraluminal illumination; and 3) high quality fiberoptic and lens systems. Incomplete studies in approximately 25 percent of patients were related to failure to achieve these technical details, and by lack of scope steerability. In 30 percent of patients, previously unrecognized anatomic details were revealed by angioscopy. These included intimal flaps at the site of vein-artery anastomosis, atheromatous plaque with adherent thrombi (not recognized on angiography), and hemorrhagic ulcerated plaques. Although one patient developed a coronary intimal flap proximal to the anastomosis during retrograde examination with an early model angioscope, no serious complications occurred secondary to the procedure. We conclude that: 1) intraoperative angioscopy is safe; 2) provides novel information which is clinically relevant; and 3) has future potential for coronary endarterectomy, intraoperative balloon and laser angioplasty.

**3:05 p.m. Discussion**

\*By Invitation

**3:10 p.m.**

**13. Comparison of Continuous Wave Lasers for Endarterectomy of Experimental Atheromas**

*JOHN EUGENE\*, MARC E. POLLOCK\*,  
STEPHEN J. McCOLGAN\*, MARIE HAMMER-WILSON\*,  
MICHAEL W. BERNES\* and C. ROBERT MASON*

*Irvine, California*

The standard surgical lasers, argon ion, Nd-YAG, and carbon dioxide are all continuous wave (CW) lasers with specific uses. We have previously demonstrated the superiority of argon ion over Nd-YAG for laser endarterectomy. Recently carbon dioxide endarterectomy has been proposed and clinical trials are underway with all 3 lasers. Therefore, we compared these 3 lasers under controlled experimental conditions. A thoracoabdominal exploration was performed in 17 arteriosclerotic rabbits. The aorta was isolated, heparin administered, and multiple endarterectomies were performed in each rabbit with each of the lasers. A line of laser craters was created at the proximal and distal ends of an atheroma. CW laser radiation was used to connect the craters thereby forming proximal and distal end points. The plaques were dissected free from the aorta with laser light and the end points were fused by laser. The aortas were removed for light microscopy and the animals were sacrificed. The endarterectomy surfaces and end points were serially sectioned and graded according to light microscopic findings (1 = worst, 4 = best). Argon ion laser endarterectomy (N = 16) required  $106 \pm 10$  J/cm<sup>2</sup>. The surface score was 3.5 and end point score 3.4. Nd-YAG laser endarterectomy (N=13) required  $1289 \pm 115$  J/cm<sup>2</sup> with a surface score of 2.4 (p<.01 from argon ion) and an end point score of 1.3 (p<.005 from argon ion). Carbon dioxide laser endarterectomy (N = 9) required  $30 \pm 5$  J/cm<sup>2</sup> with a surface score of 2.0 (p<.01 from argon ion) and an end point score of 1.6 (p<.005 from argon ion). Perforation occurred in 1/16 argon ion studies (technical error, not laser), in 11/13 Nd-YAG studies and in 6/9 carbon dioxide studies. This study demonstrates that of the currently available clinical CW lasers, the argon ion laser remains superior for endarterectomy of experimental atheromas.

### **3:15 p.m. Discussion**

\*By Invitation

### **3:20 p.m.**

#### **14. Constant Postoperative Cardiac Output Monitoring Following Correction of Congenital Heart Defects**

*BLAIR A. KEAGY\*, BENSON R. WILCOX,*

*CAROL L. LUCAS\*, HENRY S. HSIAO\*,*

*G. WILLIAM HENRY\*, MICHAEL BAUDINO\**

*and GENE BORNZIN\**

*Chapel Hill, North Carolina and Minneapolis, Minnesota*

A new method has been developed which permits constant postoperative monitoring of mean and phasic cardiac output (CO) in patients following correction of congenital heart defects (CHD). A miniature ultrasound probe (USP) is attached to the adventitia of the ascending aorta at the conclusion of the operative procedure and is connected to the monitoring equipment by means of polyurethane covered wires which exit the chest wall through a small stab wound. The probe can be easily removed by gentle traction when the patient's condition is stable. The technique was developed, validated, and refined in extensive animal studies, and this report describes the first series of 20 consecutive human implants, performed between August 1984 and September 1985, in which the absolute CO determination obtained with the USP at the time of its application was correlated with CO as measured with a standard electromagnetic flow probe (EMFP). There were 14 males and 6 females whose mean age was 5.5 years. Operations performed included 8 atrial septal defect repairs, 4 procedures for tetralogy of Fallot, 3 ventricular septal defect repairs, 3 stenotic valve corrections and 2 Senning operations. There was one operative mortality, but there were no complications related

to probe application or removal. The average CO in the 20 patients as measured with the USP was  $2.2 \pm 1.1$  L/min (range = .67 to 5.27 L/min), which is nearly identical ( $p > .4$ ) to the results noted using the EMFP, where the mean CO was  $2.3 \pm 1.2$  L/min (range = .7 to 6 L/min). Regression analysis revealed a high linear correlation ( $r = .9$ ) between the two techniques. A monitor can display the CO trend with one-minute updates, greatly enhancing management of intravenous drug therapy and volume administration. In conclusion, this new extraluminal removable probe allows postoperative CO monitoring following correction of CHD and should become a standard technique in the postoperative care of these patients.

**3:25 p.m. Discussion**

**3:30 p.m. Intermission - Visit Exhibits - Exhibit Hall**

\*By Invitation

**4:15 p.m. Scientific Session - Grand Ballroom**

**15. Myocardial Protection in the Neonatal Heart: A Comparison of Topical Hypothermia, Crystalloid and Blood Cardioplegic Solutions**

*ANTONIO F. CORNO\*, HILLEL LAKS,*

*DANIEL BETHENCOURT\*, SUNITA BHUTA\*,*

*HAKOB DAVTYAN\*, WILLIAM M. FLYNN\*,*

*and DAVIS C. DRINKWATER \**

*Los Angeles, California*

Neonatal myocardial metabolism, structure and function are different from that of the adult heart. The requirements for myocardial protection may therefore also differ.

This study evaluated the myocardial protection achieved during two hours of ischemic arrest in 42 neonatal piglets (age 1-5 days). Topical cooling (TC) was used in 9 piglets (Group I), hyperosmolar (450 m Osm) low  $Ca^{++}$  (0.5m Osm/1) crystalloid cardioplegia (LCaC) in 15 (Group II), St. Thomas Cardioplegia (St.T) in 6 (Group III), cold blood cardioplegia (CBC) with  $K^+$  (23m Osm/1), C.P.D. ( $Ca^{++}$  level = 0.3m Osm/1) and THAM in 7 (Group IV), and cold blood cardioplegia with  $K^+$  alone (23m Osm/1) in 5 (Group V).

Stroke work (SW) at baseline and during recovery (30' and 60' after re-perfusion) was measured in isolated working hearts perfused with blood from an adult support pig and beating against fixed afterload (80 mmHg). Hemodynamic recovery (% of the pre-ischemic SW) after 30' and 60' reperfusion was 82.9% (N.S.) and 86.7% (N.S.) in Group I (TC), 35.7% ( $p < 0.00002$ ) and 43.7% ( $p < 0.00002$ ) in Group II (LCaC), and 70.3% ( $p < 0.05$ ) and 78.7% (N.S.) in Group III (St.T), 67.4% ( $p < 0.05$ ) and 60.6% ( $p < 0.02$ ) in Group IV (CBC,  $K^+$ , C.P.D., THAM), 110.2% (N.S.) and 98.6% (N.S.) in Group V (CBC,  $K^+$ ). Electron microscopy of left ventricular biopsies was normal in Groups I and V, and correlated with the degree of impairment in Groups II, III and IV, with contraction bands, mitochondrial swelling, interstitial hemorrhage and edema.

Conclusions: a) Topical cooling and potassium cold blood cardioplegia allow complete structural and functional recovery after 2 hours of ischemia in isolated neonatal piglet hearts; b) low calcium CBC and crystalloid cardioplegic solution fail to provide adequate myocardial



protection in the neonate, indicating an increased dependence on calcium compared to the adult heart.

**4:20 p.m. Discussion**

\*By Invitation

**4:25 p.m.**

**16. Minitracheostomy: A New Delivery System for Jet Ventilation**

*HUGOE R. MATTHEWS\*, BARRIE FISCHER\*,  
BRENDAN E. SMITH\* and ROLAND B. HOPKINSON\**

*Birmingham, England*

*Sponsored by: THOMAS R. DEMEESTER*

*Omaha, Nebraska*

Minitracheostomy is a recent technique in which a 4.0 mm ID PVC cannula is inserted into the trachea by cricothyroid puncture using a commercially available kit (Portex U.K. Ltd.). This provides constant access to the trachea for the removal of secretions by suction, while preserving the patient's ability to talk and generate an expulsive cough. As an additional facility we have designed a simple external 'Y' connector which permits the delivery of jet ventilation via the minitracheostomy. This produces a percutaneous system that allows full access for ventilation and suction, without the need for a cuffed endotracheal tube or sedation. The system can be used long-term and patients are able to eat, drink and talk while being ventilated.

Up to October 1985 17 patients aged 31-77 years have been ventilated for a variety of respiratory problems, using the combination of a minitracheostomy and a Penlon ventilator equipped with a Bromsgrove humidifier. The main indications for treatment were the complications of chronic obstructive airways disease and post-operative cardiorespiratory failure. Ventilation was performed for periods ranging from 12 hours to 14 days and was satisfactory in all but one case, as judged by blood gas analyses, chest radiography and the clinical progress. Four patients died from irreversible respiratory disease, but the remainder were all weaned satisfactorily to spontaneous respiration. No complications related to the minitracheostomy or the jet ventilation were identified.

Initial experience with this method indicates that it is technically satisfactory and may offer important advantages over conventional methods of ventilation, particularly in weaning patients from IPPV and in those who do not require total ventilatory support.

**4:30 p.m. Discussion**

\*By Invitation

4:35 p.m.

**17. Circular Tracheal Replacement with Costal Cartilage**

*FRANZ ECKERSBERGER\*, ERICH MORITZ\**

*and ERNST WOLNER \**

*Vienna, Austria*

*Sponsored by: THOMAS W. SHIELDS*

*Chicago, Illinois*

Permanent incorporation of any foreign material for tracheal replacement produces granulation tissue which reduces blood supply to connective tissue supporting an epithelial surface. 12 tracheal replacements on dogs were done using costal cartilage strips for a neotrachea. 5 cm of the thoracic trachea were resected and a tubular silicone prosthesis composed of medical-grade silicone copolymer was implanted. Sewing rings were made of absorbable Polyglactin 0.5 cm from the end in order to telescope the prosthesis into the proximal and distal airway. Anastomosis were sewed with interrupted sutures of Polyglactin. That prosthesis was then covered with autografts of costal cartilage strips. Fibrin glue was only used between the strips as a help for stabilization and as a stimulate of vascularisation. This construction was then covered with mediastinal tissue. Silicone tube remained in place for stabilisation as a temporary stent of the neotrachea up to 6 months and was then extracted tracheoscopically. Neotrachea was observed without stenosis or tracheomalacia up to 8 weeks after the extraction of the silicone tube including good health of the animal. Histopathologic findings pointed out survival of cartilage and a thin layer of vascularised tissue inside the cartilage strips. In the subepithelial layer there was a network of vessels up to 180  $\mu$ m in diameter. 3 weeks after extraction of the tube was an end-on ingrowth of the epithelium. 6 weeks after extraction of the tube the electron microscopy showed a basal-membrane like structure. The hole inner surface of the neotrachea was covered by a layer of ciliated epithelium. This new technique in circular tracheal replacement requires no long term incorporation of foreign material.

**4:40 p.m. Discussion**

\*By Invitation

4:45 p.m.

**18. Pleural-Peritoneal Shunting for Recalcitrant Pleural Effusions**

*GEORGE E. CIMOCHOWSKI\*, KOSTAM FARDIN\*,*

*LEE R. JOYNER\*, ANTTIMARAN\**

*and ROBERT SARAMA\**

*Monroe, Louisiana*

*Sponsored by: THOMAS R. DeMEESTER*

*Omaha, Nebraska*

From March 1, 1984 to November 1, 1985, six patients underwent pleural-peritoneal shunting for either malignant or benign effusions that were intractable to the usual therapy. Five patients had malignancy related effusions. One had a benign pleural effusion, a

complication secondary to radiation therapy. Prior therapy consisted of multiple thoracentesis, chest tubes, multiple instillation of high dose (2 grams) tetracycline and in addition, in the benign case, high doses of Lasix exceeding 450 mg. daily. A modified double valve Denver peritoneal-venous shunt was inserted under local anesthesia in each case, shunting the right or left pleural space to the sub-hepatic space or pelvic area. No early complication was recognized in the peri-operative period. Each shunt is working in the patients that are alive or functioned up to the time of death in the two that are deceased. Intra-operative pressure data simultaneously recorded from both chest and abdomen indicated spontaneous flow would not occur without active pumping. All pleural effusions, including the solitary bilateral one, were alleviated by pumping the shunt 20 times four times a day. Two of the cancer patients died at one and two months from unrelated events with their symptomatic pleural effusions relieved. There are two long term survivors alive at 20 and 10 months respectively, one malignant and one benign. Technicium 90 pump-a-grams confirmed patency in both. The long term follow up revealed no erosions, shunt failures, infection or symptomatic pleural effusions.

In summary, six patients had pleural-peritoneal shunting performed and were followed from one to 20 months with successful relief of the effusion in each case. There were no short or long term complications recognized to date.

**4:50 p.m. Discussion**

\*By Invitation

**TUESDAY MORNING, April 29, 1986**

**6:45-8:30 a.m.**

**SIMULTANEOUS BREAKFAST SESSIONS\*\***

**A. PROLONGED CIRCULATORY SUPPORT**

**Rendezvous Ballroom (3rd floor)**

*Moderator:* L. Henry Edmunds, Jr., Philadelphia, Pennsylvania

J. Donald Hill, San Francisco, California

Joseph N. Cunningham, New York, New York

D. Glenn Pennington, St. Louis, Missouri

**B. TRAUMA - CARDIAC AND NON CARDIAC**

**Le Petit Trianon (3rd floor)**

*Moderator:* Martin F. McKneally, Albany, New York

**RUPTURED AORTA**

Quentin R. Stiles, M.D., Los Angeles, California

**RUPTURED TRACHIA AND ESOPHAGUS**

David S. Mulder, Montreal, Quebec

**RUPTURED DIAPHRAGM**

Robert F. Wilson, Detroit, Michigan

**C. PROBLEMS IN CARDIAC SURGERY Trianon Ballroom (3rd floor)**

*Moderator:* Gerard A. Kaiser, Miami, Florida

**THE MANAGEMENT OF A PATIENT WITH ENDOCARDITIS AND ASSOCIATED PROBLEMS**

D. J. Magilligan, M.D., Detroit, Michigan

**MITRAL VALVE REPLACEMENT IN THE PRESENCE OF EXTENSIVE CALCIFICATION, LEFT ATRIAL CLOT, OR THE SMALL LEFT VENTRICLE**

Lawrence H. Cohn, M.D., Boston, Massachusetts

**TECHNICAL CONSIDERATIONS IN REOPERATIONS OF PATIENTS WITH CORONARY ARTERY DISEASE**

Noel L. Mills, New Orleans, Louisiana

**D. PROBLEMS IN GENERAL THORACIC SURGERY**

**Mercury Ballroom (3rd floor)**

*Moderator:* John R. Benfield, Duarte, California

**THORACIC SURGERY IN IMMUNOCOMPROMISED HOSTS**

Lawrence Kaiser\*, New York, New York

**N<sub>2</sub>LUNG CANCER**

L. Penfield Faber, Chicago, Illinois

**MEDIASTINAL TUMORS**

John R. Benfield, Duarte, California

**E. ESOPHAGEAL MOTOR DISORDERS Mercury Rotunda (3rd floor)**

*Moderator:* W. Spencer Payne, Rochester, Minnesota

**ACHALASIA**

F. Henry Ellis, Jr., Boston, Massachusetts

**DIFFUSE SPASM**

Robert D. Henderson, Toronto, Ontario, Canada

**SCLERODERMA**

Mark B. Orringer, Ann Arbor, Michigan

\*\*Admission will be by ticket only and will be limited. Tickets must be obtained in the Registration Area on the Second Floor of the New York Hilton prior to 2:00 p.m. on Monday, April 28. There are no provisions for pre-registration. Breakfast will be served until 7:00 a.m. only.

\*By Invitation

**8:30 a.m. SCIENTIFIC SESSION - Grand Ballroom**

**19. Long-Term Clinical and Functional Results of Sleeve Lobectomy for Primary Lung Cancer**

*JEAN DESLAURIERS, PAUL GAULIN\*,  
MICHAL PIRAUX\*, MAURICE BEAULIEU\*,  
YVON CORMIER\* and RAYMOND BERNIER*

*Ste-Foy, Quebec*

Sleeve lobectomy is a lung saving operation where a portion of main bronchus is removed in order to preserve distal parenchyma. Current controversies relate to its safety, its adequacy as cancer operation as well as long-term function of the reimplanted lobe.

Between 1975-1985, sleeve lobectomy was done in 72 patients with lung cancer (RT upper lobe: 50, LT upper lobe: 17, RT upper and RT mid. lobes: 4, LT lower lobe: 1). There were no operative deaths but major complications occurred in 8% of patients. Most resected cancers were squamous (65/72) with complete resection in all but 4 patients.

Minimum 1 year follow-up was available in all patients (avg.: 50 months) and cumulative survival was correlated with nodal status. Five years survival rate for patients with N0 status (N:34) was 67% and for patients with N1 status (N:34) was 60%. There was no difference on survival (P<0.05) between patients with surgical or pathological N1 disease.

Overall (table) and regional lung function were studied in all patients (N:19) alive 4 or more years after surgery (avg. interval surgery/study: 6 years).

	<b>Preoper.</b>	<b>Postoper.</b>
	<b>lung function (N:12)</b>	<b>lung function (N:19)</b>
Median forced exp. volume (FEV <sub>1</sub> )	2.04 / (1.24-2.62)	1.96 / (0.92-2.87)
% predicted	70%	73%
Median forced vital capacity (FVC)	3.11 / (2.22-4.61)	3.607(2.20-4.66)
% predicted	74%	84%
FEV <sub>1</sub> /FVC	63%	59%

For the 12 patients studied preoperatively, there was no significant changes between pre and postoperative values. Differential function was determined by decubitus lateral test and ventilation/perfusion isotope scanning methods. In 15 patients with right lung bronchoplasty, avg. perfusion ratios were

41.1% (RT lung)	and	48.3% (RT)	In 4
58.9% (LT lung)	ventilation ratios were	51.7% (LT)	patients
with left lung bronchoplasty, these ratios were		71% (RT)	for
		29% (LT)	perfusion and

perfusion and  $\frac{60\% \text{ (RT)}}{40\% \text{ (LT)}}$  for ventilation. In all cases, V and Q was homogeneous

throughout the reanastomosed lobes without gas trapping. From this study, the following conclusions can be drawn: (1) Sleeve lobectomy is a safe procedure which does not compromise long-term tumor free survival; (2) The presence of metastatic hilar nodes (N1) does not contraindicate the operation when complete resection is possible and (3) The remaining ipsilateral lobe(s) have a normal physiology and contribute significantly to overall pulmonary function.

#### **8:40 a.m. Discussion**

\*By Invitation

**8:50 a.m.**

#### **20. Endobronchial Carcinogenesis in Dogs**

*JOHN R. BENFIELD, WILLIAM G. HAMMOND\**,

*RAO R. PALADUCU\*, HYUN Y. PAK\**.

*NORIO AZUMI\* and RAYMOND L. TEPLITZ\**

*Duarte, California*

Further progress against lung cancer requires clinical/basic-science studies of preneoplasia and early cancers. To make this more readily possible than with studies limited to humans, a canine squamous cell lung cancer model has been developed.

We have studied 110 dogs exposed by 11 focal endobronchial regimens to chemical carcinogens benzo(a)pyrene (BP), nitrosomethylurea (NMU), methylcholanthrene (MCA), and dimethylbenzanthracene (DMBA). A combination of NMU and BP caused the first invasive cancer in 1/7 (14%) dogs after 5.5 years. Unacceptable toxicity resulted from 3 of the 11 regimens used, i.e., NMU, DMBA, and adjuvant immunosuppression. Cancers were not induced by 4 regimens. The remaining 4 regimens in 58 dogs caused 9 T<sub>0</sub> cancers, 7 T<sub>1-2</sub>N<sub>0</sub>M<sub>0</sub> cancers, and 15 metastasizing carcinomas. The most recent regimen (30mg MCA q2-3 wks) produced 8/10 (80%) cancers at pre-selected sites within 2 years of first exposure.

The time course of a predictable, reproducible, neoplastic continuum which begins with epithelial hyperplasia and culminates with metastasis has been mapped. Squamous metaplasia occurs in 6-18 weeks; it is followed by progressive squamous atypia. The interval until invasive cancer develops (about 20 months with MCA) provides unique opportunity to sample repetitively from the preneoplastic bronchial mucosa. Serial cytologic specimens, studied by image analysis, have revealed progressive and significant (p<0.01) increase in mean total cellular DNA content from diploid in normal cells to greater than tetraploid in cancer cells. We have recently been successful with serial passage of 2 canine lung cancers into the fifth transplant generation in nude mice.

There is now a large animal model of squamous cell lung carcinoma which closely resembles lung cancer. The reproducible preneoplastic events occur over a time span short

enough to be fiscally defensible, but long enough to permit biologic dissection and evaluation of clinically relevant diagnostic-therapeutic methods during the development of cancers at predictable, pre-selected sites.

**9:00 a.m. Discussion**

\*By Invitation

**9:10 a.m.**

**21. Thoracic Surgical Spectrum of Acquired Immune Deficiency Syndrome**

*JOSEPH I. MILLER and CHARLES R. HATCHER, JR.*

*Atlanta, Georgia*

The Autoimmune Deficiency Syndrome (AIDS) has presented a complex and, as yet, unsolvable spectrum of pulmonary disease characterized by bizarre infections, pneumothoraces, respiratory distress and death. From January, 1982 to July, 1985 (42 months) a total of 38 patients (pts) were referred to the Cardio-Thoracic Surgical Service for a surgical procedure (excluding bronchoscopy). The diagnosis of AIDS was made by lifestyle, homosexual exposure, confirmed pulmonary pathology, and by laboratory confirmation of AIDS serology in the past four months. Surgical procedures consisted of closed chest thoracostomy - 14; tracheostomy - 6; open lung biopsy - 12; surgical closure of air leak and pleurodesis - 5; esophagogastrectomy -1. An additional 109 patients underwent fiberoptic bronchoscopy with transbronchial biopsy for AIDS. Thirty day hospital mortality was 10 of 38 patients. Six months mortality was 17 of 38 patients. Pulmonary pathology consisted of pneumocystis carinii (PC) - 7 pts; PC and cytomegalia-inclusion virus (CMV) - 3 pts; Kaposi's sarcoma - 2 pts; toxoplasmosis - 2 pts; idiopathic - 2 pts. Protective surgical measures consisted of double gloving, disposable linen, gas sterilization of instruments; disposable anesthetic tubing. Thoracic surgical involvement will play a dominant role in the management of AIDS patients until a method of treatment is found.

**9:20 a.m. Discussion**

\*By Invitation

**9:30 a.m.**

**22. Pulmonary Aspergillosis: Results of Surgical Treatment**

*RICHARD C. DALY\*, JEFFREY M. PIEHLER\*,*

*PETER C. PAIROLERO, VICTOR F. TRASTEK\*,*

*W. SPENCER PAYNE and PHILIP E. BERNATZ*

*Rochester, Minnesota*

Between 1953 and 1984, 68 patients (50 males and 18 females) underwent thoracotomy for pulmonary aspergillosis (PA). *Aspergillus* species was present in all patients; *A. fumigatus* was present in 56 (82%). Forty-eight patients (71%) had aspergillomas. None had allergic PA. Average age was 51.4 years (range 2 to 86 years). Predisposing factors were present in 64 patients (94%). Indication for operation was an indeterminate mass in 36, hemoptysis in 15, severe cough in 8, bronchopleural fistula in 4, obstructed bronchus in 2, and empyema in 3. Lobectomy was performed

in 26, wedge resection in 22, pneumonectomy in 8, and segmentectomy in 6. Eight had open drainage. Resection was thought complete in 59 patients (87%). Intraoperative hemorrhage occurred in 1 patient. There were no intraoperative deaths. Hospitalization average 18.1 days (range 1 to 118 days). Complications occurred in 35 patients (51%), and included respiratory insufficiency in 13, prolonged air leak in 10, empyema in 10, bronchopleural fistula in 7, hemorrhage in 7, wound infection in 5, and residual pleural space in 5. Antifungal therapy was administered postoperatively in 22 patients. Thirty-day mortality was 22% (15 patients) and varied with type of resection (incomplete, 55%) and form of disease (aspergilloma 19%). Cause of death was sepsis in 7, pulmonary in 5, and cardiac in 3. Follow-up averaged 38.6 months (range 1 month to 19 years). Ten of the 53 operative survivors (19%), had persistent documented symptomatic PA. There were 17 late deaths, 4 (24%) secondary to PA. We conclude that PA requiring surgical intervention remains life-threatening. Risks of operation are high and the possibility of long-term cure remote.

#### **9:40 a.m. Discussion**

\*By Invitation

#### **9:50 a.m.**

#### **23. Resection of Thoracic and/or Abdominal Teratoma in Patients Following Cisplatin-Based Chemotherapy for Germ Cell Tumor - Late Results**

*PATRICK J. LOEHRER\**,

*ISIDORE MANDELBAUM, SIU HUI\**,

*STEVEN CLARK\*, LAWRENCE E. EINHORN\**,

*STEPHEN D. WILLIAMS\* and JOHN P. DONAHUE\**

*Indianapolis, Indiana*

Fifty-one patients with primary testicular (N = 46) or mediastinal germ cell cancer (N = 5) were treated from April, 1975 through May, 1981 and had teratoma resected from residual disease following cisplatin-based combination chemotherapy. All patients had normal serum markers prior to resection of pulmonary (12), mediastinal (5), thoracoabdominal (8), supraclavicular (1), or abdominal disease (25). Teratoma was classified as mature teratoma (MT) (N = 29), immature teratoma (IT) (N = 15), or IT with nongerminoma elements (IT<sub>S</sub>) (N = 7). Thirty-one of 51 (61%) patients remain free of recurrent disease while 20 patients either developed recurrent carcinoma (RC) (N = 10) or teratoma (RT) (N = 10). In the RC group, after additional chemotherapy, three are alive and disease-free; two are being treated with disease, and five died. In the RT group, after additional surgery, eight of ten are long-term survivors.

Four patients developed their initial relapse of carcinoma beyond two years. Univariate factors predicting for relapse include tumor burden, IT<sub>S</sub>, and site (mediastinum), while only ITs and site predicted for survival. Immature teratoma and MT had similar relapse free intervals and overall survival.

Using a multivariate analysis, primary tumor site at the mediastinum is the most significant adverse factor predictive for both relapse and survival (two of five patients survived). This study appears to support the various preclinical models which demonstrate multipotential capabilities of teratoma. Complete surgical excision of teratoma remains the most effective treatment with



continued close follow-up recommended for high risk patients (ITs, large tumor burden, or primary mediastinal tumors).

**10:00 a.m. Discussion**

**10:10 a.m. Intermission - Visit Exhibits - Exhibit Hall**

\*By Invitation

**10:50 a.m. Scientific Session - Grand Ballroom**

**24. Surgical Technique for Successful Human Lung Transplant**

*JOEL D. COOPER, F. GRIFFITH PEARSON,  
GEORGE A. PATTERSON\*, THOMAS R.J. TODD\*,  
ROBERT J. GINSBERG, MELVYN GOLDBERG  
and WILFRED DEMAJO\**

*Toronto, Ontario*

We have reported two successful cases of unilateral lung transplant for chronic end-stage lung disease. A 58 year old male received a right lung transplant two years ago, and a 35 year old female received a left lung transplant one year ago. Both were discharged from hospital six weeks following operation and subsequently have led normal lives. Donor and recipient operations were performed in adjacent operating rooms. Unilateral lung anesthesia was utilized for both recipients. The groin vessels were prepared for cardio-pulmonary bypass though bypass was not required for either case. Extraction of the recipient's diseased lung was carried out without the need for anticoagulation, and total blood loss averaged 1 unit. The donor heart-lung block was removed and the donor lung then excised. The pulmonary artery was taken with a cuff of adjacent main pulmonary artery to allow for any discrepancy between a large recipient vessel and a normal sized donor artery. The bronchus was divided at the level of the trachea and subsequently trimmed back if necessary. A large cuff of donor pericardium was left attached to the hilum of the donor lung and used for reinforcing suture lines and as a route for development of collateral systemic blood supply. The donor harvesting technique does not preclude use of the heart for transplantation. The donor lung was not flushed, but was cooled by immersion in a basin of cold crystalloid. An atrial cuff was used for the venous anastomosis. Bronchial anastomosis was done in end-to-end fashion and was wrapped with an omental pedicle raised from the abdomen, based upon our laboratory findings that such a technique protects the anastomosis and rapidly restores systemic bronchial blood supply. Prior to performing bronchial anastomosis, the vascular clamps were removed to allow inspection of the suture lines for bleeding. To prevent hypoxemia during this phase, the donor lung was inflated through the open donor bronchus either by means of a jet ventilator or by intubation across the field. Total donor lung ischemic time was less than 90 minutes.

Success in these cases is attributed to careful patient selection, use of cyclosporine, and use of a pedicle omentum to protect and improve healing of the bronchial anastomosis.

**11:00 a.m. Discussion**

\*By Invitation

**11:10 a.m.**

**25. Autoperfusion of the Heart and Lungs for Preservation During Distant Procurement**

*ROBERT L. HARDESTY and BARTLEY P. GRIFFITH*

*Pittsburgh, Pennsylvania*

Donation has been a major problem with 29 heart-lung transplants performed between May 1982 and October 1985. Inability to statically preserve lungs for more than 1½ hours initially made it necessary to remove heart and lungs in a room adjacent to the recipient. Recently, 12 distant donors have been used with 4½ to 6 hours of extracorporeal auto-perfusion of the heart and lungs.

Autoperfusion of the heart and lungs was at 37 °C with donor whole blood, without additives. Mean arterial pressure was determined by the height of the reservoir. Cardiac output and pulmonary flow were regulated by controlling venous return. Banked blood was given to the donor when the reservoir was filled and resulted in a compensated metabolic acidosis at the outset. Ventilation with 90% room air and 10% CO<sub>2</sub> maintained or improved pH and gas exchange. Sterile wrapping for transportation is shown.

Cardiac and pulmonary function was initially satisfactory in 12 recipients. Medians of a single determination which was representative of the blood gases during the first 12 hours of implantation in all 12 recipients are:

<b>pO<sub>2</sub></b>	<b>FiO<sub>2</sub></b>	<b>PEEP</b>	<b>pCO<sub>2</sub></b>	<b>pH</b>	<b>Rate</b>	<b>TV</b>
152	0.6	6.2	41	7.43	20	900

In 2 recipients, pulmonary function was initially satisfactory but later deteriorated without an explanation other than the possibility of inadequate preservation.

**11:20 a.m. Discussion**

**11:30 a.m. Address by Honored Speaker**

**"The Cardiovascular Surgeon and the Liver"**

Professor Ake Senning, Zurich, Switzerland

**12:15 p.m. Cardiothoracic Residents' Luncheon -Petite Trianon Ballroom**

\*By Invitation

**WEDNESDAY MORNING, April 30, 1986**

**8:30 a.m. SCIENTIFIC SESSION - Grand Ballroom**

**32. Fontan Type Operation for Complex Lesions: Surgical Considerations to Improve Survival**

*SERAFIN Y. DELEON\*, MICHEL N. ILBAWI\*,  
FAROUK S. IDRIS, ALEXANDER J. MUSTER\*,  
SAMUEL S. GIDDING\*, TERESA E. BERRY\*  
and MILTON H. PAUL\**

Chicago, Illinois

Twenty-two of 44 patients who underwent the Fontan type operation (FO) had complex lesions other than tricuspid atresia with ventriculo-arterial concordance. Their age ranged from 2 to 20 years. Nine had single ventricle, 5 had tricuspid atresia with transposition, and 8 had various other lesions. Two groups were identified. Group I had pulmonic stenosis with (N = 6) and without (N = 9) previous systemic-pulmonary artery shunt. Group II (N = 7) had pulmonary artery banding. Three patients had significant subaortic stenosis. Twenty-six palliative operations, including 6 preliminary Glenn shunts, were performed prior to the FO. The mean pulmonary artery pressure and vascular resistance ranged from 10 to 26 torr and .5 to 2.9 u.M<sup>2</sup> respectively. Direct RA-to-PA anastomosis was carried out in 18 patients (7 with valve) and valved conduits were used in 4 patients. Eleven patients had right atrioventricular (A-V) valve patch closure (3 running, 8 interrupted suture technique).

In Group I, 40% developed significant pleural and/or pericardial effusion compared with 100% in Group II ( $p < .02$ ) and the average length of hospital stay was 20 days and 45 days respectively. Significant patch disruption occurred in 3 patients, 2 of whom had the running suture technique. Two patients developed late conduit occlusion in whom the Glenn shunt was lifesaving. Four patients (3 from Group II and all with subaortic stenosis) required Fontan takedown (FT) for persistent low cardiac output (PLCO), 2 of whom died (2/22, 9%). None of the patients with established Glenn shunt required FT. Twenty patients including the 2 patients who survived FT were followed over 3.5 years (range 2 months to 6 years) and did well except for 2 late deaths (10%, 4 months, and 4 years later). We believe that early FT in patients with PLCO, interrupted suture technique for A-V valve closure, and a preliminary Glenn shunt in patients with pulmonary artery banding and/or subaortic stenosis can further improve the results with the Fontan operation for complex lesions.

\*By Invitation

8:40 a.m.

### 33. Comparison of Atriopulmonary Versus Atrioventricular Connections for Repair of Tricuspid Atresia

CHUEN N. LEE\*, HARTZELL V. SCHAFF\*,

GORDON K. DANIELSON, FRANCISCO J. PUGA

and DAVID J. DRISCOLL\*

Rochester, Minnesota

Physiologic repair as described by Kreutzer and Fontan has provided excellent palliation for many children with tricuspid valve atresia. This study compares the early and late results of two variations of physiologic repair of tricuspid atresia: (1) direct atriopulmonary (AP) connection without interposed valves and (2) atrioventricular (AV) connection leaving the native pulmonary valve in place and utilizing the pumping capacity of the residual right ventricle. From January 1979 through March 1984, 50 pts had AP connection and 25 pts had AV connection during physiologic repair. Preoperative characteristics including age, severity of disability, and presence of cardiomegaly were similar. Pts with AP connection had fewer Glenn shunts (14% vs 44%,  $p < 0.004$ ) and a higher incidence of previous Waterston shunts (42% vs 16%,  $p < 0.024$ ) than pts with AV connection. Operative results in the two pt groups were similar, including cardio-pulmonary bypass time, aortic cross-clamp time, postoperative morbidity, and operative risk (30-day mortality 6% for AP connections vs 8% for AV connections). The only significant difference postoperatively was higher mean right atrial filling pressure in the AP group (18.4 mm Hg vs 16.3 mm Hg,  $p = 0.006$ ) and the more frequent

need for reoperation in the AV group (28% vs 6%,  $p=0.013$ ). Overall survival through 107 pts was 86% after AP connections versus 80% after AV connections. We conclude that there are no clinically important differences in the early results of physiologic repair of tricuspid atresia using AP versus AV connection. The choice of either technique should be dictated by the anatomy of the great arteries at the time of repair.

\*By Invitation

**8:50 a.m.**

### **34. Extending the Limits for Modified Fontan Procedures**

*JOHN E. MAYER, JR., RICHARD A. JONAS\*,*

*ALDO R. CASTANEDA, HRODMAR HELGASON\**

*and PETER LANG\**

*Boston, Massachusetts*

A variety of physiologic and anatomic limits have been proposed by Fontan's group as predictors of the outcome after atrio-pulmonary anastomotic (APA) procedures, but how far these limits can be extended with successful outcome remains unclear. Since a large number of complex cyanotic defects are physiologically correctable, only by APA procedures, we have extended these limits in the areas of age, systemic venous or pulmonary venous anomalies, pulmonary artery anatomy, and pulmonary hemodynamics. One or more of these limits was exceeded in 89 of a total of 148 patients undergoing APA procedures for tricuspid atresia (59) or more complex defects (89). The age limit of 4-15 years was exceeded in 65 patients, 41 under 4 (range 4-47 months) and 24 over 15 (range 16-30 years). Mortality was 34% under 4 years, 8.3% over 15 years, and 20% for the 4-15 year group. In the <4 group where other anatomic and physiologic limits were not exceeded, mortality was reduced to 22%. If indexed pulmonary arteriolar resistance (PAR) was  $\leq 1.5$  Woods units, 10 of 11 under 4 years survived, but if PAR was  $>1.5$  units, only 8 of 19 survived. Abnormal pulmonary or systemic venous connections occurred in 11, and 9 survived APA procedures combined with rearrangement of venous drainage. Pulmonary artery distortion requiring reconstruction occurred in 21 patients, and 9 died (42%). Five of these deaths occurred in patients with PAR  $>2$  units. The pulmonary artery pressure limit of 15 mmHg was exceeded in 25 patients, and 17 survived (68%). Of these, 19 had PAR  $<2$  units and 17 survived (89%). All 6 patients with PAP  $>15$  mmHg and PAR  $>2$  units died. Late follow-up of the 64 survivors exceeding one or more criteria shows 40 in Class I, 11 in Class II, 3 late deaths, and 10 lost to follow-up. We conclude that age, anomalies of pulmonary or systemic venous drainage, pulmonary artery distortion, or elevated pulmonary artery pressure do not individually preclude satisfactory outcome after APA procedures. Criteria for selection of patients under 4 years should be more stringent than older patients, particularly regarding calculated pulmonary arteriolar resistance.

**9:00 a.m. Discussion of the Fontan Procedure - Francis M. Fontan, Bordeaux, France**

**9:45 a.m. Intermission - Visit Exhibits - Exhibit Hall**

\*By Invitation

**10:30 a.m. Scientific Session - Grand Ballroom**

**35. A New Technique for Repair of Aortic Coarctation: Subclavian Flap Aortoplasty with Preservation of Arterial Blood Flow to the Left Arm**

*MILTON A. MEIER, FERNANDO A. LUCCHESI\*,*

*WALDIR JAZBIK\*, IVO A. NESRALLA\* and*

*JOSE TELES MENDONCA\**

*Rio de Janeiro, Porto Alegre and Aracaju, Brazil*

*Sponsored by: JOHN W. KIRKLIN, Birmingham, Alabama*

Between 1967 and 1976, 106 children survived Mustard procedure for transposition of great arteries (TGA). Fifty-five had simple and 51 complex TGA. Their age ranged between 2 weeks and 117 months (median = 12). Ninety-five patients (pts) had 121 previous palliative procedures. Follow-up data up to 18 years (mean =  $10.9 \pm 3.3$ ) is available on 98 (92.5%) pts. Late death occurred in 8 pts (1 simple, 7 complex TGA) between 2 months to 13 years (mean = 4.6). Sudden death occurred in 4 pts., 2 died of congestive heart failure, one of pulmonary vascular disease and one of tricuspid re-gurgitation. Late Sinus node dysfunction occurred in 31 pts, 6 of these required permanent pacemakers. Of these 31 pts, 17 had unroofing of coronary sinus, while in 14, it was left intact. Postoperative cardiac catheterization showed mild superior vena cava obstruction in 4, mild pulmonary venous obstruction in 3 and baffle leak in 4 pts. Of these, one patient underwent reoperation elsewhere for a baffle leak. Five pts. developed new subpulmonic obstruction, two of which required resection and myotomy. Tricuspid regurgitation occurred in 2, one underwent reoperation. The actuarial survival for 10 years is  $93 \pm 2.4\%$  and for 18 years is  $91 \pm 2.3\%$  (95% confidence interval). The probability of event-free survival at 18 years is  $82 \pm 3.8\%$  (number at risk = 69, events being death, reoperation and insertion of permanent pacemaker). Eighty-seven pts. are in NYHA class I and 3 in class II.

**Conclusions:** (1) Long-term and event-free survival has been satisfactory. (2) Late death was significantly higher in complex TGA ( $P=.027$ ). (3) Sinus node dysfunction was common, but was not related to the unroofing of coronary sinus ( $p=NS$ ). Of these, only 6 pts. required permanent pacemakers. (4) The incidence of late complications and reoperation was low.

**10:40 a.m. Discussion**

\*By Invitation

**10:50 a.m.**

**36. The Arterial Switch Operation: An Eight-Year Experience**

*JAN M. QUAEGEBEUR \*, JOHN ROHMER \*,*

*JAAP OTTENKAMP\*, TIJIK BUIS\*,*

*JOHN W. KIRKLIN, EUGENE H. BLACKSTONE*

*and A. GERARD BROM*

*Leiden, The Netherlands and Birmingham, Alabama*

Sixty-six patients (23 neonates with transposition (TGA) and intact ventricular septum (VS), 33 infants and children with TGA and large ventricular septal defect (VSD), and 10 with

the Taussig-Bing heart) have received an arterial switch operation as a routine since 1977. One with TGA and intact VS, 6 with TGA and VSD, and 1 with the Taussig-Bing heart died in the hospital. Including hospital deaths, 11 month overall actuarial survival was 81%, and no deaths occurred subsequently among the 33 patients traced thereafter for as long as 8 years. The hazard function for death had only a single early phase, and its confidence limits overlapped the hazard function of a matched general population within 12 months of operation. Incremental risk factors for death included low birth weight (but not weight or age at operation), TGA with large VSD, the Taussig-Bing heart, and presence of a patent ductus arteriosus (PDA). Coronary artery morphology and position of the great arteries were not risk factors. Earlier date of operation was a risk factor ( $P=.004$ ), and among 27 patients operated upon since April 1984 there have been no early or late deaths; 1 year survival, including hospital deaths, after operation in 1985, predicted from the multivariate equation, is 99.9% (CL 98%-100%) for neonates with TGA and intact VS, and 99.6% (99%-99.9%) for those with TGA and large VSD or the Taussig-Bing heart. The late functional results were excellent, and the rhythm was sinus in 96% of the 55 surviving patients.

A formal comparison was made of these results with those of the atrial switch and the intraventricular tunnel repair, which indicates that the arterial switch repair is superior.

### 11:00 a.m. Discussion

\*By Invitation

11:10 a.m.

### 37. Long-Term Evaluation of Homograft and Heterograft Valves in Extracardiac Valved Conduits

*JAROSLAV STARK\*, PAVEL HORVATH\*,*

*RUI ALMEIDA \*, WALTER MERRILL\*,*

*JAMES F.N. TAYLOR \*, CATHERINE BULL\*,*

*FERGUS J. MACARTNEY\* and MARC R. DE LEVAL\**

*London, England*

*Sponsored by: JAMES R. MALM New York, New York*

Long-term results of 249 children, who received extracardiac conduits between 1971 and December 1982 were evaluated. Follow-up ranged from between 3 and 13 years. Major diagnostic groups were Truncus Arteriosus (TA) 70, Transposition of the Great Arteries (TGA)/Double Outlet Right Ventricle (DORV) complex 64, Fontan type operation 37, Pulmonary Atresia (PA) and Ventricular Septal Defect (VSD) 29, Congenitally Corrected TGA (CTGA) 22 and miscellaneous 27. Aortic homografts (AH) preserved in nutrient and antibiotic solution or deep frozen were used in 108, porcine heterografts (PH) in 107, pericardial valves in 30 and valveless conduits in 6. Hospital mortality related to the age of the patient, complexity of the lesion and severity of the pre-operative condition. Hospital mortality was 77% in the first 3 months of life, 33% between 1-4 years and 23% over the age of 4 years. Status of survivors at the last follow-up was good in 92.5% and fair in 7.5%. Late results were evaluated actuarially. Probability of survival at 5 and 10 years (hospital deaths excluded) for the major diagnostic group was: TGA/DORV 82%/50%, PA + VSD 90%/78%, TA 78%/70%. Probability of survival with the original conduit for the same diagnostic group at 5 and 10 years was TGA/DORV 70%/45%, PA + VSD 85%/25%, TA 62%/20%. At 5 years there was no difference in "conduit survival" between AH and PH. At 10 years 50% of AH patients were

alive with their original conduit but only 30% of PH patients. Only 2 AH calcified and became stenotic. Cause of obstruction in AH were related to peel formation in dacron extension and anastomotic strictures. We conclude that AH conduits used without dacron extension are preferable to PH in children. Collagen or fibrinogen presealed dacron tubes may reduce peel formation, but our experience with those techniques is too short for meaningful evaluation.

#### **11:20 a.m. Discussion**

\*By Invitation

#### **11:30 a.m.**

#### **38. Management of Pulmonary Atresia with Intact Ventricular Septum**

*JOHN E. FOKER, ELIZABETH A. BRAUNLIN\*,*

*JOHN A. ST. CYR\*, DAVID HUNTER\*, JAMES H. MOLLER\*,*

*W. STEVES RING\* and J. ERNESTO MOLINA*

*Minneapolis, Minnesota*

Newborns with pulmonary atresia with intact ventricular septum may also have suprasystemic right ventricular (RV) pressures, tricuspid valve insufficiency, and hypoplastic RVs and pulmonary arteries (PAs). The complexity of these lesions is reflected in the variety of surgical approaches taken and the high mortality rates reported. The purpose of this report is to document the advantages of early RV decompression by a RV outflow tract patch (RVOP) and a variable approach to the provision of adequate pulmonary blood flow (PBF). Fifteen neonates, 1-3 days of age, with this diagnosis and suprasystemic RV pressures were placed on prostaglandin E, (PGE<sub>1</sub>) prior to surgery to improve PBF. Only 2/15 could be predicted to have satisfactory postoperative RV mechanics and had an RVOP and ductus ligation. For 9/15 a RVOP was placed but diminutive RV size and/or tricuspid incompetency precluded ductus ligation. PGE<sub>1</sub> was infused postoperatively (average 6.8 days) to provide PBF in these patients until RV function became adequate. In 3 infants with severely hypoplastic RVs, early RV function was not anticipated, therefore, an aortopulmonary shunt was placed in addition to decompression by a RVOP. One infant, early in series, had only a shunt. Postoperatively, adequate PBF was present in all and 11/15 (73%) survived. Three deaths (avg. 2.8 days) following RVOP and PGE<sub>1</sub> infusion were due to continued low cardiac output, not primary hypoxia. One neonate with a RVOP and shunt died from myocardial ischemia because of coronary artery steal through RV sinusoids. One late death occurred in the child with only a shunt, presumably due to an arrhythmia. The remaining survivors (10/15, 61%) are alive and completely repaired. These patients have revealed that adequate RV size requires more liberal definition. Four patients with a residual atrial septal defect (ASD) and a right to left shunt at age 1-3 years, were found by angiography to have a tricuspid valve diameter from 2.2-4.1 SE below the expected mean and RV volumes below the fifth percentile. Nevertheless, balloon occlusion of the ASD revealed the RVs were functionally adequate and the ASDs (in two, shunts were also closed) could be repaired. In summary, all survivors are corrected in contrast to reported studies in which many are functioning with shunts. Certain unifying treatment principles have emerged: (1) RVOP can be performed in the neonatal period with good results and maximizes the potential for RV growth by relief of RV hypertension; (2) In most patients, PBF can be assured for at least 1-2 weeks with PGE<sub>1</sub> infusion. RV function usually improves and only rarely is shunt placement required. (3) In cases of apparent inadequate RV size in follow-up, RV function can be assessed preoperatively by balloon occlusion of the ASD and, if tolerated, will be satisfactory after ASD closure.

#### **11:40 a.m. Discussion**

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

**39. Surgical Management of Post-Myocardial Infarction Ventricular Tachyarrhythmia by Myocardial Revascularization, Debulking Procedure and Septal Isolation**

*HOOSHANG BOLOOKI, GEORGE M. PALATIANOS\*,*

*LIAQAT ZAMAN\*, RICHARD J. THURER\*,*

*ROBERT J. MYERBURG\* and RICHARD M. LUCERI\**

*Miami, Florida*

Sustained ventricular tachycardia/fibrillation (VT/VF) early after myocardial infarction (up to 8 weeks) carries a high risk (>80% mortality in 6 months) when managed by conventional medical or surgical techniques. We have devised a more extensive procedure to be used as a last resort and have used it in 16 moribund pts (13 males, 3 females) with a mean age of 61 years. The procedure consisted of complete myocardial revascularization and debulking by extensive infarctectomy with unguided endocardial resection and septal isolation with support of its necrotic wall with a thick Teflon® patch (average size 10 cm<sup>2</sup>). Defibrillator patches were implanted in 4 pts. Perioperative myocardial preservation was with blood cardioplegia and intra-aortic balloon assist (12 pts). Postoperative (postop) studies in 3-10 days showed cardiac index rose from  $2.1 \pm 0.4$  to  $2.6 \pm 0.6$  L/min/m<sup>2</sup>\* (mean  $\pm$  SD), wedge pressure declined from  $26.4 \pm 3.8$  to  $13.3 \pm 4.0$  mmHg\* and ejection fraction increased from  $23 \pm 5\%$  to  $35 \pm 7\%$ .\* Thirty day mortality was 12% (2 pts). During postop electrophysiologic testing VT was not inducible, in 8 of 10 pts (83%). During mean follow-up of 14 months 9 of 14 pts (64%) are alive. This procedure which aims at improving ventricular function and fibrillatory threshold and ablating the dysrhythmic foci seems effective in prevention of arrhythmic deaths and control of congestive failure.

\*p<.002

**1:40 a.m. Discussion**

\*By Invitation

**1:50 p.m.**

**40. Improved Results in the Operative Management of Ventricular Tachycardia Related to Inferior Wall Infarction - Importance of the Annular Isthmus**

*W. CLARK HARGROVE\*, JOHN M. MILLER\*,*

*JOSEPH A. VASSALLO\* and MARK E. JOSEPHSON\**  
*Philadelphia, Pennsylvania*

*Sponsored by: L. HENRY EDMUNDS, JR*

*Philadelphia, Pennsylvania*

Ventricular tachycardia (VT) associated with inferior wall myocardial infarction (IMI) has had a lower surgical cure rate with localized subendocardial resection (SER) than VT related to anterior infarction (AMI). Some investigators have advocated visually directed extensive SER including resection of the papillary muscles and mitral valve replacement even without documenting VT origin at these sites.



We have operated on 42 patients (39 men, 3 women) for VT associated with IMI. Thirty-one patients had standard localized SER without mitral valve replacement (Group I). Eleven consecutive recent patients (Group II) underwent SER plus focal endocardial cryoablation (3 minutes at  $-60^{\circ}\text{C}$ ) of the annular isthmus. The annular isthmus is defined as the ventricular muscle between the basal end of the ventriculotomy and the mitral valve annulus. In Group I there were 4 operative deaths (13%) and VT remained inducible in 12 patients (44%) at postoperative electrophysiologic studies (EPS). In Group II there was 1 operative death (9%) and nine of 10 survivors (90%) had no inducible VT at postoperative EPS ( $P < 0.05$  vs Group I). No Group II patient required mitral valve replacement. Five of the ten operative survivors in Group II had intraoperative activation maps consistent with macroreentry incorporating the annular isthmus. Group I and Group II were indistinguishable in preoperative hemodynamics, number of coronary arteries diseased and bypassed, or the presence of left ventricular aneurysm. These results suggest that SER with additional cryoablation of the annular isthmus results in improved VT control in patients with VT associated with IMI and does not require mitral valve replacement. These data also suggest that the annular isthmus is a critical component of the reentrant circuit in these tachycardias.

## **2:00 p.m. Discussion**

\*By Invitation

## **2:10 p.m.**

### **41. An Autologous Biologic Pump Motor: One Week Experience**

*MICHAEL ACKER \*, ROBERT HAMMOND\*,*

*JOHN MANNION \*, STANLEY SALMONS\**

*and LARRY STEPHENSON*

*Philadelphia, Pennsylvania*

One method to augment the failing heart would be to construct a ventricle of living, contracting, autologous tissue. Although theoretically appealing, skeletal muscle-powered cardiac assist devices have thus far been hindered by muscle fatigue. We have demonstrated that skeletal muscle ventricles (SMV), through a combination of vascular delay, chronic electrical conditioning and multi-layered construction can be made more fatigue-resistant. These SMVs, when connected to the canine systemic arterial circulation, are capable of generating systemic pressures and outputs of up to 20% of the animal's cardiac output for 8 hours.

In this experiment 5 dogs had SMVs constructed of multi-layered latissimus dorsi muscle. The SMVs first underwent a 3 week vascular delay rest period followed by 7-10 weeks of electrical conditioning via their motor nerve. The SMVs were then connected to a totally implantable mock circulation circuit. This system permitted control of the SMVs' preload and afterload as well as the ability to measure the SMVs' pressures and ejection flow. Except during daily measurements, no wires or tubes crossed the skin barrier. The SMVs were actuated via their motor nerve by an implantable pulse generator that delivered a burst pattern of 25 Hz for 312 msec on, 812 msec off.

Over a one week period of continuous pumping, 3 of 5 SMVs exhibited no fatigue. Of those 3, one 12 kg dog has generated continuous pressures of 90/25 with continuous flows of 230 ccs/min. The stroke volume of the SMV at 7 days was 5 cc and the ejection fraction 91%. By altering the preload and afterload conditions of the SMV at one week, this animal's SMV was capable of generating sustained pressures of 190/55.

This study indicates that it is possible to construct a non-fatiguing, biologic pump motor from skeletal muscle. This concept holds great promise for long-term augmentation of the failing heart.

**2:20 p.m. Discussion**

\*By Invitation

**2:40 p.m.**

**42. Mechanical Support of the Circulation Followed by Cardiac Transplantation**

*JOHN L. PENNOCK, WILLIAM S. PIERCE,*

*DAVID B. CAMPBELL \*, DWIGHT DAVIS\*,*

*FREDERICK A. HENSLEY\**

*and JOHN A. WALDHAUSEN*

*Hershey, Pennsylvania*

Improvements in mechanical circulatory support (MCS) and immune therapy promise a wider use of sequential mechanical support followed by orthotopic cardiac transplantation (CTx). The intra-aortic balloon (IABP), left (L) and right (R) ventricular assist pumps (VAD), and the pneumatic artificial heart (TAH) represent the potential range of devices capable of keeping a patient alive who would otherwise die awaiting a potential donor organ. The major obstacle to circulatory support is the possibility of infection resulting from the required percutaneous tubes. It is speculated, though not proven, that cyclosporine combined with low dose steroids may provide the required degree of immune suppression but not eradicate resistance to infection, thus allowing graft and host survival following sequential cardiac procedures. We report here our experience utilizing mechanical circulatory support devices as a bridge to successful CTx.

Four patients in a series of 26 consecutive transplant procedures have required preoperative MCS. Two patients required the use of IABP for two and 14 days pretransplant. Both patients are alive and well six months post-CTx. One patient required LVAD for 21 days pre-CTx. This patient is alive and well two months post-CTx. One patient required TAH support for 11 days pre-CTx and is presently two days from his transplant procedure. A fifth patient required L and R VAD support but died of sepsis after 14 days (no CTx).

Our early experience appears to indicate that partial or total mechanical support followed by CTx is therapeutic.

**2:50 p.m. Discussion**

\*By Invitation

**3:00 p.m.**

**43. Extracorporeal Membrane Oxygenation for Respiratory Failure**

*ROBERT M. ARENSMAN\*, CLYDE R. REDMOND\*,*

*KENNETH W. FALTERMAN\* and JOHN L. OCHSNER*

*New Orleans, Louisiana*

Extracorporeal membrane oxygenation (ECMO) has been used in our institution to treat 46 patients with cardiorespiratory failure. This includes 40 neonates and 6 pediatric patients. Venous bypass is achieved by cannulating the right atrium via the internal jugular vein and the aortic arch via the right common carotid artery. A 5-inch roller pump is used to circulate the blood through a 0.4 to 1.2m<sup>2</sup> silicone membrane lung. This not only oxygenates the blood but also acts as both a right and left ventricular assist device by decompressing the pulmonary circuit and supporting the systemic arterial blood pressure.

Indications for ECMO in neonates are well defined, and can be used to predict an 80%-90% mortality. Of the neonates, 27 (82%) of 33 patients with persistent fetal circulation survived and 2 (29%) of 7 patients with congenital diaphragmatic hernia survived. Of the 10 old enough to undergo Bayley Infant Developmental Testing, all are within normal limits for both the mental and psychomotor developmental indices.

In pediatric patients the indications for ECMO are not well defined, but in general can be divided into two large groups. In pediatric patients with ventricular failure following cardiac surgery, ECMO can be used as cardio-pulmonary support. We have treated three such patients with one survivor. ECMO can also be used to treat children with predictably fatal but potentially reversible pulmonary failure. In this category, we have also treated three patients, with one survivor.

Our experience shows that ECMO serves a useful role in the management of carefully selected neonatal and pediatric patients with cardiorespiratory failure refractory to conventional management.

### **3:10 p.m. Discussion**

\*By Invitation

**3:20 p.m.**

### **44. Penetrating Injuries of the Diaphragm: An Analysis of 154 Cases**

*ROBERT WIENCEK\*, ROBERT F. WILSON, ZWI STEIGER*

*AND RAMESH CHERUKURI\**

*Detroit Michigan*

Penetrating injuries to the diaphragm may present special problems in trauma management because of involvement of both thoracic and abdominal organs. To evaluate our management of these injuries and look for areas of potential improvement, we analyzed the records of 154 patients with penetrating diaphragm injury seen at Detroit Receiving Hospital from July, 1980, through May, 1985.

Etiology included 89 gun shot wounds and 65 stab wounds with a mortality rate of 19% and 5% respectively. Operations on these patients were laparotomy in 117 (76%), thoracotomy in 4 (3%), and both in 33 (24%). The mortality rate with these operations was 0%, 50% and 52% respectively.

Of the 37 patients who had a thoracotomy, five were done in the ED with three (60%) deaths. Of 32 who had OR thoracotomies, 15 were done for thoracic injuries with six (40%) deaths and 17 were done for CPR or aortic cross-clamping with ten (56%) deaths. The most frequent chest injuries repaired were lung (28) and heart (8).

Of 117 patients who had a laparotomy without a thoracotomy, 55 (47%) had chest tubes inserted in the emergency department (ED) prior to surgery for hemopneumothorax. The other 62 (53%) had their chest tubes inserted in the operating room after the diaphragmatic injury

was recognized. No significant difference in complications between these two groups was noted.

Of the 19 deaths, 17 occurred within 48 hours from shock-related complications. Two others died later of sepsis. Of the 135 patients who survived, 36 (27%) required more than 14 days hospitalization because of pulmonary and/or septic complications.

Thus, diaphragmatic injuries requiring emergency thoracotomy have a significant mortality (52%) related primarily to severe bleeding. A more aggressive surgical approach seems necessary. In addition, postoperatively these patients should be treated aggressively to reduce pulmonary and septic complications.

### **3:30 p.m. Discussion**

### **3:40 p.m. Adjourn**

\*By Invitation

## **NECROLOGY**

Dermont W. Melick, M.D. Phoenix, AZ  
Hebert Meltzer, M.D. Edmonton, Alberta, Canada  
William A. Neely, M.D. Jackson, MS  
Jens G. Rosenkrantz, M.D. Cincinnati, OH  
Samuel A. Thompson, M.D. Buck Hill Fall, PA

## **American Association for Thoracic Surgery, 1985-1986**

*(Listed by Countries, States, Provinces and Cities)*

### **Geographical - UNITED STATES**

#### **ALABAMA**

##### **Birmingham**

Blackstone, Eugene H  
Blakemore, William S  
Kahn, Donald R.  
Kessler, Charles R.  
Kirklin, John W.  
McElvein, Richard B  
Pacifico, Albert D.

##### **Montgomery**

Simmons, Earl M.

##### **Opelika**

Le Beck, Martin

#### **ALASKA**

##### **Anchorage**

Phillips, Francis J.

#### **ARIZONA**

##### **Phoenix**

Brown, Lee B.  
Cornell, William P.  
Fisk, R. Leighton  
Nelson, Arthur R.

##### **Sun City**

Read, C. Thomas

##### **Tucson**

Burbank, Benjamin

##### **Chico**

Becker, Ronald M.

##### **Covina**

Carter, P. Richard

##### **Duarte**

Benfield, John R.  
Newman, Melvin M.

##### **El Macero**

Andrews, Neil C.

##### **Escondido**

Mannix Jr., Edgar P.

##### **Fresno**

Evans, Byron H.

##### **Hemet**

Hewlett, Thomas H.

##### **Irvine**

Connolly, John E.  
Miller, Don R.  
Salyer, John M.  
Wakabayashi, Akio

##### **La Canada**

Aronstam, Elmore M.

##### **La Jolla**

Fosburg, Richard G.  
Hutchin, Peter

##### **La Mesa**

Copeland III, Jack G.  
Sanderson, Richard G.

**ARKANSAS**

**Jasper**

Hudson, W. A.

**Little Rock**

Campbell, Gilbert S.  
Read, Raymond C.  
Williams, G. Doyne

**CALIFORNIA**

**Anaheim**

Main, F. Beachley

**Carmel**

Daniels, Albert C.

Khonsari, Siavosh  
Laks, Hillel  
Lee, Myles E.  
Lindesmith, George G.  
Longmire Jr, William  
Maloney Jr, James V.  
Mandal, Ashis K.  
Matloff, Jack M.  
Meyer, Bert W.  
Morton, Donald L.  
Mulder, Donald G.  
Stiles, Quentin R.

**Martinez**

Guernsey, James M.

**Montebello**

Lui, Alfred H. F.

**Oakland**

Ecker, Roger R.  
May, Ivan A.

**Orange**

Gazzaniga, Alan B.  
Mason, G. Robert

**Oxnard**

Dart Jr., Charles H.

**Pacific Palisades**

Ramsay, Beatty H.  
Weinberg, Joseph A.

**Palm Springs**

Goldman, Alfred

**Palo Alto**

Cohn, Roy B.  
Jamplis, Robert W.

**Pasadena**

Ingram, Ivan N.  
Penido, John R. F.  
Silver, Arthur W.

**Rancho Mirage**

Bjork, Viking O.

**Sacramento**

Harlan, Bradley J.  
Hurley, Edward J.  
Miller Jr., George E.  
Smeloff, Edward A.  
Tyson, Kenneth R. T.

**San Bernadino**

Flynn, Pierce J.

**San Diego**

Angell, William W.  
Baronofsky, Ivan D.

Long Jr., David M.

**Loma Linda**

Bailey, Leonard L.  
Wareham, Ellsworth E.

**Long Beach**

Bloomer, William E.  
Carlson, Herbert A.  
Stemmer, Edward A.

**Los Angeles**

Baisch, Bruce F.  
Buckberg, Gerald D.  
Davis, Lowell L.  
Fonkalsrud, Eric W.  
Holmes, E. Carmack  
Hughes, Richard K.  
Kay, Jerome Harold

Chambers Jr, John S.

Daily, Pat O.

Lamberti Jr, John J.

Peters, Richard M.

Trummer, Max J.

**San Francisco**

Culiner, Morris M.

Ebert, Paul A.

Ellis, Robert J.

Gardner, Richard E.

Grimes, Orville F.

Heydorn, William H.

Hill, J. Donald

Kerth, William J.

Leeds, San ford E.

McEnany, M. Terry

Richards, Victor

Roe, Benson B.

Rogers, W. L.

Thomas, Arthur N.

Turley, Kevin

Ullyot, Daniel J.

**San Jose**

Oakes, David D.

**San Rafael**

Julian, Ormand C.

**Santa Ana**

Pratt, Lawrence A.

**Santa Barbara**

Higginson, John F.

Jahnke Jr., Edward J.

Lewis, F. John

Love, Jack W.

**South Laguna**

Oatway Jr, William H.

**South Pasadena**

Brewer III, Lyman A.

**St Helena**

Dugan, David J.

**Stanford**

Jamieson, Stuart W.

Mark, James B. D.

Miller, D. Craig

Shochat, Stephen J.

Shumway, Norman E.

Wilson, John L.

**Thousand Oaks**

Tsuji, Harold K.

**Torrance**

Carey, Joseph S.  
 Cukingnan, Ramon A.  
 Moore, Thomas C.  
 Nelson, Ronald J.  
 State, David

**COLORADO****Aspen**

Zaroff, Lawrence I.

**Denver**

Brown, Robert K.  
 Burrington, John D.  
 Condon, William B.  
 Eiseman, Ben  
 Grow, John B.  
 Harken, Alden H.  
 Harper, Frederick R.  
 Hopeman, Alan R.  
 Kovarik, Joseph L.  
 Pappas, George  
 Paton, Bruce C.  
 Pomerantz, Marvin  
 Rainer, W. Gerald  
 Van Way III, Charles W.  
 Waddell, William R.  
 Wright, George W.

**Lakewood**

Swan, Henry

**CONNECTICUT****Hartford**

Kemler, R. Leonard

**New Haven**

Carter, Max G.  
 Geha, Alexander S.  
 Glenn, William W. L.  
 Hammond, Graeme L.  
 Linskog, Gustaf E.  
 Stansel Jr, Horace C.  
 Stern, Harold

**Norwich**

Kelley, Winfield O.

**Sharon**

Wylie, Robert H.

**Wilton**

Pool, John L.

**DELAWARE****Wilmington**

Pecora, David V.

**N. Miami Beach**

Spear, Harold C.

**N. Palm Beach**

Dorsey, John M.

**Naples**

Linberg, Eugene J.

**Orlando**

Scott, Meredith L.  
 Sherman, Paul H.  
 Ponte Vedra Beach  
 Gilbert Jr, Joseph

**St Petersburg**

Clerf, Louis H.  
 Daicoff, George R.  
 Dematteis, Albert  
 Wheat Jr., Myron W.

**Tallahassee**

Kraeft, Nelson H.

**Tampa****DISTRICT OF COLUMBIA****Washington**

Aaron, Benjamin L.  
 Bowles, L. Thompson  
 Hufnagel, Charles A.  
 Keshishian, John M.  
 Midgley, Frank M.  
 Mills, Mitchell  
 Randolph, Judson G.  
 Simmons, Robert L.  
 Smyth, Nicholas P. O.  
 Wallace, Robert B.

**FLORIDA**

Atlantic Beach  
 Stranahan, Allan

**Belleair**

Lasley, Charles H.

**Boca Raton**

Seley, Gabriel P.

**Coral Gables**

Cooke, Francis N.

**Delray Beach**

Geary, Paul

**Gainesville**

Alexander, James A.  
 Bartley, Thomas D.

**Jacksonville**

Koster Jr, J. Kenneth  
 Stephenson Jr., Sam

**Lakeland**

Brown Jr., Ivan W.

**Marathon**

Mangiardi, Joseph L.

**Miami**

Bolooki, Hooshang  
 Center, Sol  
 Chesney, John G.  
 Daughtry, Dewitt C.  
 Gentsch, Thomas O.  
 Jude, James R.  
 Kaiser, Gerard A.  
 MacGregor, David C.  
 Papper, Emanuel M.  
 Reis, Robert L.  
 Ripstein, Charles B.  
 Thurer, Richard J.

**Miami Beach**

Greenberg, Jack J.  
 Grondin, Pierre

**Savannah**

Langston, Hiram T.  
 Yeh, Thomas J.

**HAWAII****Honolulu**

Ching, Nathaniel P.  
 Gebauer, Paul W  
 McNamara, Joseph J.  
 Moreno-Cabral, Ricardo  
 Kailua Kona  
 Fell, Egbert H

**Tripler AMC**

Streyer Jr, Tracy E

**IDAHO****Boise**

Ashbaugh, David G.  
 Herr, Rodney H.

**ILLINOIS****Chicago**

Blank, Richard H.  
Connar, Richard G.  
Seiler, Hawley H.

**Titusville**

Labrosse, Claude C.

**Winter Haven**

Maurer, Elmer P. R.

**Winter Park**

Bloodwell, Robert D.

**GEORGIA**

**Atlanta**

Graver, Joseph M.  
Hatcher Jr, Charles  
Hopkins, William A.  
Jones, Ellis L.  
King, Richard  
Lee Jr, Arthur B.  
Logan Jr., William D.  
Mansour, Kamal A.  
Miller, Joseph I  
Rivkin, Laurence M.  
Symbas, Panagiotis  
Williams, Willis H.

**Augusta**

Ellison, Robert G.  
Rubin, Joseph W.

**Brunswick**

Collins, Harold A.

**Macon**

Sealy, Will C.

**Glencoe**

Rubenstein, L. H.

**Maywood**

Keeley, John L.  
Pifarre, Roque

**Oak Brook**

Hudson, Theodore R.  
Nigro, Salvatore L.

**Peoria**

Debord, Robert A.

**Springfield**

Wellons Jr., Harry A.

**Winnetka**

Mackler, S. Allen

**INDIANA**

**Indianapolis**

Battersby, James S.  
Brown, John W.  
King, Harold  
King, Robert D.  
Mandelbaum, Isidore  
Siderys, Harry

**IOWA**

**Cedar Rapids**

Lawrence, Montague S.

**Des Moines**

Doner, Ralph A.  
Watkins, David H.

**Iowa City**

Brandt III, Berkeley  
Ehrenhaft, Johann L.  
Rossi, Nicholas P.  
Stanford, William

**KANSAS**

**Cunningham**

Allbritten Jr., F. F.

**Overland Park**

Barnhorst, Donald A.

Baffes, Thomas G.  
Barker, Walter L.  
Campbell, Charles D.  
Faber, L. Penfield  
Hanlon, C. Rollins  
Head, Louis R.  
Hunter, James A.  
Idriss, Farouk S.  
Javid, Hushang  
Jensik, Robert J.  
Karp, Robert B.  
Kittle, C. Frederick  
Leininger, Bernard J.  
Levitsky, Sidney  
Michaelis, Lawrence  
Midell, Allen I.  
Najafi, Hassan  
Raffensperger, John  
Repogle, Robert L.  
Shields, Thomas W.  
Skinner, David B.  
Thomas Jr., Paul A.  
Vanecko, Robert M.  
Weinberg Jr., Milton

**Evanston**

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

**Geneva**

Tarnay, Thomas J.

**LOUISIANA**

**Alexandria**

Knoepp, Louis F.

**Baton Rouge**

Berry, B. Eugene  
Beskin, Charles A.

**Marrero**

O'Neill Jr, Martin J.

**Melairie**

Ochsner Jr., Alton

**New Orleans**

Blalock, John B.  
Decamp, Paul T.  
Hewitt, Robert L.  
Lindsey, Edward S.  
Mills, Noel L.  
Moulder, Peter V.  
Ochsner, John L.  
Pearce, Charles W.  
Rosenberg, Dennis M.  
Schramel, Robert J.  
Strug, Lawrence H.  
Webb, Watts R.

**MAINE**

**Liberty**

Hurwitz, Alfred

**Portland**

Drake, Emerson H.  
Hiebert, Clement

**Rockport**

Swenson, Orvar

**MARYLAND**

**Baltimore**

Attar, Safuh M. A.  
Baker, R. Robinson  
Brawley, Robert K.  
Cowley, R. Adams  
Gardner, Timothy J.

**Wichita**

Tocker, Alfred M.

**KENTUCKY****Lexington**

Crutcher, Richard R.

Dillon Jr., Marcus L

Todd, Edward P. J.

**Louisville**

Gray Jr, Laman A.

Mahaffey, Daniel E.

Ransdell Jr, Herbert

**Chevy Chase**

Iovine, Vincent M.

**Potomac**

Zajtchuk, Rostik

**Worton**

Walkup, Harry E.

**MASSACHUSETTS****Acton**

Boyd, Thomas F.

**Boston**

Akins, Gary W.

Austen, W. Gerald

Barsamian, Ernest M.

Berger, Robert L.

Bernhard, William F.

Bougas, James A.

Braunwald, Nina S.

Buckley, Mortimer J.

Burke, John F.

Castaneda, Aldo R.

Cleveland, Richard J.

Clowes Jr., George

Cohn, Lawrence H.

Collins, John J.

Daggett, Willard M.

Daly, Benedict D. T.

Deterling Jr., Ralph

Frank, Howard A.

Gaensler, Edward A.

Grillo, Hermes C.

Hilgenberg, Alan D.

Moncure, Ashby C.

Neptune, Wilford B.

Overholt, Richard H.

Rheinlander, Harold F

Roberts, Arthur J.

Russell, Paul S.

Scannell, J. Gordon

Schuster, Samuel R.

Starkey, George W.

Weintraub, Ronald

Wilkins Jr., Earle W.

**Brookline**

Madoff, Irving M.

**Burlington**

Boyd, David P.

Ellis Jr, F. Henry

Watkins Jr., Elton

**Cambridge**

Harken, Dwight E.

**Farmington Hls**

Lam, Conrad R.

**Grand Rapids**

Gott, Vincent L.

Haller Jr., J. Alex

Hankins, John R.

McLaughlin, Joseph S.

Michelson, Elliott

Moulton, Anthony L.

Reitz, Bruce A.

Turney, Stephen Z.

**Bethesda**

Clark, Richard E.

Jones, Michael

Shumacker Jr, Harris B.

**Chestnut Hill**

Laforet, Eugene G.

**Concord**

Soutter, Lamar

**Dover**

Black, Harrison

**Lynnfield**

Wesolow, Adam

**Medford**

Desforges, Gerard

**Methuen**

Wilson, Norman J.

**Newton Lwr Fall**

Strieder, John W.

**No Andover**

Cook, William A.

**So Weymouth**

Malcolm, John A.

**Springfield**

Engelman, Richard M.

Rousou, John A.

**West Roxbury**

Khuri, Shukri F.

**Westport Harbor**

Findlay Jr, Charles W.

**Winchester**

Taylor, Warren J.

**Worcester**

Vander Salm, Thomas J.

**MICHIGAN****Ann Arbor**

Bartlett, Robert H.

Behrendt, Douglas M.

Bove, Edward L.

Gago, Otto

Kirsh, Marvin M.

Morris, Joe D.

Orringer, Mark B.

Sloan, Herbert

**Birmingham**

Dodrill, Forest D.

Timmis, Hilary H.

**Detroit**

Arbulu, Augustin

Arciniegas, Eduardo

Day, J. Claude

Levine, Frederick H.

Magilligan Jr, D. J.

Steiger, Zwi

Wilson, Robert F.

**MISSOURI****Bridgeton**

Codd, John E.



Harrison, Robert W.  
Meade, Richard H.  
Rasmussen, Richard A.  
Tomatis, Luis A.

**Grosse Pointe**

Benson, Clifford D.  
Taber, Rodman E.

**Kalamazoo**

Neerken, A. John

**Leonard**

Gerbasi, Francis S.

**MINNESOTA**

**Duluth**

Fuller, Josiah

**Minneapolis**

Arom, Kit V.  
Foker, John E.  
Gannon, Paul G.  
Garamella, Joseph J.  
Helseth, Hovald K.  
Humphrey, Edward W.  
Johnson, Frank E.  
Riser, Joseph C.  
Molina, J. Ernesto  
Nicoloff, Demetre M.

**Rochester**

Bernatz, Philip E.  
Clagett, O. Theron  
Danielson, G. K.  
Kaye, Michael P.  
McGoon, Dwight C.  
Olsen, Arthur M.  
Pairolero, Peter C.  
Payne, W. Spencer  
Pluth, James R.  
Puga, Francisco J.

**St Paul**

Lillehei, C. Walton  
Miller, Fletcher A.  
Perry Jr., John F.

**MISSISSIPPI**

**Jackson**

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

**Browns Mills**

Fernandez, Javier  
Gonzalez-Lavin, Lorenzo

**Camden**

Camishion, Rudolph C.

**Cherry Hill**

Pierucci Jr., Louis

**East Orange**

Auerbach, Oscar

**Jersey City**

Demos, Nicholas J.

**Millhurn**

Parsonnet, Victor

**Moorestown**

Morse, Dryden P.

**New Brunswick**

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

**Newark**

Abel, Ronald M.  
Amato, Joseph J.

**Columbia**

Silver, Donald

**Kansas City**

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

**Mt Vernon**

Campbell Jr, Daniel C.

**St Louis**

Earnar, Hendrick B.  
Baue, Arthur E.  
Bergmann, Martin  
Bolman III, R. Morton  
Connors, John P.  
Cox, James L.  
Ferguson, Thomas B.  
Flye, M. Wayne  
Kaiser, George C.  
Kouchoukos, Nicholas T.  
Lewis Jr., J. Eugene  
Pennington, D. Glenn  
Roper, Charles L.  
Weldon, Clarence S.  
Willman, Vallee L.

**NEBRASKA**

**Omaha**

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

**NEW HAMPSHIRE**

**Hanover**

Crandell, Walter B.

**Peterborough**

Woods, Francis M.

**NEW JERSEY**

**Bellville**

Gerard, Franklyn P.

**Belmar**

Bailey, Charles P.

**Bronx**

Brodman, Richard F.  
Fell, Stanley C.  
Ford, Joseph M.  
Prater, Robert W. M.  
Hirose, Teruo  
Robinson, George

**Brooklyn**

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

**Buffalo**

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

**Cooperstown**

Blumenstock, David A.

**Fayetteville**

Gielchinsky, Isaac  
Neville, William E.  
Norman, John C.

**No Caldwell**

Wychulis, Adam R.

**Paterson**

Bregman, David

**Short Hills**

Timmes, Joseph L.

**Tenafly**

Gerst, Paul H.

**NEW MEXICO**

**Albuquerque**

Akl, Bechara F.

Edwards, W. Sterling

**Las Vegas**

Thai, Alan P.

**NEW YORK**

**Albany**

Alley, Ralph D.

Foster, Eric D.

Kausel, Harvey W.

McKneally, Martin F.

**Bay Shore**

Ryan, Bernard J.

Hood, R. Maurice  
Hutchinson III, John E.

Isorn, O. Wayne

Jaretzki III, Alfred

Jurado, Roy A.

King, Thomas C.

Kirschner, Paul A.

Lambert, Adrian

Litwak, Robert S.

Maier, Herbert C.

Malm, James R.

Martini, Nael

Nealon Jr., Thomas F.

Okinaka, Arthur J.

Redo, S. Frank

Reemtsma, Keith

Rubin, Morris

Spencer, Frank C.

Spotnitz, Henry M.

Steichen, Felicien M.

Subramanian, V. A.

Tice, David

Veith, Frank J.

Wallsh, Eugene

Wichern Jr, Walter

Wolff, William I.

**Patchogue**

Finnerty, James

**Plattsburg**

Potter, Robert T.

**Rochester**

Graver, William L.

Deweese, James A.

Hicks, George L.

Mahoney, Earle B.

Schwartz, Seymour I.

Stewart, Scott

**Roslyn**

Thomson Jr., Norman

Wisoff, B. George

Bugden, Walter F.

**Floral Park**

Crastrnopol, Philip

**Irvington**

Attai, Lari A.

**New Hyde Park**

Tyras, Denis H.

**New Paltz**

Johnson, Elgie K.

**New York**

Acinapura, Anthony J.

Adams, Peter X.

Bains, Manjit S.

Beattie Jr., Edward

Bloomberg, Allan E.

Bowman Jr, Frederick

Boyd, Arthur D.

Cahan, William G.

Clauss, Roy H.

Conklin, Edward F.

Courmand, Andre

Cracovaner, Arthur J.

Culliford, Alfred T.

Friedlander, Ralph

Giannelli Jr, Stanley

Green, George E.

Holman, Cranston W.

Holswade, George R.

**Stony Brook**

Anagnostopoulos, C.

Dennis, Clarence

Soroff, Harry S.

**Syracuse**

Bredenberg, Carl E.

Effler, Donald B.

Meyer, John A.

Parker Jr, Frederick

**Valhalla**

Reed, George E.

**Westhampton Beach**

Sarot, Irving A.

**NORTH CAROLINA**

**Asheville**

Belts, Reeve H.

Scott, Stewart M.

Sethi, Gulshan K.

Takaro, Timothy

**Chapel Hill**

Starek, Peter J. K.

Wilcox, Benson R.

**Charlotte**

Robicsek, Francis

Taylor, Frederick H.

**Durham**

Jones, Robert H.

Oldham Jr., H. N.

Sabiston, David C.

Wechsler, Andrew S.

Wolfe, Walter G.

Young Jr, W. Glenn

**Oriental**

Deaton Jr., W. Ralph

**Pinehurst**

Fischer, Walter W.

**Tryon**

Wilson, Julius L.

**Winston-Salem**

Cordell, A. Robert

**Saranac Lake**  
Decker Jr., Alfred M.  
**Scottsville**  
Emerson, George L.  
**Southampton**  
Heroy, William W.  
**Staten Island**  
Garzon, Antonio A.

**Cincinnati**  
Albers, John E.  
Flege Jr, John B.  
Gonzalez, Luis L.  
Helmsworth, James A.  
Wright, Creighton B.

**Cleveland**  
Ankeney, Jay L.  
Cosgrove, Delos M.  
Cross, Frederick S.  
Groves, Laurence K.  
Kay, Earle B.  
Loop, Floyd D.

**Columbus**  
Clatworthy Jr, H.W.  
Kakos, Gerard S  
Kilman, James W.  
Meckstroth, Charles  
Vasko, John S.  
Williams Jr., Thomas

**Dayton**  
Dewall, Richard A.

**Pepper Pike**  
Mendelsohn, Harvey J

**OKLAHOMA**  
**Oklahoma City**  
Elkins, Ronald C.  
Felton II, Warren L.  
Fisher, R. Darryl  
Greer, Allen E.  
Munnell, Edward R.  
Wilder, Robert J.  
Williams, G. Rainey  
Zuhdi, M. Nazih

**Tulsa**  
McPhail, Jasper L.

**OREGON**  
**Days Creek**  
Miller, Arthur C.

**Portland**  
Krause, Albert H.  
Okies, J. Edward  
Poppe, J. Karl  
Starr, Albert

**Salem**  
Blair, Emil

**PENNSYLVANIA**  
**Arlington**  
Frobese, Alfred S.

**Sayre**  
Sewell, William H.  
**Villanova**  
Lemmon, William M.  
**Yardley**

Hudspeth, Allen S.  
Johnston, Frank R.  
Meredith, Jesse H.  
**NORTH DAKOTA**  
**Grand Forks**  
James, Edwin C.  
**OHIO**  
**Akron**  
Falor, William H.

**Bethlehem**  
Snyder, John M.  
**Bryn Mawr**  
Mundth, Eldred D.  
**Carlisle**  
Demuth Jr., William  
**Darby**  
McKeown Jr., John J.  
**Fairfield**  
McClenathan, James E  
**Gladwyne**  
Johnson, Julian  
**Hamburg**  
Judd, Archibald R.  
**Hershey**  
Pennock, John L.  
Pierce, William S.  
Waldhausen, John A.

**Lancaster**  
Bonchek, Lawrence I.  
Witmer, Robert H.

**Lumberville**  
O'Neill, Thomas J. E.

**Philadelphia**  
Brockman, Stanley K.  
Donahoo, James  
Dunn, Jeffrey M.  
Edie, Richard N.  
Edmunds Jr, L. Henry  
Fineberg, Charles  
Haupt, George J.  
Lemole, Gerald M.  
MacVaugh III, Horace  
Mendelssohn, Edwin  
Nemir Jr., Paul  
Norwood, William I.  
Parr, Grant V. S.  
Rosemond, George P.  
Stephenson, Larry W.  
Templeton III, John  
Van De Water, Joseph M.  
Wallace, Herbert W.

**Pittsburgh**  
Bahnon, Henry T.  
Ford, William B.  
Griffith, Bartley P.  
Hardesty, Robert L.  
Magovern, George J.  
Pontius, Robert G.  
Rams, James J.  
Ravitch, Mark M.

**Nashville**  
Alford Jr., William  
Bender Jr., Harvey W.  
Dale, W. Andrew  
Foster, John H.

Sommer Jr., George N.

**RHODE ISLAND**

**Providence**

Karlson, Karl E.  
Moran, John M.  
Simeone, Fiorindo A.  
Singh, Arun K.

**SOUTH CAROLINA**

**Charleston**

Bradham, Randolph R.  
Hairston, Peter  
Parker, Edward F.  
Sade, Robert M.

**Columbia**

Almond, Carl H.

**Landrum**

Stayman, Joseph W.

**Mt Pleasant**

Crawford Jr, Fred A.

**Spartanburg**

Utley, Joe R.

**TENNESSEE**

**Chattanooga**

Adams Jr., Jesse E.  
Hall, David P.

**Johnson City**

Lefemine, Armand A.

**Knoxville**

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

**Memphis**

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

Lawrie, Gerald M.  
Mattox, Kenneth L.  
Morris Jr, George C.  
Mountain, Clifton F.  
Ott, David A.  
Overstreet, John W.  
Reul Jr, George J.  
Walker, William E.  
Wukasch, Don C.

**Kaufman**

Davis, Milton V.

**Lubbock**

Bricker, Donald L.  
Feola, Mario

**San Antonio**

Dooley, Byron N.  
French III, Sanford  
Grover, Frederick L.  
Heaney, John P.  
Trinkle, J. Kent

**Temple**

Brindley Jr., G. V.

Gobbel Jr., Walter G.

Hammon Jr, John W.

Johnson, Hollis E.

Sawyers, John L.

Scott Jr., Henry W.

Stoney, William S.

Thomas Jr, Clarence

Sewanee

Thrower, Wendell B.

**TEXAS**

**Amarillo**

Sutherland, R. Duncan

**Burnet**

Ross, Raleigh R.

**Dallas**

Adam, Maurice  
Crosby, Ivan K.  
Holland, Robert H.  
Lambert, Gary J.  
Mills, Lawrence J.  
Mitchel Jr., Ben F.  
Paulson, Donald L.  
Platt, Melvin R.  
Razzuk, Maruf A.  
Seybold, William D.  
Shaw, Robert R.  
Sugg, Winfred L.  
Urschel Jr, Harold

**Dilley**

Hood Jr., Richard H.

**El Paso**

Glass, Bertram A.

**Ft Sam Houston**

Treasure, Robert L.

**Galveston**

Conti, Vincent R.  
Derrick, John R.

**Houston**

Beall Jr., Arthur C.  
Burdette, Walter J.  
Cooley, Denton A.  
Crawford, E. Stanley  
De Bakey, Michael E.  
Frazier, Oscar H.  
Hallman, Grady L.  
Henly, Walter S.

**Charlottesville**

Dammann, John F.  
Minor, George R.  
Muller Jr., William  
Nolan, Stanton P.

**Lynchburg**

Moore, Richmond L.

**Richmond**

Bosher Jr, Lewis H  
Brooks, James W.  
Cole, Dean B.  
Greenfield, Lazar J.  
Gwathmey, Owen  
Johns, Thomas N. P.  
Lower, Richard R.

**WASHINGTON**

**Bellevue**

Li, Wei-I

**Bellingham**

Varco, Richard L.

**Friday Harbor**

Fox, Robert T.

**Woodville**

Harrison, Albert W.

**UTAH****Sail Lake City**

Cutler, Preston R.  
Doty, Donald B.  
Gay Jr., William A.  
Liddle, Harold V.  
Mortensen, J. D.  
Nelson, Russell M.  
Wolcott, Mark W.

**VERMONT****Brattleboro**

Gross, Robert E.

**Burlington**

Coffin, Laurence H.  
Miller, Donald B.

**Chester Depot**

Adams, Herbert D.

**West Dover**

Humphreys II, G. H.

**White River Jet**

Tyson, M. Dawson

**VIRGINIA****Arlington**

Conrad, Peter W.  
Klepser, Roy G.

**Morgantown**

Murray, Gordon F.  
Warden, Herbert E.

**WISCONSIN****La Crosse**

Gundersen, Erik A.

**Madison**

Berkoff, Herbert A.  
Chopra, Paramjeet S.  
Kroncke, George M.  
Young, William P. Marshfield  
Myers, William O.  
Ray III, Jefferson F.  
Sautter, Richard D.

**CANADA****Alberta****Calgary**

Miller, George E.

**Edmonton**

Callaghan, John C.  
Gelfand, Elliot T.  
Sterns, Laurence P.

**British Columbia****Kelowna**

Couves, Cecil M.

**Vancouver**

Allen, Peter  
Ashmore, Phillip G.  
Harrison, Elliott  
Jamieson, W. R. Eric  
Tyers, G. Frank O.

**Victoria**

Stenstrom, John D.

**W. Vancouver**

Robertson, Ross

**Manitoba****Winnipeg**

Barwinsky, Jaroslaw

Lawrence, G. Hugh

**Mercer Island**

Mills, Waldo O.

**Seattle**

Anderson, Richard P.  
Dillard, David H.  
Hill III, Lucius D.  
Jarvis, Fred J.  
Jones, Thomas W.  
Manhas, Dev R.  
Mansfield, Peter B.  
Miller Jr, Donald W  
Pinkham, Roland D.  
Rittenhouse, Edward A.  
Sauvage, Lester  
Thomas, George I.

**Spokane**

Berg Jr, Ralph

**WEST VIRGINIA****Daniels**

Littlefield, James B.

**East Charleston**

Walker, James H.

**Huntington**

Bryant, Lester R

**Milwaukee**

Flemma, Robert J.  
Hausmann, Paul F.  
Johnson, W. Dudley  
Litwin, S. Bert  
Mullen, Donald C.  
Narodick, Benjamin  
Olinger, Gordon N.  
Tector, Alfred J.

**Wausau**

Davila, Julio C.

**West Bend**

Gardner, Robert J.

**WYOMING****Teton Village**

Kaunitz, Victor H.

**Newfoundland****St. John's**

Brownrigg, Garrett M.

**Nova Scotia****Halifax**

Murphy, David A.

**Kentville**

Quinlan, John J.

**Mabou**

Thomas, Gordon W.

**Ontario****Dorset**

Mustard, William T.

**Hamilton**

Sullivan, Herbert J.

**Kingston**

Charrette, Edward J. P.

**London**

Heimbecker, Raymond

**Nottawa**

Key, James A.

**Ottawa**

Keon, Wilbert J.

Cohen, Morley

**Sudbury**

Field, Paul  
Walker, George R.

**Toronto**

Baird, Ronald J.  
Bigelow, Wilfred G.  
Cooper, Joel D.  
David, Tirone E.  
Ginsberg, Robert J.  
Goldberg, Melvyn  
Goldman, Bernard S.  
Henderson, Robert D.  
Joynt, George H. C.  
McIntosh, Clarence A.  
Pearson, F. Griffith  
Salerno, Tomas A.  
Scully, Hugh E.  
Trimble, Alan S.  
Trusler, George A.  
Weisel, Richard D.  
Williams, William G.

**Westbrook**

Lynn, R. Beverley

**Woodbridge**

Laird, Robert C

**OTHER COUNTRIES**

**ARGENTINA**

**Buenos Aires**

Favaloro, Rene G.

**AUSTRALIA**

**South Australia**

**Piccadilly**

Sutherland, H. D'Arcy

**BRAZIL**

**Sao Paulo**

Jatene, Adib D.  
Zerbini, E. J.

**ENGLAND**

**Bath, Avon**

Belsey, Ronald

**Buckingham**

Sellers, Sir Thomas

**Hereford**

Thompson, Vernon C.

**Herefordshire**

Smith, Mr Roger Abbey

**IRELAND**

**Dublin**

O'Malley, Eoin

**ISRAEL**

**Haifa**

Fishman, Noel H.

**ITALY**

**Bergamo**

Parenzan, Lucio

**JAPAN**

**Kitakyushu**

Miyamoto, Alfonso T.

**Tokyo**

Wada, Juro J.

**Ube**

Mohri, Hitoshi

**MOZAMBIQUE**

**Maputo**

McCord, Colin W.

**Province Of Quebec**

**Montreal**

Blundell, Peter E.  
Chiu, Chu-Jeng (Ray)  
Dobell, Anthony R.  
Grondin, Claude M.  
Lepage, Gilles  
MacLean, Lloyd D.  
Morin, Jean E.  
Mulder, David S.  
Scott, Henry J.

**Outremont**

Bruneau, Jacques

**Quebec**

Gravel, Joffre-Andre

**Sainte-Foy**

Deslauriers, Jean

**Westmount**

Vineberg, Arthur M.

**London**

Braimbridge, Mark V.  
Kennedy, John H.  
Lennox, Stuart C.  
Ross, Donald N.

**FRANCE**

**Bordeaux-Pessac**

Fontan, Francis M.

**Paris**

Binet, Jean-Paul  
Carpentier, Alain F.  
Dubost, Prof. Charles

**GUATEMALA**

**Guatemala City**

Herrera, Rodolfo

**INDIA**

**Raiputana**

Van Allen, Chester M.

**PORTUGAL**

**Lisbon**

Macedo, Manuel E. M.

**SAUDI ARABIA**

**Riyadh**

Merendino, K. Alvin  
Deniord, Richard N.

**SCOTLAND**

**Edinburgh**

Logan, Andrew

**SPAIN**

**Santander**

Duran, Carlos Gomez

**SWITZERLAND**

**Arzier**

Hahn, Charles J.

**Zurich**

Senning, Prof Ake

**VENEZUELA**

**NEW ZEALAND**

**Auckland**

Barratt-Boyes, Sir Brian

**NETHERLANDS**

**Leiden**

Brom, A. Gerard

**P.R. CHINA**

**Beijing**

Ying-Kai, Wu

**Caracas**

Tricerri, Fernando E.

**WEST GERMANY**

**Aachen**

Messmer, Bruno J.

**Hamburg**

Rodewald, Georg

**Hannover**

Borst, Hans G

**THE AMERICAN ASSOCIATION FOR THORACIC SURGERY**

**Charter Members**

**June 7, 1917**

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

**BY-LAWS OF  
THE AMERICAN ASSOCIATION  
FOR THORACIC SURGERY**

**ARTICLE I. Name**

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

**ARTICLE II. Purposes**

The purposes of the Association shall be:

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

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

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

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

**ARTICLE III. Membership**

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

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

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

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

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

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

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

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

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



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

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

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

#### **ARTICLE IV. Board of Directors ("Council")**

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

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

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

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

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

#### **ARTICLE V. Officers**

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

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

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

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

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

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

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

Section 8. The Editor of the Association is not an officer of the Association. He shall be appointed by the Council at its annual meeting; provided, however, that such appointment shall not become effective until approved by the Association at the annual meeting of the Association. The Editor shall be appointed for a five-year term and may not be appointed to more than two successive terms; provided, however, that an Editor completing two years or less of the unexpired term of a previous Editor may be appointed for two successive five-year terms. The Editor shall serve as the Editor of the official Journal and shall be ex officio, the Chairman of the Editorial Board and a member of the Council of the Association. Section 9. Vacancies occurring among the officers named in Section 1 or a vacancy in the position of Editor shall be temporarily filled by the Council, subject to approval of the Association at the next meeting of the Association.

## **ARTICLE VI. Committees**

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

Section 2. The Membership Committee shall consist of seven Active or Senior Members. The Council may appoint not more than one of its own members to serve on this Committee. The duties of the Membership Committee are to investigate all candidates for membership in the Association and to report its findings as expeditiously as possible to the Council through the Secretary of the Association. This Committee is also charged with searching the literature of this and other countries to the end that proper candidates 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 of Directors and Officers**

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

Section 2. Upon specific authorization by the Council, the Association may purchase and maintain insurance on behalf of any and all of its directors or officers or former directors or officers, or any person who has served or shall serve at the Association's request or by its election as a director or officer of another corporation or association, against any liability, or settlement based on asserted liability, incurred by them by reason of being or having been directors or officers or a director

or officer of the Association or of such other corporation or association, whether or not the Association would have the power to indemnify them against such liability or settlement under the provisions of Section 1.

### **ARTICLE X. Papers**

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

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

### **ARTICLE XI. Initiation Fees, Dues and Assessments**

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

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

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

## **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

## GRAHAM EDUCATION AND RESEARCH FOUNDATION

13 Elm Street, Manchester, Massachusetts 01944, (617) 927-8330

President Quentin R. Stiles, M.D., Los Angeles, California

Vice President Floyd D. Loop, M.D., Cleveland, Ohio

Secretary-Treasurer William T. Maloney, Manchester, Massachusetts

Director Andrew S. Wechsler, M.D., Durham, North Carolina

### 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, 36 young surgeons from 18 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. Oulun Laaninsairaala, Oulu, FINLAND
11th	1963-64	Masahiro Saigusa, M.D. National Nakano Chest Hospital, 3-14-20 Egata, Nakano-Ku, Tokyo 165, JAPAN
12th	1963-64	Adar J. Hallen, M.D. Department of Thoracic Surgery, University Hospital Uppsala, SWEDEN
13th	1964-65	Stuart C. Lennox, M.D. Marlowe House, 103 Dulwich Village, London, SE21 7B, ENGLAND
14th	1964-65	Elias Carapistolis, M.D., F.A.C.S. University Hospital A.H.E.P.A., Surgical Clinic Department Aristotelian University of Thessaloniki, Thessaloniki, GREECE
15th	1965-66	Gerhard Friebs, M.D. Chirurgische University Klinik, Graz A-8036, AUSTRIA
16th	1965-66	Ary Blesovsky, M.D. London, ENGLAND
17th	1966-67	C. Peter Clarke, F.R.A.C.S. Ste. #4, 6th Floor, 55 Victoria Parade, Fitzroy 3065 AUSTRALIA
18th	1966-67	G. B. Parulkar, M.D. K.E.M. Hospital & Seth G.S., Medical College, Bombay 400 012, INDIA
19th	1967-68	Claus Jessen, M.D.

20th	1969-70	Surg. Dept. D, Rigshospitalet, Blegdamsvej 9, Copenhagen, DENMARK Peter Bruecke, M.D. AM Steinbruch 29 Linz-Puchenau, A-4020, AUSTRIA
21st	1970-71	Michel S. Slim, M.D. Department of Surgery, American University Hospital, Beirut, LEBANON
22nd	1971-72	Severi Pellervo Mattila, M.D. Department of Thoracic Surgery, Helsinki University Central Hospital, Helsinki 29, FINLAND
23rd	1972-73	Yasuyuki Fujiwara, M.D. Department of Cardiovascular Surgery, Tokyo Medical College Hospital, Shinjuku, Tokyo, JAPAN
24th	1973-74	Marc Roger deLeval, M.D. 8 Thornton Way, Hampstead Garden Suburb, London NW 11, ENGLAND
25th	1974-75	J. J. DeWet Lubbe, M.D. Dept. of Cardio-Thoracic Surgery, University of Stellenbosch P.O. Box 53, Bellville, REPUBLIC OF SOUTH AFRICA
26th	1975-76	Mieczyslaw Trenkner, M.D. Institute of Surgery, 80-211 ul. Debinki 7, Gdansk, POLAND
27th	1976-77	Bum Koo Cho, M.D. Yonsei University, P.O. Box 71 Severance Hospital, Seoul, KOREA
28th	1977-78	Alan William Gale, M.D., FRACP, FRACS 171 Sutherland Paddington 2021 Sidney, AUSTRALIA
29th	1978-79	Eduardo Otero Coto, M.D. Servicio de Cirugia Cardiovascular Ciudad Sanitaria "Le Fe" Valencia, SPAIN
30th	1981-82	Richard Firmin, M.D. The London Chest Hospital, Bonner Road London E2 9JX ENGLAND
31st	1981-82	Claudio A. Salles, M.D. Rua Niquel 237 Belo Horizonte MG, BRAZIL
32nd	1982-83	Yasuhisa Shimazaki, M.D. First Dept. of Surgery Osaka Univ. Medical School Fukushima-ku Osaka 553, JAPAN
33rd	1983-84	Georg S. Kobinia, M.D. 1. Surgical Unit City Hospital Linz Krankenhausstrasse 9 A-4020 Linz, AUSTRIA
34th	1984-85	Aram Smolinsky, M.D. Department of Cardiac Surgery, The Sheba Medical Center Tel Hashomer, 52621, ISRAEL
35th	1985-86	Florentino J. Vargas, M.D. 46 Homer Steet, Newton Center, Massachusetts 02159
36th	1986-87	Ari L. J. Harjula, M.D. Mitalitte 2 A 4, 02680 Espoo 68, SF, FINLAND

## **AMERICAN ASSOCIATION FOR THORACIC SURGERY RESEARCH SCHOLARSHIP**

The American Association for Thoracic Surgery Research Scholarship was established by the Association in 1985. Funded by the Association and individual contributions, the Research Scholarship provides an opportunity for research, training and experience for North American Surgeons committed to pursuing an academic career in cardiothoracic surgery. Administered by the Graham Education and Research Foundation, the program is undertaken within the first three years after completion of an approved cardiothoracic residency and is about two years in duration.



**EDWARD D. CHURCHILL RESEARCH SCHOLARSHIP**

1986-1988 Mark K. Ferguson, M.D.  
*University of Chicago*  
*Department of Surgery, Box 255*  
*5841 South Maryland Avenue*  
*Chicago, Illinois 60637*