# Table of Contents

## Reflections of the Pioneers

1093  
**The first Maze procedure**  
James L. Cox, MD, St Louis, Mo

## Presidential Perspectives

1098  
Patricia Nicolato, DO, and Abe DeAnda, Jr, MD, Richmond, Va, and New York, NY

## Cardiothoracic Surgical Education and Training (EDU)

1101  
**The AATS Academy: Development of a unique concept in medical education**  
V. Sreenath Reddy, MD, MBA, FACS, John S. Ikonomidis, MD, PhD, and Fred A. Crawford, Jr, MD, San Antonio, Tex, and Charleston, SC

1103  
**A positive return on investment: Research funding by the Thoracic Surgery Foundation for Research and Education (TSFRE)**  
David R. Jones, MD, Michael J. Mack, MD, G. Alexander Patterson, MD, and Lawrence H. Cohn, MD, Charlottesville, Va, Dallas, Tex, St Louis, Mo, and Boston, Mass

TSFRE funding for thoracic surgeon–scientists is important in attracting residents to our specialty and in fostering the academic careers of awardees. NIH K to R conversion rates for TSFRE awardees are higher than for the NIH collectively.

1107  
**Perceptions regarding cardiothoracic surgical training at Veterans Affairs hospitals**  
Faisal G. Bakaeen, MD, Elizabeth H. Stephens, PhD, Danny Chu, MD, William L. Holman, MD, Ara A. Vaporiyan, MD, Walter H. Merrill, MD, and Frederick L. Grover, MD, Houston, Tex, Birmingham, Ala, Jackson, Miss, and Aurora, Colo

Forty-three percent (292/676) of cardiothoracic residents, recent cardiothoracic graduates (on or after June 2006), cardiothoracic chairpersons, program directors, associate program directors, and section heads responded to a survey designed to evaluate perceptions relating to the role of VA hospitals in cardiothoracic training. An affiliation with a VA hospital was rated as beneficial by 93% of the responders (273/292), and the cardiothoracic training received at the VA was rated as good to excellent by 73% of the responders (213/292).

1114  
**Curriculum innovation: The key to recruiting the best and brightest**  
George J. Magovern, Jr, MD, and Kathleen A. Simpson, BS, Pittsburgh, Pa

(continued on page 12A)
Neurocognitive and neuroanatomic changes after off-pump versus on-pump coronary artery bypass grafting: Long-term follow-up of a randomized trial

John D. Puskas, MD, Anthony Stringer, PhD, Scott N. Hwang, MD, PhD, Brannon Hatfield, MD, A. Shannon Smith, RN, Patrick D. Kilgo, MS, and Willis H. Williams, MD, Atlanta, Ga

Two hundred unselected patients were randomized to off-pump or on-pump coronary artery bypass grafting. After mean 7.5 years of follow-up, patients undergoing off-pump coronary artery bypass performed better in several neuropsychological domains. Brain MRI in 168 patients showed no significant differences between groups.

Comparison of the effectiveness and safety of a new de-airing technique with a standardized carbon dioxide insufflation technique in open left heart surgery: A randomized clinical trial

Faleh Al-Rashidi, MD, Maya Landenhed, MD, Sten Blomquist, MD, PhD, Peter Höglund, MD, PhD, Per-Axel Karlsson, EBCP, Leif Pierre, CCP, BSc, and Bansi Koul, MD, PhD, Lund, Sweden

A newly developed de-airing technique for open left heart surgery (pleural cavities open, ventilator disconnected during cardiopulmonary bypass, staged perfusion, and ventilation of lungs during de-airing) is safer, simpler, and more effective compared with a standardized CO₂ insufflation technique (pleural cavities unopened, dead space ventilation during cardiopulmonary bypass).

Drug-eluting stents versus coronary artery bypass grafting for the treatment of coronary artery disease: A meta-analysis of randomized and nonrandomized studies

Tristan D. Yan, BSc(Med), MBBS, PhD, Ratnasari Padang, MBBS, Chin Poh, Christopher Cao, BSc(Med), MBBS, Michael K. Wilson, MBBS, Paul G. Bannon, MBBS, PhD, and Michael P. Vallely, MBBS, PhD, Newtown and Sydney, Australia

The present meta-analysis suggests that percutaneous coronary intervention with drug-eluting stents was associated with less periprocedural risks but a higher incidence of postprocedural myocardial infarction, repeat revascularization, and 12-month major adverse cardiac and cerebrovascular events when compared with coronary artery bypass grafting.

Heparinized cardiopulmonary bypass circuits and low systemic anticoagulation: An analysis of nearly 6000 patients undergoing coronary artery bypass grafting

Eivind Øvrum, MD, PhD, Geir Tangen, MD, Stein Tølløfsrud, MD, PhD, Bjørn Skeie, MD, PhD, Mari Anne L. Ringdal, CCP, Reidar Istad, CCP, and Rolf Øystese, CCP, Oslo, Norway

An analysis of 5954 patients undergoing coronary artery bypass grafting with heparin-coated circuits and low systemic anticoagulation (activated clotting time >250 seconds) revealed very satisfactory clinical results, with low rates of blood transfusion and low morbidity and mortality rates. No technical side effects have thus far been documented.

Echocardiographically based treatment of chronic ischemic mitral regurgitation

Antonio M. Calafiore, MD, Angela L. Iacò, MD, Antonio Bivona, MD, Egidio Varone, MD, Salvo Scandura, MD, Patrizia Greco, MD, Antonella Romeo, MD, and Michele Di Mauro, MD, Riyadh, Kingdom of Saudi Arabia; and Catania and Bari, Italy

Echocardiographically based surgical strategy for chronic ischemic mitral regurgitation included prosthesis insertion and annuloplasty, alone or combined with chordal cutting, anterior leaflet augmentation, or exclusion of ventricular scars. No patients showed severe residual mitral regurgitation during follow-up. All survivors were in New York Heart Association functional class I or II.
1157  Stentless biological valved conduit for aortic root replacement: Initial experience with the Shelhigh BioConduit model NR-2000C
Abdullah Kaya, MD, Robin H. Heijmen, MD, PhD, J. C. Kelder, MD, Marc A. Schepens, MD, PhD, and Wim J. Morshuis, MD, PhD, Nieuwegein, The Netherlands, and Brugge, Belgium

Retrospective analysis of the Shelhigh BioConduit in 175 patients resulted in a hospital mortality of 13.7% and a late mortality of 33.1%. Six (4.0%) patients required a reoperation, and endocarditis of the bioconduit was reported in 11 (7.3%) patients, which forced us to look for other alternatives.

1163  Complete repair of Ebstein anomaly in neonates and young infants: A 16-year follow-up
Umar S. Boston, MD, Steven P. Goldberg, MD, Kent E. Ward, MD, Edward D. Overholt, MD, Thomas Spentzas, MD, MS, Thomas K. Chin, MD, and Christopher J. Knott-Craig, MD, Memphis, Tenn, and Oklahoma City, Okla

Our experience with 32 patients over 16 years indicates that complete biventricular repair of neonatal Ebstein anomaly can be accomplished with good long-term survival, TV and RV function, and with acceptable freedom from reoperation.

1170  Individualized computer-based surgical planning to address pulmonary arteriovenous malformations in patients with a single ventricle with an interrupted inferior vena cava and azygous continuation
Diane A. de Zelicourt, PhD, Christopher M. Haggerty, BS, Karthik S. Sundareswaran, PhD, Brian S. Whited, PhD, Jarek R. Rossignac, PhD, Kirk R. Kanter, MD, J. William Gaynor, MD, Thomas L. Spray, MD, Foris Sotiropoulos, PhD, Mark A. Fogel, MD, and Ajit P. Yoganathan, PhD, Atlanta, Ga, Philadelphia, Pa, and Minneapolis, Minn

The virtual surgical planning investigations of 5 patients with a single ventricle with an interrupted inferior vena cava are reviewed to identify the anatomy- and flow-based patient characterizations that can be made for the definition of “global” surgical strategies to minimize the risk of pulmonary arteriovenous malformations.

1178  Cone reconstruction of the tricuspid valve in Ebstein anomaly with or without one and a half ventricle repair
Jinfen Liu, MD, Lisheng Qiu, MD, PhD, Zhongqun Zhu, MD, PhD, Huiwen Chen, MD, PhD, and Haifa Hong, MD, PhD, Shanghai, China

Satisfactory early results can be achieved with cone reconstruction of the tricuspid valve for Ebstein anomaly. However, cone reconstruction of the tricuspid valve alone might not produce ideal midterm results for patients with severe Ebstein anomaly. One and a half ventricle repair should be considered as a planned procedure for these patients.

1184  Myocardial expression of heat shock protein 70i protects early postoperative right ventricular function in cyanotic tetralogy of Fallot
Edward W. K. Peng, MB, BS, MRCS, MD, David McCaig, PhD, James C. S. Pollock, FRCS, Kenneth MacArthur, FRCS, Fiona Lyall, PhD, and Mark H. D. Danton, MD, FRCS(CTh), Glasgow, United Kingdom

The myocardial expression of HSP-70i in the RV was quantified during corrective TOF repair. In the cyanotic group, HSP-70i correlated with better postoperative RV function and oxygen extraction ratio, suggesting that HSP-70i may be important during cardiopulmonary bypass to limit ischemia–reperfusion injury in cyanotic patients.

(continued on page 16A)
1192 Improvements in exercise performance after surgery for Ebstein anomaly

Jan Müller, Andreas Kühn, MD, Manfred Vogt, MD, Christian Schreiber, MD, John Hess, MD, FESC, and Alfred Hager, MD, FESC, München, Germany

Patients with Ebstein anomaly and severe tricuspid regurgitation draw clinical benefit from surgical intervention as measured by exercise testing. This holds true for patients after primary surgery for Ebstein anomaly and for patients being reoperated.

1196 Predictors of recurrence and disease-free survival in patients with completely resected esophageal carcinoma

Paul C. Lee, MD, Farooq M. Mirza, MD, Jeffrey L. Port, MD, Brendon M. Stiles, MD, Subroto Paul, MD, Paul Christos, DrPH, and Nasser K. Altorki, MD, New York, NY

We conducted a retrospective review of patients with completely resected esophageal carcinoma to determine predictors of recurrence and disease-free survival. We found that good performance status, en bloc resection, and early pathologic stage were significant independent predictors of improved freedom from recurrence and disease-free survival.

1207 Accuracy of helical computed tomography in the detection of pulmonary colorectal metastases

Cheng-Ching Chung, MD, Chih-Cheng Hsieh, MD, Hui-Chen Lee, MS, Mei-Han Wu, MD, Min-Hsiung Huang, MD, Wen-Hu Hsu, MD, and Han-Shui Hsu, MD, PhD, Taipei, Taiwan

The sensitivity of helical computed tomography in the detection of pulmonary metastases in patients with colorectal cancer can reach 95%. A unilateral solitary metastatic lesion was an independent factor for prediction of additional metastatic lesions. Video-assisted thoracoscopic surgery is justified in patients with colorectal cancer and unilateral solitary pulmonary metastases.

1213 Management of esophageal anastomotic leaks, perforations, and fistulae with self-expanding plastic stents

Yiyang Dai, MD, Sascha S. Chopra, MD, Sören Kneif, PhD, and Michael Hünerbein, MD, PhD, Berlin, Germany

Esophageal anastomotic leaks, perforations, and fistulae are associated with considerable morbidity and mortality. The aim of the present study was to assess the efficacy of self-expanding plastic stents in the treatment of esophageal leaks. In combination with effective interventional or surgical drainage, stenting is a viable option for the treatment of esophageal anastomotic leaks and perforations, but the success in tracheoesophageal fistula is limited.

1218 Safety distance in the resection of colorectal lung metastases: A prospective evaluation of satellite tumor cells with immunohistochemistry

Stefan Welter, MD, Dirk Theegarten, MD, Tanja Trarbach, MD, Frank Maletzki, ScD, Georgios Stamatis, MD, and Martin Tötsch, MD, Essen, Germany

Immunohistochemistry clearly detects satellite tumor cells around colorectal metastases. The mean distance between satellite tumor cells and the surface of the metastasis was 0.99 ± 0.85 mm. The probability for a complete removal of satellite cancer cells with a safety distance of 1.6 mm, 3.43 mm, and 7.4 mm was 68.3%, 95.5%, and 99.7%, respectively.

(continued on page 18A)
Evolving Technology/Basic Science (ET/BS)

1231 Sutureless replacement of aortic valves with St Jude Medical mechanical valve prostheses and Nitinol attachment rings: Feasibility in long-term (90-day) pig experiments
Eric Berreklouw, MD, PhD, Bart Koene, MD, Filip De Somer, PhD, Stefaan Bouchez, MD, Koen Chiers, DMV, PhD, Yves Taeymans, MD, PhD, and Guido J. Van Nooten, MD, PhD, Eindhoven, The Netherlands; and Ghent and Merelbeke, Belgium

In 10 pigs the aortic valve was replaced suturelessly by Nitinol rings with mechanical valve prostheses, with 90 days’ follow-up. Four pigs did not reach 90 days, but in all pigs at autopsy the devices were at the aortic annulus, without migration, para-device leakage, or damage to the surrounding tissues.

1238 Improvement of cardiac function in the failing rat heart after transfer of skeletal myoblasts engineered to overexpress placental growth factor
Matthias Gmeiner, MD, Daniel Zimpfer, MD, Johannes Hoffeld, MD, Gernot Seebacher, MD, Dietmar Abraham, PhD, Michael Grimm, MD, and Seyeddosseh Aharinejad, MD, PhD, Vienna, Austria

Graft survival is a limiting factor in myoblast transplantation. Delivery of autologous skeletal rat myoblasts overexpressing placental growth factor to the failing rat heart enhanced graft survival, induced angiogenesis, and improved cardiac function. This approach could be beneficial in treatment of ischemia-induced heart failure.

1246 Activated protein C attenuates cardiopulmonary bypass–induced acute lung injury through the regulation of neutrophil activation
Sachiko Yamazaki, MD, Syunji Inamori, ME, Takeshi Nakatani, MD, PhD, and Michiharu Saiga, MD, PhD, Osaka, Japan

Activated protein C is known to regulate coagulation and inflammatory responses. This study revealed that administration of activated protein C before CPB attenuates CPB-induced acute lung injury at least in part through the inhibition of neutrophil activation in a rat model of CPB.

1253 Pulsed ultrasounds accelerate healing of rib fractures in an experimental animal model: An effective new thoracic therapy?
Norberto Santana-Rodriguez, MD, PhD, Bernardino Clavo, MD, PhD, Leandro Fernandez-Perez, MD, PhD, Jose C. Rivero, MD, Maria M. Travieso, MD, Maria D. Fiuza, MD, PhD, Jesus Villar, MD, PhD, Jose M. Garcia-Castellano, MD, PhD, Octavio Hernandez-Perez, BSc, PhD, and Antonio Déniz, MD, PhD, Las Palmases de Gran Canaria and Madrid, Spain

Our study shows that pulsed ultrasound accelerates the consolidation of rib fractures. This study is the first to show that pulsed ultrasound promotes the healing of rib fractures. From a translational point of view, this easy, cheap technique could serve as an effective new therapeutic modality in patients.
1259  **Role of biofilm in *Staphylococcus aureus* and *Staphylococcus epidermidis* ventricular assist device driveline infections**  
Faustino A. Toba, PhD, Hirokazu Akashi, MD, Carlos Arrecubieta, PhD, and Franklin D. Lowy, MD, New York, NY

Driveline infections are among the most common adverse events in ventricular assist device implantation. Bacterial genes involved in biofilm formation play a role in ventricular assist device driveline infections. Biofilm formation facilitates staphylococcal migration along infected drivelines.

1265  **Automatic aortic anastomosis with an innovative computer-controlled circular stapler for surgical treatment of aortic aneurysm**  
Munehisa Takata, MD, Go Watanabe, MD, PhD, Hiroshi Ohtake, MD, PhD, Teruki Ushijima, MD, PhD, Shojiro Yamaguchi, MD, PhD, Yajiro Kikuchi, MD, PhD, and Yoshitaka Yamamoto, MD, Kanazawa and Tokyo, Japan

In our first experience of computer-controlled anastomosis between a pig aorta and an artificial graft, we established a specially designed purse-string suture for both and introduced a mechanical stapling method for vascular anastomosis. The computer-controlled stapling device enabled reliable and speedy vascular anastomosis.

1270  **Does lung allocation score maximize survival benefit from lung transplantation?**  
Mark J. Russo, MD, MS, Berhane Worku, MD, Alexander Iribarne, MD, MS, Kimberly N. Hong, MHSA, Jonathan A. Yang, MD, Wickii Vigneswaran, MD, and Joshua R. Sonett, MD, Chicago, Ill, and New York, NY

The relationship between lung allocation score and survival benefit after lung transplantation was assessed. Those with a mid-priority lung allocation score achieve the greatest survival benefit from transplantation. Survival benefit for low-priority patients is small because of low waiting list mortality, whereas the low survival benefit for higher-priority groups is small because of poor posttransplantation survival.

1278  **Bronchiolitis obliterans syndrome occurs earlier in the post–lung allocation score era**  
Abbas Emaminia, MD, Sara A. Hennessy, MD, Tjasa Hranjec, MD, MS, Damien J. LaPar, MD, Benjamin D. Kozower, MD, MPH, David R. Jones, MD, Irving L. Kron, MD, and Christine L. Lau, MD, Charlottesville, Va

The impact of lung allocation score (LAS) on development of bronchiolitis obliterans syndrome (BOS) was evaluated. Data from 8091 patients undergoing transplantation between 2002 and 2008 demonstrated that the development of BOS occurred earlier in recipients in the post-LAS era (2005–2008) than in those in the pre-LAS era (2002–2005).

1283  **Predictors of massive transfusion with thoracic aortic procedures involving deep hypothermic circulatory arrest**  
Judson B. Williams, MD, Barbara Phillips-Bute, PhD, Syanal D. Bhattacharya, MD, Asad A. Shah, MD, Nicholas D. Andersen, MD, Burak Altitas, MD, Brian Lima, MD, Peter K. Smith, MD, G. Chad Hughes, MD, and Ian J. Welsby, MBBS, Durham, NC

This study examined the independent predictors of massive perioperative transfusion in 168 consecutive patients undergoing thoracic aortic procedures involving deep hypothermic circulatory arrest.

(continued on page 22A)
1289 Cardiotomy suction, but not open venous reservoirs, activates coagulofibrinolysis in coronary artery surgery

Atsushi Nakahira, MD, PhD, Yasuyuki Sasaki, MD, PhD, Hidekazu Hirai, MD, PhD, Mitsunori Matsu, Akimasa Morisaki, MD, Shigefumi Suehiro, MD, PhD, and Toshihiko Shibata, MD, PhD, Osaka, Japan

We compared the respective contribution of cardiotomy suction and open venous reservoirs to perioperative activation in the coagulofibrinolysis and inflammation systems, with identical conditions of priming volume, heparin coating, and protocols of anticoagulation and transfusion. Cardiotomy suction, but not open venous reservoirs, caused perioperative coagulofibrinolysis activation, although neither affected the inflammation system.

1298 Normovolemic modified ultrafiltration is associated with better preserved platelet function and less postoperative blood loss in patients undergoing complex cardiac surgery: A randomized and controlled study

Christian Friedrich Weber, MD, Csilla Jambor, MD, Christian Strasser, Anton Moritz, MD, PhD, Nestoras Papadopoulos, MD, Kai Zacharowski, MD, PhD, and Dirk Meininger, MD, PhD, Frankfurt am Main and Munich, Germany

To assess the influence of normovolemic ultrafiltration (N-MUF) on hemostasis after cardiopulmonary bypass, 50 patients were randomized to a control group or an N-MUF group. Platelet function after N-MUF was increased, and postoperative blood loss was lower in the N-MUF group compared with the control group.

1305 Short- and long-term mortality associated with new-onset atrial fibrillation after coronary artery bypass grafting: A systematic review and meta-analysis

Roop Kaw, MD, Adrian V. Hernandez, MD, MSc, PhD, Iqbal Masood, MD, A. Marc Gillinov, MD, Walid Saliba, MD, and Eugene H. Blackstone, MD, Cleveland, Ohio

New-onset atrial fibrillation is the most common arrhythmia after coronary artery bypass grafting; however, its association with mortality is not well established. Our systematic review shows increased short- and long-term mortality associated with new-onset atrial fibrillation after coronary artery bypass grafting and explores factors that can potentially reduce its occurrence.

1313 An unusual cause of dyspnea in a patient with prior mitral valve annuloplasty and congestive heart failure

Ulrich Lindner, MD, Martina Paetzl, MD, and Christian S. Haas, MD, Luebeck, Germany

1315 Dynamic RING + STRING for ischemic mitral regurgitation: Papillary muscle repositioning and modification of the septal–lateral diameter in the loaded beating heart under echocardiographic guidance

Frank Langer, MD, Heinrich-Volker Groesdonk, MD, Takashi Kunihara, MD, PhD, and Hans-Joachim Schäfers, MD, Homburg, Germany

1317 Reducing operative mortality in valvular reoperations: The “valve in ring” procedure

Filip Casselman, MD, PhD, FETCS, Sebastiaan Martens, MD, Bernard De Bruyne, MD, PhD, and Ivan Degrieck, MD, FETCS, Aalst, Belgium

(continued on page 24A)
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1319</td>
<td>Timing for successful surgical management of heart block after placement of an Amplatzer occlusion device for secundum atrial septal defect repair</td>
<td>Umang Gupta, MBBS, DCH, Shadda J. Al-anani, MD, and Anastasios C. Polimenakos, MD, Chicago, Ill</td>
</tr>
<tr>
<td>1321</td>
<td>Eagle-shaped patch to restore mitral–aortic continuity</td>
<td>Samer Kassem, MD, Francesco Alamanni, MD, and Ghassan A. Moasis, MD, Milan, Italy, and Damascus, Syria</td>
</tr>
<tr>
<td>1323</td>
<td>Totally thoracoscopic resection of a superior mediastinal tumor extending above the thoracic inlet</td>
<td>Toshiki Tanaka, MD, PhD, Kazuhiro Ueda, MD, PhD, Masataro Hayashi, MD, PhD, and Kimikazu Hamano, MD, PhD, Yamauchi, Japan</td>
</tr>
<tr>
<td>1325</td>
<td>A novel technique for identification of the lung intersegmental plane using dye injection into the segmental pulmonary artery</td>
<td>Seiichiro Sugimoto, MD, Takahiro Oto, MD, Kentaroh Miyoshi, MD, and Shinichiro Miyoshi, MD, Okayama, Japan</td>
</tr>
</tbody>
</table>

**Online Only: Brief Clinical Reports**

| e27  | Melkersson–Rosenthal syndrome: An unusual cause of intermittent raised hemidiaphragm?       | Bilal H. Kirmani, MRCS, Christopher M. Dobson, FRCP, FRCPATH, and Joseph Zacharias, FRCS (C-Th), Blackpool and Preston, United Kingdom |
| e28  | Staged repair of pectus excavatum during an aortic valve–sparing operation                  | Natacha Rousse, Francis Juthier, MD, PhD, Alain Prat, MD, and Alain Wurtz, MD, Lille, France |
| e31  | Regional cerebral oxygenation measured by multichannel near-infrared spectroscopy (optical topography) in an infant supported on venoarterial extracorporeal membrane oxygenation | Maria D. Papademetriou, MSc, Ilias Tachtsidis, PhD, M. Banaji, PhD, Martin J. Elliott, MD, Aparna Hoskote, MD, and Clare E. Elwell, PhD, London, United Kingdom |
| e33  | Seven-year outcome of pulmonary valve autograft replacement of the mitral valve in an infant | Tomohito Kanzaki, MD, Masaaki Yamagishi, MD, PhD, Masafumi Yashima, MD, and Hitoshi Yaku, MD, PhD, Kyoto, Japan |
| e36  | Does simultaneous lung–liver transplantation provide an immunologic advantage compared with isolated lung transplantation? | Jay K. Bhama, MD, Joseph M. Pilewski, MD, Diana Zaldonis, MPH, BSN, Paulo A. Fontes, MD, Michael E. Devera, MD, Michael A. Shillo, PharmD, Norihisa Shigemura, MD, PhD, Christian A. Bermudez, MD, Yoshiya Toyoda, MD, PhD, and Kenneth R. McCurry, MD, Pittsburgh, Pa, and Cleveland, Ohio |

**Letters to the Editor**

| 1328 | Modified “turn up” plus adventitia inversion technique for managing porcelain aorta        | Takeshi Shimamoto, MD, Tatsuhiko Komiya, MD, and Genichi Sakaguchi, MD, Karashiki, Japan |
| 1329 | Norwood procedure with right ventricle to pulmonary artery shunt: An underestimated technical surgical variable | Jeffrey H. Shuhaiber, MD, Cincinnati, Ohio |

(continued on page 26A)
Table of Contents (continued)

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
</tr>
</thead>
</table>
| 1330 | Conventional rather than off-pump coronary artery bypass grafting should be performed for non–high-risk patients  
 *Hisato Takagi, MD, PhD, Masafumi Matsui, MD, and Takuya Umemoto, MD, PhD, Shizuoka, Japan* |
| 1331 | Reply to the Editor  
 *Nishith N. Patel, BSc, MB BCh, MRCS, and Gianni D. Angelini, MD, MCh, FRCS, Bristol, United Kingdom* |
| 1332 | Thomas W. Shields, 1922–2010  
 *Joseph LoCicero III, MD, Mobile, Ala* |

### Meetings and Courses

#### Announcements

- **The American Association for Thoracic Surgery**
  - 1334 AATS Inaugural Mitral Conclave
  - 1334 The 91st AATS Annual Meeting
  - 1335 2011 Heart Valve Summit: Medical, Surgical, and Interventional Decision Making
  - 1336 AATS Meetings and Sponsored Events
  - 1336 AATS Online Award Applications

- **The Western Thoracic Surgical Association**
  - 1336 Applications for Membership
  - 1336 WTSA 37th Annual Meeting

- **The American Board of Thoracic Surgery**
  - 1337 Notices
  - 1337 Requirements for Maintenance of Certification

### Reader Services

- **27A** JTCVS Disclosure Statement
- **28A** Information for Readers

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