Annular rupture is an umbrella term covering different procedural-related injuries that may occur in the region of the aortic root and the left ventricular outflow tract during transcatheter aortic valve replacement. According to the anatomical location of the injury, there are 4 main types: supra-annular, intra-annular, subannular, and combined rupture. Treatment approaches include conventional cardiac procedure, isolated pericardial drainage, and conservative therapy. This summary describes theoretical and practical considerations of the etiology, pathophysiology, classification, natural history, diagnostic and treatment strategies, and prevention approaches of annular rupture.

The Impact of Extreme-Risk Cases on Hospitals’ Risk-Adjusted Percutaneous Coronary Intervention Mortality Ratings
Matthew W. Sherwood, J. Matthew Brennan, Kalon K. Ho, Frederick A. Masoudi, John C. Messenger, W. Douglas Weaver, David Dai, Eric D. Peterson

To address concerns that treating percutaneous coronary intervention (PCI) patients with high-risk features may adversely impact hospital performance ratings, Sherwood et al. examined a validated risk-adjustment model in high-risk PCI cases to assess whether sites’ case mix affects their performance ratings. Their study sample included 624,286 PCI procedures at 1,168 sites from the CathPCI Registry in 2010. Crude in-hospital PCI mortality was 1.4%. The V4 NCDR PCI risk-adjusted mortality (RAM) model was well calibrated among high-risk cases. Hospitals treating the highest overall expected risk PCI patients had lower (better) RAM ratings than centers treating lower-risk cases (1.25% vs. 1.51%). Combining high-risk patients over a 2-year period into a single year did not negatively impact sites’ RAM ratings. There was no evidence that treating high-risk PCI cases adversely affects hospital RAM rates.
Access Site Practice and Procedural Outcomes in Relation to Clinical Presentation in 439,947 Patients Undergoing Percutaneous Coronary Intervention in the United Kingdom
Karim Ratib, Mamas A. Mamas, Simon G. Anderson, Gurbir Bhatia, Helen Routledge, Mark De Belder, Peter F. Ludman, Douglas Fraser, James Nolan, for the British Cardiovascular Intervention Society and the National Institute for Cardiovascular Outcomes Research

The influence of access site on patient outcomes was studied in 439,947 procedures from the BCIS (British Cardiovascular Intervention Society) database. This study with a high proportion of transradial access (TRA) procedures (210,260) observed an association with TRA and reduced bleeding and access site complications in stable, non-ST-segment elevation acute coronary syndrome (NSTEACS) and STEACS presentations. An association with reduced major adverse cardiac events was observed in NSTEACS and STEACS. The same associations were observed in a matched cohort comparing TRA to femoral access using closure devices. This suggests the effects observed in randomized trials translate into real patient benefits in routine practice.

Comparison of Sirolimus-Eluting Stenting With Minimally Invasive Bypass Surgery for Stenosis of the Left Anterior Descending Coronary Artery: 7-Year Follow-Up of a Randomized Trial
Stephan Blazek, Cornelius Rossbach, Michael A. Borger, Georg Fuernau, Steffen Desch, Ingo Eitel, Thomas Steirmaier, Philipp Lurz, David Holzhey, Gerhard Schuler, Friedrich-Wilhelm Mohr, Holger Thiele

This analysis assessed the 7-year long-term outcomes of a randomized comparison of percutaneous coronary intervention (PCI) with sirolimus-eluting stents versus minimally invasive direct coronary artery bypass (MIDCAB) surgery for the treatment of isolated proximal left anterior descending lesions. Follow-up was conducted in 129 patients at a median time of 7.3 years (interquartile range: 5.7 to 8.3 years). At 7-year follow-up, PCI by sirolimus-eluting stents and MIDCAB in isolated proximal left anterior descending lesions yielded similar long-term outcomes regarding the primary composite clinical endpoint (22% PCI vs. 12% MIDCAB; p = 0.17) and quality of life. Target vessel revascularization was more frequent in the PCI group (20% vs. 1.5%; p < 0.001).
An Angiographic Tool for Risk Prediction of Side Branch Occlusion in Coronary Bifurcation Intervention: The RESOLVE Score System (Risk prEdiction of Side branch Occlusion in coronary bifurcation interVEntion)

Kefei Dou, Dong Zhang, Bo Xu, Yuejin Yang, Dong Yin, Shubin Qiao, Yongjian Wu, Hongbing Yan, Shijie You, Yang Wang, Zhenqiang Wu, Runlin Gao, Ajay J. Kirtane

The RESOLVE (Risk prEdiction of Side branch Occlusion in coronary bifurcation interVEntion) score system aimed to stratify the risk of side branch (SB) occlusion in patients undergoing coronary bifurcation intervention. A total of 1,545 consecutive patients with 1,601 bifurcation lesions were used to construct and validate the risk model and score system. In multivariable analyses, 6 variables were independently associated with the risk of SB occlusion (model C-statistic = 0.80 [95% confidence interval: 0.75 to 0.85] with good calibration). The SB occlusion rates in both the construction and validation cohort increased significantly across different risk groups. The RESOLVE score can help identify patients at risk for SB occlusion during bifurcation intervention.

SEE ADDITIONAL CONTENT ONLINE

EDITORIAL COMMENT

When You Ask Yourself the Question "Should I Protect the Side Branch?": The Answer Is “Yes”

Antonio Colombo, Neil Ruparelia

Middle-of-the-Night Percutaneous Coronary Intervention and its Association With Percutaneous Coronary Intervention Outcomes Performed the Following Day: An Analysis From the National Cardiovascular Data Registry

Herbert D. Aronow, Hitinder S. Gurm, James C. Blankenship, Charles A. Czeisler, Tracy Y. Wang, Lisa A. McCoy, Megan L. Neely, John A. Spertus

Aronow et al. compared in-hospital mortality and bleeding complications for PCI procedures performed by sleep-deprived versus non-sleep-deprived operators using CathPCI registry data. Our cohort included 1,509,096 daytime percutaneous coronary intervention procedures performed by 5,014 operators. In adjusted analyses, when comparing procedures performed by acutely sleep-deprived with non-sleep-deprived operators, there were no significant differences in mortality (odds ratio [OR]: 1.02; 95% confidence interval [CI]: 0.94 to 1.12; p = 0.61) or bleeding (OR: 1.03; 95% CI: 0.98 to 1.08; p = 0.19). However, a greater degree of chronic sleep deprivation was associated with a higher adjusted risk of bleeding (OR: 1.19; 95% CI: 1.05 to 1.34; p = 0.007).

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EDITORIAL COMMENT

Should Interventionalist Work Hours Be Restricted After a Night on Call?

Kirk N. Garratt
Conduction disturbances requiring permanent pacemaker (PPM) remain a frequent complication of transcatheter aortic valve replacement (TAVR). This study included patients without prior pacemaker who underwent TAVR in the PARTNER (Placement of Aortic TraNs catheterER Valves) trial and registry and investigated the predictors and clinical effect of new PPM. In this population, PPM was required in 173 of 1,973 patients (8.8%). By multivariable analysis, independent predictors of PPM included right bundle branch block, prosthesis to left ventricular (LV) outflow tract diameter ratio, LV end-diastolic diameter, and continued access registry. Patients requiring PPM had longer post-procedure hospitalizations and significantly higher 1-year repeat hospitalization and mortality or repeat hospitalization. There were no significant differences in mortality or LV ejection fraction at 1 year.

**EDITORIAL COMMENT**

**Permanent Pacemaker Implantation Following Transcatheter Aortic Valve Replacement: Still a Concern?**

Marina Urena, Josep Rodés-Cabau

The indications of percutaneous edge-to-edge mitral valve repair with the MitraClip system are currently limited by strict echocardiographic criteria. Broadening indications for this therapy could potentially benefit a large number of patients that are referred to isolated medical management, likely carrying poor long-term prognosis. In the present study, patients that fulfilled the expanded echocardiographic criteria demonstrated similar safety at 30-day follow-up and efficacy through 12-month follow-up after MitraClip implantation compared with safety and efficacy in the control (i.e., strict criteria) group. Furthermore, both groups revealed statistically significant left ventricle reverse remodeling at 12 months, but the between-group baseline differences were sustained.

CONTINUED ON PAGE A-26
**Transfemoral Implantation of Transcatheter Heart Valves After Deterioration of Mitral Bioprosthesis or Previous Ring Annuloplasty**  
Claire Bouleti, Amir-Ali Fassa, Dominique Himbert, Eric Brochet, Gregory Ducrocq, Mohammed Nejjari, Walid Ghodbane, Jean-Pol Depoix, Patrick Nataf, Alec Vahanian

Bouleti et al. evaluated the results of transfemoral implantation of an Edwards Sapien prosthesis in 17 patients after failed mitral bioprosthesis ($n = 6$) and ring annuloplasty ($n = 11$). All patients were in New York Heart Association class $\geq$III with a high surgical risk (Society of Thoracic Surgeons score $18 \pm 22\%$). Procedure was successful in 14 patients (82%). The 18-month survival was $78 \pm 14\%$ for patients with elective procedure. At last follow-up, 75% of patients were in New York Heart Association class $\leq$II. Transfemoral transcatheter heart valve implantation for deterioration of mitral bioprosthesis or surgical repair provides encouraging immediate and midterm results and may be considered for patients unsuitable for surgery or at very high surgical risk.

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**Randomized Controlled Study of Excimer Laser Atherectomy for Treatment of Femoropopliteal In-Stent Restenosis: Initial Results From the EXCITE ISR Trial (EXCimer Laser Randomized Controlled Study for Treatment of Femoropopliteal In-Stent Restenosis)**  
Eric J. Dippel, Prakash Makam, Richard Kovach, Jon C. George, Raghotham Patlola, D. Christopher Metzger, Carlos Mena-Hurtado, Robert Beasley, Peter Soukas, Pedro J. Colon-Hernandez, Matthew A. Stark, Craig Walker, on behalf of the EXCITE ISR Investigators

Femoropopliteal stenting for treatment of peripheral arterial disease (PAD) continues to increase. However, in-stent restenosis (ISR) remains a challenging therapeutic problem due to procedural complications and repeat restenosis. The multicenter, prospective, randomized, controlled EXCITE ISR (EXCimer Laser Randomized Controlled Study for Treatment of Femoropopliteal In-Stent Restenosis) trial enrolled 250 subjects to evaluate the safety and efficacy of excimer laser atherectomy (ELA) with adjunctive percutaneous transluminal angioplasty (PTA) versus PTA alone for treating chronic PAD patients with femoropopliteal ISR. ELA + PTA and PTA subject 6-month freedom from TLR was 73.5% versus 51.8% ($p < 0.005$), and 30-day major adverse event rates were 5.8% versus 20.5% ($p < 0.001$), respectively. ELA + PTA was associated with a 52% reduction in TLR (hazard ratio: 0.48; 95% confidence interval: 0.31 to 0.74).
Angioplasty of Femoral-Popliteal Arteries With Drug-Coated Balloons: 5-Year Follow-Up of the THUNDER Trial
Gunnar Tepe, Beatrix Schnorr, Thomas Albrecht, Klaus Brechtel, Claus D. Claussen, Bruno Scheller, Ulrich Speck, Thomas Zeller

The THUNDER (Local Taxan With Short Time Contact for Reduction of Restenosis in Distal Arteries) investigated the treatment of femoropopliteal arteries with a paclitaxel-coated balloon (PCB). Over 5 years, the cumulative number of patients with target lesion revascularization remained significantly lower in the PCB group (21%) than in the uncoated control group (56%, p = 0.0005). In the small group of patients with angiographic and duplex sonographic follow-up, PCB was associated with a lower rate of binary restenosis (17% vs. 54%; p = 0.04). A benefit of PCB treatment in terms of late lumen loss and target lesion revascularization was seen independent of lesion length.

EDITORIAL COMMENT
The THUNDER Trial Results: Clearing the Way or Ushering the Storm?
Michael R. Jaff
**LETTERS TO THE EDITOR**

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Calcified Nodule Mimicking Red Thrombus on Optical Coherence Tomography
Fernando Alfonso, Javier Cuesta, Teresa Bastante, Fernando Rivero, Santiago Jiménez

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Hiroyuki Hao

The Optimal Cutoff Value for Left Main Minimal Lumen Area of 4.5 mm²: A Word of Caution
Jose M. de la Torre Hernández, Felipe Hernández, Fernando Alfonso

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Spencer B. King III