Futility, Benefit, and Transcatheter Aortic Valve Replacement

Brian R. Lindman, Karen P. Alexander, Patrick T. O’Gara, Jonathan Afilalo

Transcatheter aortic valve replacement (TAVR) is a transformative innovation that benefits many patients with aortic stenosis who were previously untreated. However, many patients die soon after the procedure or lack improvement in quality of life. This emphasizes the need to identify and acknowledge the possibility of futility in some patients considered for TAVR. The multidisciplinary heart valve team needs to weigh a number of factors such as multimorbidity, frailty, and disability in addition to traditional risk factors in order to assess the anticipated benefit of TAVR. The authors review issues to be considered when making and communicating these difficult decisions.
Impact of Delay to Reperfusion on Reperfusion Success, Infarct Size, and Clinical Outcomes in Patients With ST-Segment Elevation Myocardial Infarction: The INFUSE-AMI Trial (INFUSE-Anterior Myocardial Infarction)
Alejandra Guerchicoff, Sorin J. Brener, Akiko Maehara, Bernhard Witzenbichler, Martin Fahy, Ke Xu, Bernard J. Gersh, Roxana Mehran, C. Michael Gibson, Gregg W. Stone

Longer delay from symptom onset to reperfusion is associated with worse outcome in ST-segment elevation myocardial infarction. We studied the relationship between reperfusion delay (<3 vs. $\geq$3 h) and infarct size (IS) and clinical outcomes in The INFUSE-AMI (INFUSE-Anterior Myocardial Infarction) Study. There were 280 patients (62%) with <3-h delay and 170 patients (38%) with $\geq$3-h delay. Earlier reperfusion was not associated with higher rates of final Thrombolysis In Myocardial Infarction flow grade 3 or myocardial blush grade 2/3, but was an independent predictor of smaller IS ($p=0.02$). Mortality at 1 year was reduced in patients with a shorter delay (4.0% vs. 9.2%, $p=0.02$). Thus, in patients undergoing relatively early reperfusion, longer delays were associated with larger IS and 1-year mortality, but not with reduced reperfusion success.

ABSORB Biodegradable Stents Versus Second-Generation Metal Stents: A Comparison Study of 100 Complex Lesions Treated Under OCT Guidance
Alessio Mattesini, Gioel G. Secco, Gianni Dall’Ara, Matteo Ghione, Juan C. Rama-Merchan, Alessandro Lupi, Nicola Viceconte, Alistair C. Lindsay, Ranil De Silva, Nicolas Foin, Toru Naganuma, Serafina Valente, Antonio Colombo, Carlo Di Mario

Fifty complex coronary lesions treated with a bioresorbable vascular scaffold (BVS) undergoing a final optical coherence tomography (OCT) examination were compared with an equal number of matched lesions treated with drug-eluting stents (DESs). A higher balloon diameter/reference vessel diameter ratio was used for pre-dilation in the BVS group ($p<0.01$). In the BVS group, OCT showed greater tissue prolapse area ($p=0.08$) and incidence of proximal edge incomplete strut apposition (ISA) ($p=0.04$) with no difference in the overall ISA. The RAS was 20.2% in the BVS group and 21.7% in the DES group ($p=0.32$). Acute strut fracture was only observed in the BVS group (2 cases). Based on OCT assessment, the BVS showed an acute performance similar to that of second-generation DESs. A different approach to lesion preparation and universal OCT guidance may have helped to achieve this result.
Direct Drug-Eluting Stenting to Reduce Stent Restenosis: A Randomized Comparison of Direct Stent Implantation to Conventional Stenting With Pre-Dilation or Provisional Stenting in Elective PCI Patients

Wouter S. Remkes, Samer Somi, Vincent Roolvink, Saman Rasoul, Jan Paul Ottervanger, A.T. Marcel Gosselink, Jan C.A. Hoornje, Jan-Henk E. Dambrink, Menko-Jan de Boer, Harry Suryapranata, Arnoud W.J. van ’t Hof, on behalf of the Acute Myocardial Infarction Study Group

Direct stenting, without pre-dilation, has previously been shown to be a safe and effective treatment, reducing procedure length, the use of contrast agent, and costs. This study demonstrates that direct stenting with second-generation drug-eluting stents is feasible and safe in the vast majority of patients, which is similar to previous trial results with bare metal and drug-eluting stents. There were no significant differences in the mean minimal lumen diameter and major adverse cardiac events in the direct, conventional, and provisional stenting groups at 9-month angiographic and 2-year clinical follow-up.

EDITORIAL COMMENT

Should Every Drug-Eluting Stent Be Deployed Directly?

Marco A. Magalhaes, Sa’ar Minha, Augusto D. Pichard

Native Coronary Artery Patency After Coronary Artery Bypass Surgery

David Pereg, Paul Fefer, Michelle Samuel, Rafael Wolff, Andrew Czarnecki, Saswata Deb, John D. Sparkes, Stephan E. Fremes, Bradley H. Strauss

The study aim was to determine the prevalence and predictors of new native coronary artery occlusions in 388 patients with coronary angiography at 1-year after coronary artery bypass grafting (CABG). New native coronary artery chronic total obstruction (CTO) occurred in 169 patients (43.6%). In 7.5% of patients, the native artery and its bypass graft were both occluded. A new CTO was more frequent in native arteries with a preoperative proximal stenosis < 90% and in patients with Canadian Cardiovascular Society class 4 angina. Neither the graft type nor graft patency was associated with native coronary artery occlusion. CTO of bypassed coronary arteries is extremely common at 1 year post-CABG.
Fractional Flow Reserve Calculation From 3-Dimensional Quantitative Coronary Angiography and TIMI Frame Count: A Fast Computer Model to Quantify the Functional Significance of Moderately Obstructed Coronary Arteries
Shengxian Tu, Emanuele Barbato, Zsolt Köszegi, Junqing Yang, Zhonghua Sun, Niels R. Holm, Balázs Tar, Yingguang Li, Dan Rusinaru, William Wijns, Johan H.C. Reiber

A novel computer model for fast computation of fractional flow reserve (FFR) from x-ray angiography was presented and validated on 77 vessels in 68 patients. The computed fractional flow reserve by quantitative coronary angiography (FFRQCA) correlated well with FFR measured by pressure wire (r = 0.81; p < 0.001), with a mean difference of 0.00 ± 0.06 (p = 0.541). Applying the cutoff value of <0.8 resulted in 18 true positives, 50 true negatives, 4 false positives, and 5 false negatives. The area under the receiver-operating characteristic curve was 0.93 for FFRQCA. Computation of FFRQCA is a novel method that allows the assessment of the functional significance of intermediate stenosis.

EDITORIAL COMMENT
Fractional Flow Reserve From 3-Dimensional Quantitative Coronary Angiography: Fresh Light Through an Old Window
Alexandra J. Lansky, Cody Pietras

Outcomes With Post-Dilation Following Transcatheter Aortic Valve Replacement: The PARTNER I Trial (Placement of Aortic Transcatheter Valve)
Rebecca T. Hahn, Philippe Pibarot, John Webb, Josep Rodes-Cabau, Howard C. Herrmann, Mathew Williams, Raj Makkar, Wilson Y. Szeto, Michael L. Main, Vinod H. Thourani, E. Murat Tuzcu, Samir Kapadia, Jodi Akin, Thomas McAndrew, Ke Xu, Martin B. Leon, Susheel K. Kodali

As-treated patients in the PARTNER (Placement of Aortic Transcatheter Valve) I trial (n = 2,135) were evaluated for the hemodynamic and short-term outcome of post-transcatheter aortic valve replacement balloon dilation (PD). PD patients had significantly less prosthesis-patient mismatch (p > 0.001) and larger effective orifice areas (p > 0.001) throughout the 1-year follow-up period. PD patients had more strokes occurring >7 days (p = 0.04) but no increase in strokes beyond this period. At 1 year, there was a trend for higher all-cause mortality in PD patients (p = 0.054). Subgroup analysis of patients with none/trace paravalvular regurgitation, as well as multivariable analysis, showed no significant relationship between PD and mortality.

EDITORIAL COMMENT
Balloon Post-Dilation After Transcatheter Aortic Valve Replacement: A Solution Worth Trying in Patients With Residual Aortic Insufficiency
Fabian Nietlispach, Francesco Maisano

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Shared and Differential Factors Influencing Restenosis Following Endovascular Therapy Between TASC (Trans-Atlantic Inter-Society Consensus) II Class A to C and D Lesions in the Femoropopliteal Artery
Osamu Iida, Mitsuyoshi Takahara, Yoshimitsu Soga, Kenji Suzuki, Keisuke Hirano, Daizo Kawasaki, Yoshiaki Shintani, Nobuhiro Suematsu, Terutoshi Yamaoka, Shinsuke Nanto, Masaaki Uematsu

The authors investigated factors associated with restenosis after endovascular therapy of TASC (Trans-Atlantic Inter-Society Consensus) II classes A to C and class D lesions. Diabetes, no stent use, chronic total occlusion, and poor below-the-knee runoff were shared restenosis predictors for TASC II classes A to C and class D lesions, whereas renal failure was a predictor for TASC II classes A to C lesions and female sex for TASC II class D lesions.

SEE ADDITIONAL CONTENT ONLINE

EDITORIAL COMMENT
The Superficial Femoral Artery Conundrum: So Close, Yet So Far Away!
Thomas T. Tsai

Impact of Watchman and Amplatzer Devices on Left Atrial Appendage Adjacent Structures and Healing Response in a Canine Model
Saibal Kar, Dongming Hou, Russell Jones, Dennis Werner, Lynne Swanson, Brian Tischler, Kenneth Stein, Barbara Huibregtse, Elena Ladich, Robert Kutys, Renu Virmani

Watchman (Boston Scientific, Plymouth, Minnesota) and Amplatzer Cardiac Plug (St. Jude Medical, Minneapolis, Minnesota) are the 2 most commonly used devices for left atrial appendage (LAA) closure. In this study, the authors investigated the impact of these 2 devices on LAA adjacent structures and healing response in the canine model at 28 days, and demonstrated that the Watchman had a favorable surface recovery with no impact on the LA adjacent structures. In comparison, in a few instances, the Amplatzer Cardiac Plug was in close proximity to the LAA and neighboring structures, which contributed to the incomplete healing.

SEE ADDITIONAL CONTENT ONLINE

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RADIATION SAFETY

Operator Radiation Exposure and Physical Discomfort During a Right Versus Left Radial Approach for Coronary Interventions: A Randomized Evaluation
Herman Kado, Ambar M. Patel, Siva Suryadevara, Martin M. Zenni, Lyndon C. Box, Dominick J. Angiolillo, Theodore A. Bass, Luis A. Guzman

This is a randomized study to assess radiation exposure and operator discomfort when using the left radial approach (LRA) versus the right radial approach (RRA) for coronary interventions. Operator radiation was measured using radiation badges placed at the head and thyroid. There was a significant increase in external radiation exposure using the RRA versus the LRA (head: median: 6.12 [interquartile range (IQR): 2.6 to 16.6] mRems vs. median: 12.0 [IQR: 6.4 to 22.0] mRems, p = 0.02; thyroid: median: 10.10 [IQR: 4.3 to 25.0] mRems vs. median: 18.70 [IQR: 11.0 to 38.0], p = 0.001). More discomfort was reported with the LRA. The LRA shows a safer profile with decreased radiation exposure to the operator, at the expense of more operator discomfort only during vascular access.

IMAGES IN INTERVENTION

Successful Treatment of Spontaneous Coronary Artery Dissection With Cutting Balloon Angioplasty as Evaluated With Optical Coherence Tomography
Kazuhiko Yumoto, Hojo Sasaki, Hajime Aoki, Kenichi Kato

Full Polymer Jacketing for Long-Segment Spontaneous Coronary Artery Dissection Using Biodegradable Vascular Scaffolds
Gunasekaran Sengottuvelu, Ravindran Rajendran

Valve Migration Into the Left Ventricular Outflow Tract Managed by Coaxial Double-Valve Alignment
Annamaria Nicolino, Massimo Vischi, Shahram Moshiri, Antonio Salsano, Giancarlo Passerone, Francesco Chiarella, Francesco Santini

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Michael D. Seckeler, Chet Villa, Russel Hirsch

ONLINE FEATURE  CoreValve Degeneration With Severe Transvalvular Aortic Regurgitation Treated With Valve-in-Valve Implantation
Jan-Malte Sinning, Mariuca Vasa-Nicotera, Nikos Werner, Sebastian Zimmer, Fritz Mellert, Armin Welz, Eberhard Grube, Georg Nickenig, Christoph Hammerstingl

ONLINE FEATURE  Stent Deformation in Bifurcation Stenting With Final Kissing Balloon Inflation: In Vivo Demonstration With Enhanced Cine Fluoroscopic Imaging
Stephan Achenbach, Christian Schlundt

ONLINE FEATURE  Acute Myocardial Infarction After Kawasaki Disease
Yuhei Kobayashi, Yukari Kobayashi, Atsushi Hirohata

ONLINE FEATURE  Percutaneous Valve-in-Valve Transcatheter Tricuspid Valve Replacement With Simultaneous Paravalvular Leak Closure in a Patient With Refractory Right Heart Failure
Serdar Sevimli, Enbiya Aksakal, Ibrahim Halil Tanboga, Engin Bozkurt

ONLINE FEATURE  Treatment of a Failing St. Jude Medical Trifecta by Medtronic CoreValve Evolut Valve-in-Valve Implantation
Stephan Haussig, Gerhard Schuler, Axel Linke

ONLINE FEATURE  Transcatheter Aortic Valve Implantation in a Patient With Severe Bicuspid Aortic Valve Stenosis and Ascending Aortic Aneurysm
Mao Chen, Yuan Feng, Domenico Mazzitelli, Hong Tang, Xin Wei, Zhen-Gang Zhao, Yuan-Ning Xu, Yan-Biao Liao, De-Jia Huang

ONLINE FEATURE  Catheter-Based Edge-to-Edge Mitral Valve Repair After Percutaneous Mitral Valve Annuloplasty Failure
Carmelo Grasso, Guilherme F. Attizzani, Yohei Ohno, Fabio Dipasqua, Sarah Mangiafico, Margherita Minieri, Anna Caggegi, Stefano Cannata, Salvatore Scandura, Corrado Tamburino

ONLINE FEATURE  Multivessel Spontaneous Coronary Artery Dissection Mimicking Atherosclerosis
Mathieu Lempereur, Kenneth Gin, Jacqueline Saw

ONLINE FEATURE  THESE ARTICLES ARE AVAILABLE ONLY IN THE ONLINE VERSION OF THIS ISSUE

EDITOR’S PAGE

Getting Outside of Our Comfort Zone
Spencer B. King III