Tuesday, April 25, 2017

22nd CARDIOVASCULAR SUMMIT
TCTAP2017

DAILY NEWS

Today's Highlights

Endovascular Symposium
8:30 AM - 5:40 PM
Endovascular Theater, Level 1

11th CTO Live 2017
8:30 AM - 6:10 PM
CTO Theater, Level 1

TCTAP Workshops
8:30 AM - 5:30 PM
Presentation Theater, Level 1

Satellite Symposia
Lunchtime Activities @12:45 PM - 1:45 PM

Moderated E-Poster Competition
10:00 AM - 11:20 AM
E-Poster Zone, Level 3

Moderated Abstract Competition
2:00 AM - 5:50 PM
Abstract Zone, Level 3

Moderated Case Competition
8:30 AM - 6:00 PM
Case Zone, Level 3

Inside this Issue

Welcome Message

Inside TCTAP 2017: Cardio Vascular Summit-Bringing Together All the Advances in Interventional Cardiology

Seung-Jung Park, MD
Asan Medical Center, Korea

Widely recognized as the educational hub where the world's best experts come to gather, TCTAP has built a strong reputation as the world premier conference in the field of cardiovascular medicine. Again this year, TCTAP 2017 will highlight the newest advances and share its vision to create a new legacy for intervention cardiology in the Asia Pacific region in three days. We hope that the participants/attendees enjoy the following highlights and get the best of TCTAP this year.

Live Case Demonstrations from World Renowned Centers

There will be a feast of live cases at TCTAP 2017 on a wide variety of topics including CTO, Coronary and Endovascular Intervention, and Valve. We are very proud to demonstrate various approaches to treatment and provide information on up-to-date medical therapy. All the live cases carefully arranged by the TCTAP committee will enrich your learning experience.

State-of-the-Art Lectures: CTO LIVE, Endovascular Symposium, TCTAP Workshops, Coronary & Valve Symposium, Focused Workshops on Hot Topics

A wide range of topics will be covered during the course of these three full days. Lectures designed to disclose the hottest topics including BRS & DES, Valves, Left Main, Bifurcation, and Multi-vessel PCI, CTO, IVUS & FFR etc. will intrigue and inspire the participants in all aspects.

Continued on page 7

11th CTO Live 2017

CART to Reverse CART: Temporal Trend of Method

Satoru Otsuji, MD
Higashi Takarazuka Satoh Hospital, Japan

CTO Retrograde PCI for chronic total occlusion (CTO) has been continuously improving, and it contributes to procedural success. Now, efficient algorithms have been established from several working groups. Recent retrograde summit data from Japan clearly shows that the critical step of retrograde procedural success is whether the wire passes through the collateral channels. The advent of SUOH 03 wire in Japan changes the frontline wire for retrograde collateral channel crossing from SION, and some improvement was achieved regarding collateral channel crossing. Several methods have been applied for CTO lesion crossing after crossing the collateral channel with both a guide wire and a microcatheter (**Figure 1**, Muramatsu *et al*, CCI 2013;81(4):e187-185). CART technique has been shifted to reverse CART and has been seldom done except in particular cases. Kissing wire technique has limitations, as illustrated in **Figure 2**. However, the difficulty

Continued on page 9

CTO Live 2017 | Coronary Physiology | Partnership Sessions with International Societies and Meetings | Hot Abstract
Coronary Imaging | ACS & Pharmacotherapy: Dissecting the Issues, Exploring Solutions | Endovascular Symposium | Hot Case

General information

Shuttle Bus
Free shuttle bus is provided between COEX and several venue hotels.
Visit the **CVRF booth** for more information.

Certificate of Attendance
Certificate of Attendance for TCTAP 2017 will be distributed along with the badge.
- Registration Booth, Level 3

Cyber Station / Free Mobile Recharge
- Lounge, Exhibition Hall, Level 3
- Lounge, Grand Ballroom Lobby, Level 1

Lost and Found / Coat Room
Hours: **8:00 AM - 6:00 PM**
- Coat Room (next to Room 1A), Level 3

Tour Information
Tour information will be provided by COSMO JIN Tour and Seoul Metropolitan Government.
- Information Booth, Grand Ballroom Lobby, Level 1
- Seoul Promotional Booth, Grand Ballroom Lobby, Level 1

Invitation to the ACT Tour
at CARDIOVASCULAR SUMMIT-TCTAP 2017

We would cordially invite you to the ACT Tour to experience ACT Program at Asan Medical Center.

Pick-up place
ACT Banner next to Information Desk (Lobby, 1F, Coex)

Participants
12 persons per section

Program (For 2 hours)
- Move to ther Asan Medical Center (Curation: 30 min)
- Presentation and Q&A (Duration: 20 min)
- Cathlab, CCU Tour & the Other Facilies (Duration: 40 min)
- Return to the Coex (Duration: 30 min)

Time Table

Date	Section	Departure Time
April 26 (Wed.)	Tour 1	10:00 AM
	Tour 2	4:00 PM

How to Register *First Come, First Served Basis
On-site Registration: ACT Desk at CVRF Booth (3F, Coex)
For more Information about ACT Program,
Please visito http://www.cvrf.org/act/

TCTAP Wrap up Interview

Here, the most debated issues will be discussed in an interactive way. TCTAP 2017 Wrap-up Interviews are 30-minute moderated interview sessions held in an open studio.

The purpose of these interviews is to address professional knowledge and experience on selected topics in details with world's leading experts in the field of cardiovascular medicine. Distinguished experts will highlight various aspects of the selected topics and exchange lessons learned through open discussions. Participants at TCTAP 2017 will be able to watch the interview during the meeting not only in designated spots but also via TCTAP Webcast (webcast.summitmd.com) and TCTAP mobile application in real-time.

Tuesday, April 25

Vulnerable Plaque: To Treat or Not to Treat
11:40 AM - 12:10 PM
Moderator: Ik-Kyung Jang
Interviewees: Takashi Akasaka, Akiko Maehara, Evelyn Regar

Bifurcation Disease: Technique or Concept
2:00 PM - 2:30 PM
Moderator: Yves R. Louvard
Interviewees: Bon-Kwon Koo, Thierry Lefevre, Duk-Woo Park

TAVI
3:30 PM - 4:00 PM
Moderator: Eberhard Grube
Interviewees: Helene Eltchaninoff, E Murat Tuzcu, Darren L. Walters

CTO
4:30 PM - 5:00 PM
Moderator: James Aaron Grantham
Interviewees: Seung-Whan Lee, Toshiya Muramatsu, Etsuo Tsuchikane

Wednesday, April 26

Bioresorbable Vascular Scaffolds: Current Status & Future Perspectives
11:00 AM - 11:30 AM
Moderator: David J. Cohen
Interviewees: Stephen G. Ellis, Adnan Kastrati, Ashok Seth

Left Main Disease: PCI vs. CABG
1:20 PM - 1:50 PM
Moderator: David R. Holmes
Interviewees: Cheol Whan Lee, Imad Sheiban, David Paul Taggart

The finished interviews will be broadcasted on our websites at **www.summit-tctap.com, www.summitmd.com,** and **www.youtube.com/CVRFevents** and on **TCTAP mobile application** during and after the meeting.

Program at a Glance: Tuesday, April 25, 2017

	Endovascular Theater *Level 1*	CTO Theater *Level 1*	Presentation Theater *Level 1*	Other Session Room	Poster Zone *Level 3*	Abstract Zone I, II *Level 3*	Case Zone I, II, III *Level 3*
08:00							
08:30							
09:00							
09:30							
10:00	**Endovascular Symposium** Live Cases & Lectures	**11th CTO LIVE**	**TCTAP Workshop** LM & Bifurcation / DES & BVS		**Moderated E-Poster Competition**		**Moderated Complex Case Competition**
10:30							
11:00							
11:30							
12:00							
12:30	**Satellite Symposia - Lunchtime Activities**						
13:00							
13:30							
14:00							
14:30	**Endovascular Symposium** Live Cases & Lectures	**11th CTO LIVE**	**TCTAP Workshop** Imaging & Physiology / ACS / Valves			**Moderated Abstract Competition**	**Moderated Complex Case Competition**
15:00							
15:30							
16:00							
16:30							
17:00							
17:30							
18:00	**The Partnership Session with International Society** Taiwan, Indonesia, Malaysia, Thailand, Hong Kong, Bangladesh, India						
18:30							
19:00				**Friends Dinner** * Invitation Only			
19:30							
20:00							
20:30							
21:00							

Partnership Sessions with International Societies and Meetings

TTT @ TCTAP 2017
- 6:00 PM ~ 8:00 PM
@ Endovascular Theater, Level 1

3 Countries' Joint Session-ISICAM (Indonesia) & Malaysia LIVE & CIAT (Thailand) @ TCTAP 2017
- 6:15 PM ~ 8:15 PM
@ CTO Theater, Level 1

HKSTENT @ TCTAP 2017: Deep Dive Session on Left Main Intervention 2017
- 6:00 PM ~ 8:00 PM
@ Presentation Theater, Level 1

BIT @ TCTAP 2017: Interesting PCI Cases from Bangla Interventional Therapeutics
- 6:00 PM ~ 7:52 PM
@ Room 105, Level 1

India Live @ TCTAP 2017
- 6:00 PM ~ 7:30 PM
@ Room 203, Level 2

Live Case Transmission from World-Renowned Medical Centers

Asan Medical Center, Seoul, Korea
- 8:35 AM ~ 10:00 AM @ CTO Theater, Level 1
- Operator(s): (Case #1) Seung-Whan Lee, Chang Hoon Lee, Gyung-Min Park (Case #2) Yasushi Asakura, Young Rak Cho
- 10:50 AM ~ 12:00 PM @ CTO Theater, Level 1
- Operator(s): (Case #3) Nae Hee Lee, Jon Suh (Case #4) Toshiya Muramatsu, Han Young Jin, Hyuck Jun Yoon
- 2:00 PM ~ 3:00 PM @ Endovascular Theater, Level 1
- Operator(s): (Case #5) Seung-Whan Lee, Young Rak Cho (Case #6) Mark W. Burket, Gyung-Min Park
- 4:00 PM ~ 5:00 PM @ Endovascular Theater, Level 1
- Operator(s): (Case # 7) John Robert Laird, Jr., Chang Hoon Lee (Case # 8) Pil Hyung Lee

Severance Hospital, Seoul, Korea
- 8:35 AM ~ 9:30 AM @ Endovascular Theater, Level 1
- Operator(s): (Case #1) Jae-Hwan Lee, Chul-Min Ahn (Case #2) Donghoon Choi, Sanghoon Shin
- 10:30 AM ~ 11:30 AM @ Endovascular Theater, Level 1
- Operator(s): (Case #3) Young-Guk Ko, Chul-Min Ahn (Case #4) William A. Gray, Donghoon Choi
- 2:00 PM ~ 3:30 PM @ CTO Theater, Level 1
- Operator(s): (Case #5) Yangsoo Jang, Sung-Jin Hong (Case #6) Byeong-Keuk Kim, Jung-Hee Lee
- Imaging Interpreter: Jung-Sun Kim
- 4:10 PM ~ 5:30 PM @ CTO Theater, Level 1
- Operator(s): (Case #7) Yasumi Igarashi, Jung Rae Cho (Case #8) Yangsoo Jang, Hoyoun Won
- Imaging Interpreter: Jung-Sun Kim

Coronary Imaging

[Debate I: How to Do PCI?] IVUS-Guidance is Better

Myeong-Ki Hong, MD
Severance Hospital, Korea

Emphasis

Intravascular ultra-sound (IVUS) provides anatomic information regarding the coronary artery lumen, wall, and plaques, which can help the accurate evaluation of lesion characteristics with vessel sizing. Thus, the first reason that I prefer the IVUS-guided during percutaneous coronary intervention (PCI) is that IVUS-guided vessel sizing can provide more accurate and typically larger vessel sizing than angiographic-guided. According to an IVUS study validating the IVUS measurement and quantitative coronary angiography (QCA) measurement, reference lumen dimensions measured by QCA only fairly correlated with the reference lumen dimensions measured by IVUS. On average, the reference lumen measured by IVUS was 0.5 mm larger than the measurement by QCA. Furthermore, in a significant number of lesions, the IVUS measurement was larger by 1.0 mm or smaller by 0.5 mm. Also, we can confirm these findings from many observational and randomized clinical trials comparing the IVUS-guided and angiography-guided. In most clinical studies, the implanted average stent diameters were (1) different between the IVUS-guided arm and the angiography-guided arm, and (2) significantly greater in the IVUS-guided arm versus the angiography-guided arm.

The second reason is that IVUS changes the strategies to optimize stent deployment. After stent implantation, underexpansion, malapposition, or edge dissections can be detected by IVUS. Thus, through further intervention based on these IVUS findings, stent optimization can be achieved, resulting in improved clinical outcomes. We can also observe that IVUS-guided arm had higher frequency of adjuvant ballooning after stent implantation with higher pressure and larger balloon, according to many clinical studies comparing the IVUS-guided and angiography-guided. Therefore, current guidelines recommend the use of IVUS to optimize stent implantation for select patients (Class of recommendation IIa, Level of evidence B), and, recently, much evidence demonstrating the clinical usefulness of IVUS has accumulated since prior guidelines were released. Most recent randomized trials which showed statistically significant clinical benefit were performed mainly for complex lesions, such as left main lesions, chronic total occlusions, and diffuse long lesions. Also, a meta-analyses with individual patient-level data from over 2,000 randomized patients demonstrated that IVUS-guided new-generation drug-eluting stent (DES) implantation versus angiography-guided drug-eluting stent implantation was associated with a favorable outcome, particularly the occurrence of hard clinical endpoint (the composite of cardiac death, myocardial infarction, or stent thrombosis) for complex lesions **(Figure 1)**. Thus, much evidence demonstrating that IVUS improves clinical outcomes has been accumulated. In conclusion, IVUS-guided PCI is better, and enough is not enough particularly for complex lesions.

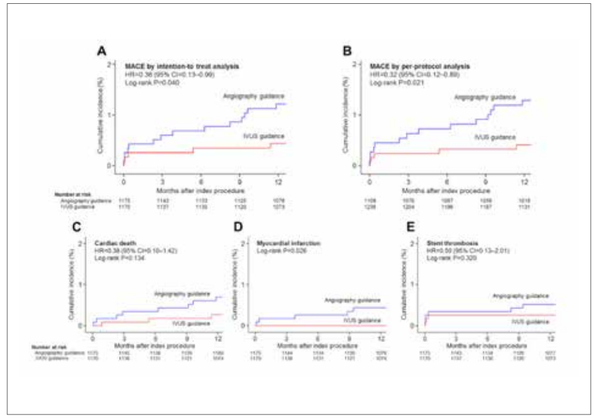


Figure 1. Clinical outcomes of IVUS-guided vs. Angiography-guided new-generation DES implantation: Meta-analysis with individual patient–level data from 2,345 randomized patients (Shin DH, *et al. JACC: Cardiovascular Interventions.* 2016;9(21):2232–2239.)

TCTAP Workshops:
Imaging & Physiology

›› Tuesday, April 25, 2:00 PM ~ 3:40 PM
›› Presentation Theater, Level 1

Coronary Physiology

FFR, iFR, Contrast FFR, CFR, IMR, etc.; Too Many Indices? Please Keep It Simple

Nico Pijls, MD
Catharina Hospital, Netherlands

Physiol

Coronary angiography is fundamentally limited to establishing the func-tional significance of coronary heart disease. Therefore, the importance of additional physiological methods to quantify coronary disease is undisputable.

Coronary flow reserve (CFR) is the maximum increase in blood flow through the coronary arteries above the normal resting volume. Although CFR is a beautiful physiological concept, its usefulness for clinical decision making with respect to revascularization is limited. To determine what an abnormal value of a particular index is, a clear normal value should be known, valid for every patient and every artery, and independent of the location within the artery where the measurement is performed. Clinical measurement of CFR (either by Doppler or thermo) is unreliable in >30% of the patients.

Fractional flow reserve (FFR) is defined as the pressure distal to stenosis relative to the pressure before the stenosis **(Figure 1)**. (DEFER study). It is indicated to perform PCI if FFR is positive (FAME 2 study), and systematic use of FFR improved PCI outcome (FAME study). The superiority of FFR-guided PCI to has been demonstrated now in many RCTs, in almost all clinical and angiographic conditions, such as single to complex multi-vessel disease, LM disease, proximal LAD disease, ACS, and STEMI.

There are some older and newer indices derived from pressure measurement at rest, such as iFR, Pd/Pa at rest, diastolic Pd/Pa, and cFFR (contrast). They do not need to induce hyperemia, but there is 20% possibility of misclassification, especially in large arteries in young patients. Simply put, the greater the hyperemia, the higher the accuracy. Recent studies suggest that, in some populations, resting indices (iFR, Pd/Pa) may be non-inferior to FFR (DEFINE-FLAIR & SWEDE-HEART studies). Both studies were severely underpowered, were conducted on very low risk populations, and had large non-inferiority margins (>50% of events). Besides, a strong trend of increased mortality with iFR (p<0.09) was found in the meta-analysis of both studies.

Evaluation of coronary micro-circulation is mainly performed by microcirculatory resistance (IMR) determined by thermodilution and short coronary injections of saline (IMR=distal coronary pressure x mean transit time). The relevant clinical

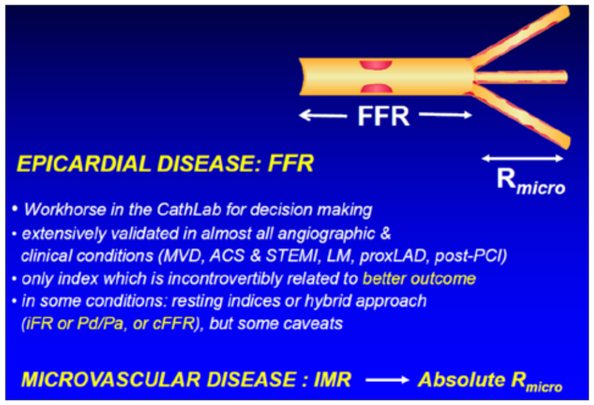


Figure 1. Summary slide of the lecture

During maximal vasodilatation, coronary artery with stenosis shows decreased FFR. FFR is easy to measure, an unequivocal normal value, and not dependent on heart rate, blood pressure, or contractility. Based on a study from the IRIS Registry, FFR shows better clinical value than CFR in terms of major adverse cardiac events (MACE). FFR is the only functional index which has ever been validated independently versus a true gold standard. All studies ever performed in a wide variety of clinical and angiographic conditions found threshold between 0.75 and 0.80 (Sensitivity: 100%; Specificity: 90%). It is safe to defer PCI if FFR is negative parameter is minimal resistance, so hyperemia is needed. The variability is still large (15%), and it is operator-dependent. Value of >25 U is mostly considered as microvascular disease.

Fractional Flow Reserve (FFR); Diagnostic Test for Coronary Artery Disease

Coronary artery disease (CAD) is a leading global cause of morbidity and mortality. Fractional flow reserve (FFR) is a means of assessing the physiological significance of a coronary artery stenosis. FFR citations in medical journals are increasing and FFR-guided management in patient with stable CAD now has class I and class IIa guideline recommendations. We review to evaluate whether FFR can be used as a diagnostic test in CAD by stepwise evaluation **(Figure 2)**.

Nils Johnson, MD
McGovern Medical School at UTHealth (Houston), USA

Step 1: Technical accuracy

The technical accuracy of a test refers to its ability to produce usable information under laboratory conditions and should be evaluated for every diagnostic test under evaluation. Reproducibility of FFR is a good test with a coefficient of variation of 3%. This accuracy 93%.

Step 4: Impact on patient outcome

The ultimate goal of healthcare is to improve patient outcome. When a test is to be used as add-on to an existing pathway, RCTs will be necessary, as the spectrum of patients entering treatment or the choice of therapy itself changes depending on the new information. Pijls, *et al*. reported from DEFER study that the five-year outcome after deferral of PCI of an intermediate coronary stenosis based on FFR of 0.75 or higher is excellent. Pijls, *et al*. reported from FAME 1 study that for lesions deferred on the basis of FFR >0.80, trend of death and myocardial infarction decreased. De Bruyne, *et al.* reported from FAME 2 study that FFR-guided PCI, as compared with medical therapy alone, improved outcome. FFR-

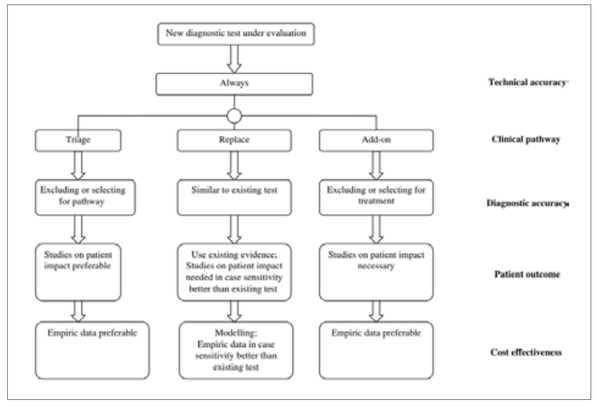


Figure 2. Stepwise evaluation (Van den Bruel A, *et al. J Clin Epidemiol*. 2007;60(11):1116-1122.)

is better than other diagnostic tests used in cardiology practice.

Step 2: Place in the clinical pathway

With the exception of a new screening test, new diagnostic tests fit into an existing pathway. A new test may be added onto an existing clinical pathway because it is more accurate. Some of the most important clinical trials (DEFER, FAME 1, FAME 2, etc.) involving patients with CAD used FFR as an add-on diagnostic test. In these studies, they have assessed and confirmed the validity of FFR as a predictor of outcomes.

Step 3. Diagnostic accuracy

Diagnostic accuracy refers to the test's ability to correctly detect or exclude a target condition or disease in patients. When the test is intended to be used as an add-on, the desired test characteristics depend on its goal. Pijls, *et al*. compared FFR with the results of noninvasive tests commonly used to detect myocardial ischemia. The sensitivity of FFR in the identification of reversible ischemia was 88%, specificity 100%, positive predictive value (PPV) 100%, negative predictive value (NPV) 88%, and

guided therapy improves patient outcome by continuous relationship with prognosis.

Step 5. Cost-effectiveness

Cost-effectiveness analysis goes beyond the individual risks and benefits, but assesses whether the cost of using a given test is acceptable to society. Fearon, et al. reported from FAME 1 study that FFR improved QALY gained and reduced cost. Fearon, et al. reported from FAME 2 study that FFR improved QALY gained but increased cost. The incremental cost-effectiveness ratio of PCI was $36,000 per QALY. FFR-guided PCI improves outcomes and appears economically attractive compared with optimal medical therapy.

FFR has superior repeatability as an add-on test for clinical judgement, high agreement, continuous relationship with prognosis, and cost effectiveness. FFR is a good diagnostic test for CAD.

TCTAP Workshops:
Imaging & Physiology

›› Tuesday, April 25, 2:00 PM ~ 3:40 PM
›› Presentation Theater, Level 1

Partnership Sessions with International Societies and Meetings

TCTAP 2017 Joint Sessions

PSIS

It is with much excitement that we look forward to the collaboration of the interventional societies of Indonesia, Malaysia and Thailand: ISICAM (Indonesia) - ICSM [MyLIVE] (Malaysia) - CIAT (Thai-land). The theme of the collaboration is "The ASEAN Way". The TCTAP 2017 Joint Sessions will be chaired by the leaders in interventional cardiology in the 3 countries, with interventional cardiologists from other countries participating as panelists. The TCTAP 2017 Joint Sessions will feature case presentations by the representative of one country, followed by responses from panelists on country-specific approaches to the case. The presenter will then show how the case was actually treated. Through this session, we hope to see the similarities and differences in the approaches from the participating countries. Dr. Robaayah Zambahari, on behalf of Dr. Sunarya Soerianata and ISICAM, Dr. Wan Azman Wan Ahmad and ICSM [MyLive] as well as Dr. Wasan Udayachalerm and CIAT.

Partnership Sessions with International Societies and Meetings:
3 Countries' Joint Session- ISICAM (Indonesia) & Malaysia LIVE & CIAT (Thailand) @ TCTAP 2017

›› Tuesday, April 25, 6:15 PM ~ 8:15 PM
›› CTO Theater, Level 1

India Live @ TCTAP, 2017

The combined session of Indialive @ TCTAP is being held on April 25, 2017 in Seoul during the TCTAP. The highlights of this joint session will be based upon the work done in India during the last few years in the fields of coronary artery disease and structural heart disease. Dr. Ashok Seth would be sharing the Indian experience with TAVR. There will be a thought-provoking talk by Prof. Upendra Kaul on the status of PCI vs. CABG in the era of new generation DES, emphasizing the changing scene based upon the seminal study TUXEDO India that shows clear superiority in terms of efficacy and safety of the everolimus stents. The results of the EXCEL study were predicted by this study showing equivalence of the two procedures. The results of the new generation 100 microns vascular scaffold developed in India will be highlighted by Prof. VK Bahl. The retrograde method of opening CTO's, which has been picking up in India in the recent years, will be highlighted by Dr. HK Bali. The additional value of resolving the issues during PCI by adjunct intravascular imaging techniques will be elaborated by a speaker from Korea. The session will end by having a panel discussion on the future of BVS. It is hoped that this session will further strengthen the ties between India Live and TCTAP and would lead to active collaboration between the two bodies in promoting science.

Partnership Sessions with International Societies and Meetings:
India Live @ TCTAP 2017

›› Tuesday, April 25, 6:00 PM ~ 7:20 PM
›› Room 203, Level 2

Inside TCTAP 2017: Cardio Vascular Summit - Bringing Together All the Advances in Interventional Cardiology

Continued from page 1

Spotlights on New Clinical Trials & New Data from AMC

Distinguished studies including the most recent data were revealed in this session on Thursday, April 27. It is designed to share the current clinical experience and provide insight on recent trials on topics that are at the center of extreme controversy. We are certain that the presentations and subsequent debates on these impressive trials will be of great educational value. Eye-catching data from Asan Medical Center will also be presented.

International Chambers: Partnership Session with Global Society

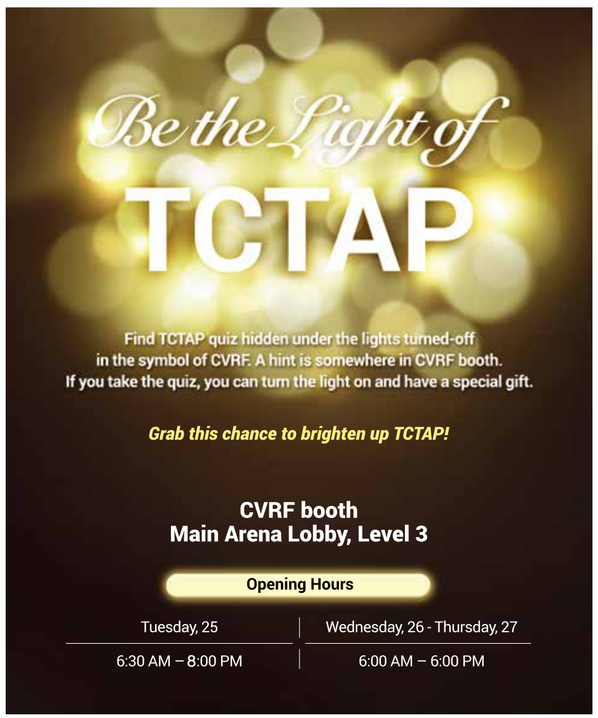
Highly reputed international societies organize and present their own session at TCTAP. Faculties from all over the world will gather to broaden the view of the attendees and expose them to different treatment approaches from each country. We thank all delegates for their unstinting support and contribution.

Moderated Abstracts & Cases Competition Sessions

There is no better time and place than TCTAP to enjoy the gripping abstracts and cases. The sessions will be held from Tuesday, April 25 to Thursday, April 27 to give participants invaluable insights from experts' focused reviews. Presenters can also gain professional visibility and expand knowledge about new technology and practical tips relevant to their research area. It will be full of thought-provoking research and positive competition driven by enthusiastic cardiologists from all over the world.

Main Arena:
Opening of TCTAP 2017

›› Wednesday, April 26, 9:30 AM ~ 9:35 AM
›› Main Arena, Level 3



11th CTO Live 2017

Continued from page 1

of antegrade preparation for reverse CART can sometimes be overcome by using controllable guide wires such as GAIA series antegradely. Classic reverse CART technique also has limitations, as shown in **Figure 3**. Besides these limitations, multiple stent implantations would be mandatory if a large hematoma is created by subintimal tracking. Therefore, the AP CTO algorithm recommends this technique in case of ambiguous vessel course CTO and/or severe calcified

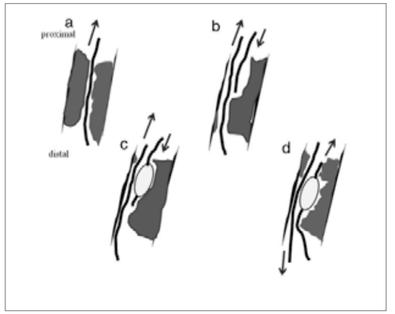


Figure 1. Retrograde CTO crossing techniques (a) retrograde direct crossing (b) kissing wire technique (c) reverse CART technique (d) CART technique

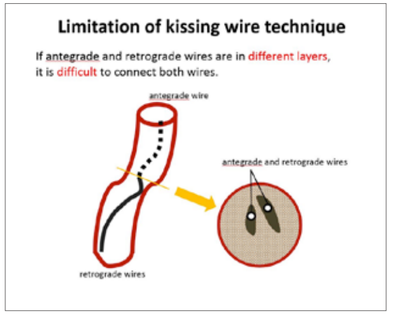


Figure 2. Limitation of kissing wire technique

CTO lesion unsuitable for contemporary reverse CART technique. **Figure 4** shows the concept of contemporary reverse CART technique. Figure 4 shows the concept of contemporary reverse CART technique. To avoid creating a large hematoma that leads to multiple stenting and to save the procedural time that reduces contrast volume and radiation exposure, the AP CTO club algorithm also strongly recommends contemporary reverse CART in the step of CTO lesion crossing. Therefore, the current trend of retrograde procedures is contemporary reverse CART, and we also recommend this technique for retrograde CTO PCI procedure.

The Newer, The Better - Shiro Ono, MD (Saiseikai Yamaguchi General Hospital, Japan)

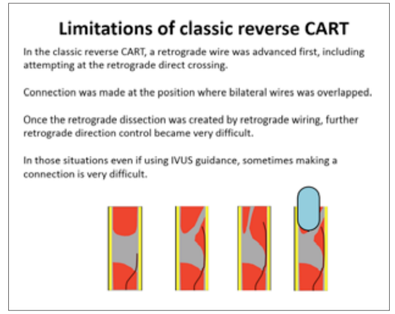


Figure 3. Limitations of classic reverse CART

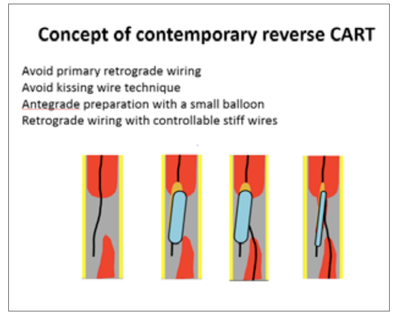


Figure 4. Concept of contemporary reverse CART

Microcatheters are essential tools in PCI for CTOs, and their development and improvement have contributed to the increase in the success rate of PCI in CTO cases. Microcatheters are very small hypotubes that are used for wire support and stability during a CTO attempt. Currently, we have many kinds of microcatheters such as FineCross, Corsair, Caravel, Tornus, Crusade, Sasuke etc. The most important properties of microcatheters needed for daily practice are crossability and trackability. The Terumo FineCross, which has a tapered design and a stainless steel, braided structure throughout the length of the catheter, is used to approach highly stenosed, complex lesions, especially when we are dealing with tortuous vessels. The Asahi Corsair has been developed as the dilator of collateral channels. Its braided wire design and scored tungsten tip act as a screw to help it pull its way through occlusions and small collateral channels. The new Corsair named Corsair Pro has been improved by minimizing the stiffness difference between the tip and the shaft joint, which would enable tracking of severely bent vessels. The Asahi Caravel also has superb crossability, trackability and guidewire control, which would show ideal support catheter performance for antegrade and retrograde procedures. Compared to Corsair, Caravel has a low profile with less limitation for device selection. Multifunction catheters such as Crusade and Sasuke have been used for side branch access and parallel wiring, which are essential techniques, especially in antegrade procedure. Newly developed Asahi Sasuke, as well as Corsair and Caravel, has a loaded tapered soft tip, which brings good visibility and high trackability. Improvement of devices for CTO would make procedures easier and safer, but the most important thing is to use any device properly.

A New Approach to Antegrade Re-canalization Coronary CTO: CrossLock™ Catheter

Richard R. Heuser, MD
St. Luke's Medical Center, USA

This device started out as a replacement for the standard anchoring balloon used in crossing chronic total occlusions (CTO). The anchoring balloon is shorter than any other commercially available balloon at about 4 mm. It is very compliant and goes up to 6 mm. We found this to be useful in crossing coronary CTOs.

The next version of this support catheter is called CrossLock™. CrossLock™ has some similarities as the GuideLiner in that you can pass various catheters, stents and atherectomy devices while it is being deployed. However, the difference from the GuideLiner is that CrossLock™ has a distal elastomeric balloon that goes up to 8 mm to keep the inner catheter stable and it provides stronger support **(Figure 5)**. Unlike the GuideLiner, it is also an excellent device in peripheral intervention, both CTOs as well as complex peripheral arterial disease lesions. Both of these centering balloon systems allow the operator to stay in the lumen, reducing the likelihood of dissection, and allows the physician to save time, fluoroscopy and contrast. Unlike any peripheral support catheter, you can keep it in place and use various wires, catheters, balloons and stents while it is deployed. We now have an LP CrossLock™ which is smaller for infrapopliteal CTOs (3 mm in diameter). It also has the ability to be utilized with various crossing devices, lasers, as well as stents. This portfolio of products will allow the interventionist to be more successful in treating both coronary and peripheral lesions in the future.

Figure 5. Concept of contemporary reverse CART

11th CTO Live 2017

›› Tuesday, April 25, 8:30 AM ~ 6:10 PM
›› CTO Theater, Level 1

ACS & Pharmacotherapy: Dissecting the Issues, Exploring Solutions

Atrial Fibrillation & Anti-thrombotic Regimens: Finding the "Sweet-Spot" from RCTs

Freek W.A. Verheugt, MD
Onze Lieve Vrouwe Gasthuis (OLVG), Netherlands

ACS

Prevention of bleeding in patients with atrial fibrillation (AF) undergoing percutaneous coronary intervention (PCI) with drug-eluting stents (DES) remains one of the most challenging problems in interventional cardiology. Dr. Verheugt discussed these challenging issues in the session on acute coronary syndrome and pharmacology. According to recent studies as well as a large Danish registry, when dual antiplatelet therapy (DAPT) is combined with warfarin, bleeding increased two- to three-fold, especially when early bleeding was enhanced. Thus, the search continues for ways to reduce the risk of bleeding complications. There are three randomized studies available in this field. The WOEST trial showed that aspirin can be safely skipped. In the ISAR-TRIPLE trial, 6 weeks of clopidogrel on top of aspirin and warfarin was not inferior to 6 months of clopidogrel. Non-vitamin-K oral anticoagulants (NOACs) for stroke prevention in AF may be useful in the setting of triple therapy because they appear safer than warfarin, especially with respect to intracranial hemorrhage. Therefore, several randomized trials using NOACs in combination with antiplatelet agents are ongoing to test whether NOACs plus either one or two antiplatelet agents is associated with better safety outcomes in patients with non-valvular AF **(Table 1)**. Dr. Gibson, *et al*. recently assessed the effectiveness of rivaroxaban plus either one or two antiplatelet agents on 2,124 patients with non-valvular AF who had undergone PCI with stenting (the PIONEER AF-PCI trial): low-dose rivaroxaban plus a $P2Y_{12}$ inhibitor for 12 months vs. very-low-dose rivaroxaban plus DAPT for one, six or 12 months vs. standard therapy of a dose-adjusted vitamin K antagonist plus DAPT for one, six or 12 months. The primary outcome was clinically significant bleeding. Patients who received either low-dose rivaroxaban plus a $P2Y_{12}$ inhibitor or very-low-dose rivaroxaban plus DAPT had lower rates of significant bleeding compared with the standard triple therapy group **(Figure 1)**. In contrast, the rates of death from cardiovascular events, myocardial infarction, or stroke were similar across the three groups. However, the number of study patients is too small to draw firm conclusions regarding efficacy from these data, and further studies are required. Nevertheless, these findings suggest that there seem to be significant benefits without parallel harms from new antithrombotic regimens (NOACs plus $P2Y_{12}$ inhibitors) compared with to full-dose triple therapy.

Table 1. Ongoing trials in PCI for AF patients with or without aspirin

Ongoing trials in PCI for AF patients with or without aspirin

Trial	n	Experimental arm	Control arm	Clinicaltrials.gov	Primary endpoint
RE-DUAL PCI	2,500	dabigatran* $P2Y_{12}$	warfarin $P2Y_{12}$ aspirin	02164864	Bleeding
AUGUSTUS**	4,600	apixaban/warfarin $P2Y_{12}$	warfarin $P2Y_{12}$ aspirin	02415400	Bleeding
ENTRUST AF-PCI	1,500	edoxaban $P2Y_{12}$	warfarin $P2Y_{12}$ aspirin	NA	Bleeding
MANJUSRI[1]	296	warfarin ticagrelor	warfarin clopidogrel aspirin	02206815	Bleeding

*150 mg bid vs. 110 mg bid
**ACS with or without PCI only

[1] Contemp Clin Trials 2015;40:166-171

olvg

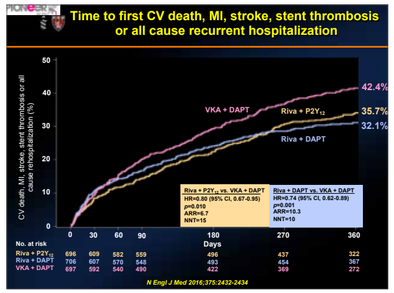


Figure 1. Time to first CV death, MI, stroke, stent thrombosis or all cause recurrent hospitalization

TCTAP Workshops:
ACS & Pharmacotherapy: Dissecting the Issues, Exploring Solutions

›› Tuesday, April 25, 3:40 PM ~ 4:30 PM
›› Presentation Theater, Level 1

Endovascular Symposium

The interest and needs for endovascular therapy are progressively increasing in the current era as the prevalence is on the rise. During the Endovascular Symposium, there will be valuable segments about endovascular intervention in peripheral artery disease for beginners to experts.

Endovascular Session I. Changing Paradigm and Future Concepts in Peripheral Intervention: Iliac to SFA

Lawrence A, Garcia, MD
St. Elizabeth's Medical Center, USA

Endo

For the first session of the program, speakers will present regarding the changing pa-radigm and future concepts in peripheral interventions, from iliac to SFA. The answer to a very difficult question, "DES vs. DCB: When to Choose?", will be provided by Dr. Mark W. Burket.

Dr. Lawrence A. Garcia will speak about 'Peripheral Vascular Restenosis a Core Lab Driven Classification of SFA Restenosis, a Potential to Unify Scientific Trials".

Currently, endovascular therapy for the femoro-popliteal location remains a first line therapy. There are a myriad of technologies for treatment in this location however, not one has emerged as the default therapy or "gold" standard. All technologies have successes in their primary patency. This remains important. However, the failure mode (i.e. restenosis or thrombosis or occlusion) of the target lesion become equally important. Not solely for the fact of retreatment but more so towards the ideal of health care costs. Therefore, being able to characterize the failure mode (i.e. restenoses) becomes critical, not solely in the outcome of retreatment, but in the selection of device and specific technology at the time of the index procedure. What Dr. Garcia has done development of the system as a scoring system regardless of treatment strategy at the index procedure to characterize the restenosis that can be applied through core lab and individual operators. This system reviewed 8 registries or RCT Medtronic trials involving 2,400 patients and reviewed over 400 clinically driven TLR events within the first year and developed a scoring system on the pattern of restenosis **(Figure 1)**.

The initial concept of this classification system will be presented during this session. The implications are a couple of very important points. First, this will classify restenotic patterns specific to the femoro-popliteal segment and not rely solely on stenting or coronary trials for the descriptors. Second, this will be developed across a myriad of device technologies, stent and non-stent to include atherectomy, PTA and DCB. In this way, the classification of restenosis will also unify the patterns of failures among and between devices and trials where none has existed before. Finally, it may allow a phenomenal opportunity to fully understand the health care costs associated with any one device as to a success and more importantly its failure. Also, Dr. John Robert Laird, Jr. will give a presentation to stress about the "Medical Therapy, Current Guideline and More Things That Will Change the Management of PAD Patients".

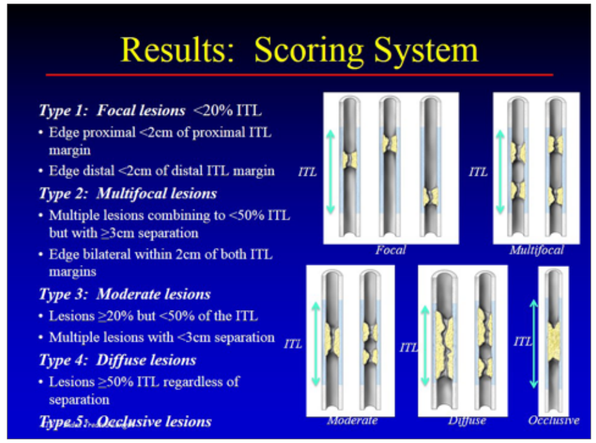


Figure 1. Scoring system on the pattern of restenosis

Endovascular Session II. Solutions for Risky Aorta

John Robert Laird, Jr, MD
UC Davis Medical Center, USA

Robert Bersin, MD
Swedish Heart and Vascular, USA

Aorta is still very dangerous and a risky target for all interventionists. Thus, TCTAP has prepared a dedicated session titled, "Solutions for Risky Aorta", which will include talks on "Anatomical Decision: Suprarenal vs. Infrarenal Devices" by Dr. John R. Laird, and "Venting and Snorkeling Difficult Aortic Necks with the Trivascular Endograft" by Dr. Robert Bersin. In the trivascular endograft, there some definitions regarding adjunctive procedures. For example, venting is a covered stent placed into the renal artery or SMA vessel adjacent to the main body of the EVAR device, where the covered stent does not cross the proximal sealing ring. The aortic lumen of the renal or SMA covered stent is directed superiority to the grafts sealing collar, resembling a snorkel. Snorkle is a covered stent parallel to the main aortic stent-graft to extend the proximal sealing zone while maintaining side vessel patency. Snorkle grafts extend across one or both sealing rings and are directed superiorly above the main body sealing collar. Dr. Bersin will discuss further on how venting of visceral vessels can be performed in short neck situations reliably with the Trivascular Ovation endograft. Also, he will further explain on the topic of why the Alto endograft should facilitate short neck/no neck venting and reduce the need for snorkel grafts. Furthermore, explanation on the biopolymer sealing rings, which provide superior sealing for snorkel grafts with the potential for less gutter leak **(Figure 2)**. Endobags may transform our ability to provide endovascular solutions for hostile neck anatomy.

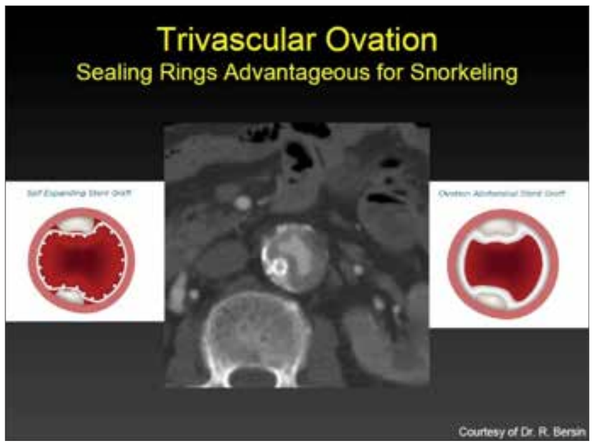


Figure 2. Trivascular ovation: Sealing rings advantageous for snorkeling

Endovascular Session III. Changing Paradigm and Future Concepts in Peripheral Intervention: BTK Intervention

The third session is dedicated for the BTK intervention, especially because best efforts must be devoted to save limbs. Dr. Pil Hyung Lee will be discussing on the topic, "Treating Single Vessel is Enough," as this is a fundamental question in the treatment. Furthermore, to answer another interested topic, Dr. Lawrence A. Garcia will present on "How Can We Identify Patients Before Amputation Is Imminent?: Steps and Programs for Identifying and Treating Patients Earlier to Enhance Limb Preservation".

Endovascular Session IV. Carotid Intervention

In regard to carotid intervention, there are many topics of ongoing debates, including medical therapy, carotid endarterectomy (CEA) and carotid artery stenting (CAS). During the Carotid Intervention session, aforementioned topics and on the improvement of the prognosis of CAS, such as new approach, embolic protection device, stent design and new system will be presented and discussed.

Piotr Odrowaz-Pieniazek, MD
Jagiellonian University/ John Paul II Hospital Krakow, Poland

Dr. Mark W. Burket will open the session with his presentation on "Where Are We Now? Current Scientific Evidences from Clinical Trials and Upcoming New Horizon". Piotr Odrowaz-Pieniazek MD PhD will be presenting on "New Road for Carotid Intervention".

The tremendous progress and development of new carotid artery stenting (CAS) technologies has led to the increased clinical use in the treatment of carotid artery stenosis is increasingly used in everyday clinical practice. Aging patient populations and many comorbidities (e.g. after neck radiation, severe coronary artery disease or congestive heart failure) make less invasive endovascular method sometimes the only therapeutic option for both symptomatic and asymptomatic carotid stenosis. In these patient groups, femoral access for CAS procedure can be difficult or even impossible. Several clinical situations that preclude doing CAS procedure via femoral artery might be present **(Figure 3)**.

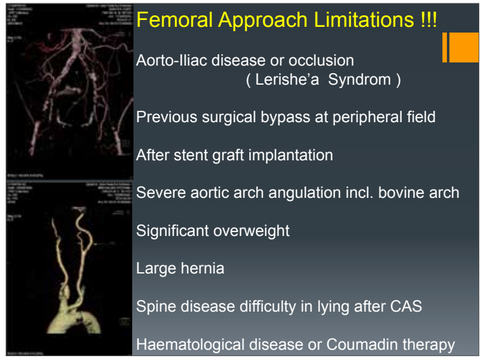


Figure 3. Limitations of femoral approach

Radial artery is currently the routine access for coronary procedures and is also often practiced by CAS operators. Although special diagnostic catheters, guide wires, guiding catheters or destination sheaths are required, there are many data from literature and arguments in favor of increasing the frequency of CAS pro-cedures from radial access. The only si-gnificant limitation of this approach is the use of distal protection. In our high-volume center, where more than 3,200 CAS procedures are performed, proximal protection is being used in about half of the cases. The use of Mo.Ma system for CAS from radial access is not recommended especially in the Asian population.

In high-risk symptomatic patients with high plaque volume and "string-sign" stenosis, when femoral access is not feasible or associated with the risk of possible complications, a new and very promising solution using proximal protection system for CAS procedure is available. It is the TransCarotid Artery Revascularization (TCAR) with flow reversal **(Figure 4)**.

William A. Gray, MD
Main Line Health/ Lankenau Heart Institute, USA

This technique, based on the principle of backflow during CAS (used before in Gore Flow Reversal), is a very promising method, as it eliminates difficulty in maneuvering with diagnostic catheters in the aortic arch, which sometimes become an issue when femoral or radial access is used. It can be a method of choice for vascular surgeons, as direct access to the common carotid artery is a technique they are already familiar with. The results of the ROADSTER multicenter registry using the En Route (SilkRoad Medical) Flow Reversal system make it possible to look op-timistically at the development of this type of brain protection technique during CAS procedures in the nearest future.

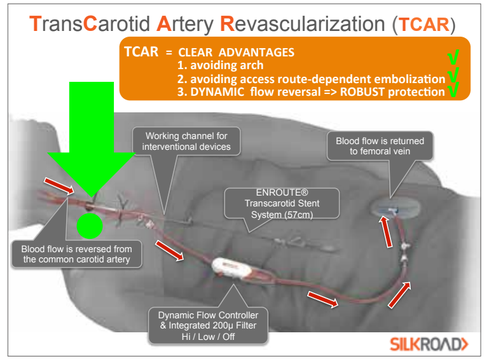


Figure 4. Transcarotid artery revascularization

The possibilities of new vascular access in the treatment of carotid stenosis based on experience make CAS procedure fea-sible for the patients, who had contraindications for endovascular treatment of carotid stenosis until now. Moreover, it is important that CAS centers have the right equipment and new technologies with a comprehensive approach to the interventional treatment of carotid atherosclerosis.

Dr. William A. Gray will give his presentation on "New Design in Stent: Micromesh Technology Compared with Closed or Opened Cell Design". With the provision of thorough contents, the audience will have the opportunity to gain newest updates.

Endovascular Symposium
›› Tuesday, April 25, 8:30 AM ~ 5:40 PM
›› Endovascular Theater, Level 1

Bioresorbable Vascular Scaffold Implantation for the Treatment of Coronary in Stent Restenosis: Long-term Clinical Outcomes of a Multicenter Italian Experience

Elisabetta Moscarella, MD
Second University of Naples AO Dei Colli, Italy

Hot Ab

Even though drug eluting stents have significantly reduced the rate of in-stent restenosis (ISR) compared to bare metal stents, ISR still exists, and the treatment of ISR is still challenging. In this setting, the use of bioresorbable vascular scaffold (BVS) appears very attractive, as it allows drug delivery combined with transient vessel scaffolding, thus obviating the limitations of drug-eluting stent or balloon as ISR therapy. Today, Dr. Elisabetta Moscarella from Second University of Naples AO Dei Colli, Italy and her colleagues presented their analysis of the clinical outcome of patients with ISR treated with BVS. They aimed to investigate the long-term results following BVS use in ISR lesions. A prospective analysis was performed on all patients that underwent percutaneous coronary intervention (PCI) with BVS implantation for ISR at 7 Italian Centers. The primary endpoint was the device-oriented composite end-point (DOCE, Cardiac death, target vessel myocardial infarction: TV-MI, ischemia-driven target lesion revascularization: ID-TLR) at the longest follow-up available. From April 2012 to June 2014, a total of 116 patients (127 lesions) underwent PCI for ISR with BVS implantation. Among the ISR lesions, the majority was DES (78, 61.6%), de novo (92, 72.4%) ISR, and 81 (63.8%) were diffuse-ISR. Procedural success was achieved for all (100%) patients. No in-hospital death, myocardial infarction (MI), or revascularization occurred. At median follow-up time of 20 months (IQ, 15-24), 14 (12.1%) ID-TLR occurred, 3 (2.6%) target vessel MI and 6 (5.2%) cardiovascular deaths occurred. DOCE occurred in 17 (14.7%) patients. Definite/probable scaffold thrombosis occurred in 2 (1.7%) patients. Dr. Elisabetta Moscarella concluded that, *"To the best of our knowledge, we report the largest registry with the longest follow-up available on the use of BVS for ISR treatment. Our registry suggests that the use of BVS implantation for the treatment of complex DES and BMS ISR lesions might be associated with acceptable long-term clinical outcomes."*

Moderated Abstract Competition I
›› Tuesday, April 25, 2:40 PM ~ 2:50 PM
›› Abstract Zone I, Level 3

Incompletely Ligated Coronary Fistula Treated by Transcatheter Embolization with Vascular Plug

Ha Young Choi, MD
Soonchunhyang University Cheonan Hospital, Korea (Republic of)

Hot Ca

Non-surgical management of large coronary aneurysm depends on the location and anatomy of the aneurysm and the clinical context. Coil embolization and stenting have been used as non-surgical management of coronary artery aneurysms. This morning, Ha Young Choi, et al. from Soonchunhyang University Cheonan Hospital, Korea, presented a unique case of transcatheter embolization with Vascular Plug for incompletely ligated coronary fistula. A 46 year-old female patient was transferred from a local hospital because of effort-induced chest discomfort. She had no significant cardiovascular risk factors such as diabetes or hypertension. She told that, seventeen years ago, she had suffered from chest discomfort and dyspnea from a large coronary artery fistula (CAF) and was treated by surgical ligation at another hospital. She had no illness comparable to Kawasaki disease. Coronary CT angiography showed large, aneurysmal coronary fistula between the left main and the entire course of anatomical LCX draining into the left ventricle (LV). The fistula showed a short segmental stenosis with surgical materials because of incomplete surgical ligation. The distal LCX drained into the LV directly, and the LCX territory of the LV was supplied from collateral circulation from the RCA and diagonal artery. Coronary angiography revealed the similar findings to CT results **(Figure 1)**. She wanted to occlude the fistula completely without open heart surgery. After review of the CT angiography and coronary angiography, they decided to perform transcatheter embolization with Ampltzer Vascular Plug (AVP). A 6F sheath was inserted through the right radial artery, and the left coronary artery was engaged with a 6Fr JL4 guiding catheter (Cordis). They inserted a coronary guide wire (Run through, Terumo) into the fistula and passed the narrowed portion and performed intravascular ultrasonography (IVUS) evaluation for precise assessment about the fistulous tract. At the narrowest segments except the ligated portion, which was located just proximal to the incompletely ligated portion, vessel diameter was about 10.2 mm by IVUS measurement. A 6F JR catheter was inserted deep within the fistula for better backup support, and was then placed with its tip at the proximal of the narrowest portion. A 12 mm Amplatzer Vascular Plug 2 (AVP 2) was loaded and delivered into the fistula. Afterwards, the plug was released from the cable. Selective angiography by means of a guiding catheter, performed 5 minutes after the deployment of AVP 2, revealed complete occlusion of the fistula at the plug level, and the distal LAD flow was good **(Figure 2)**. After discharge, single antiplatelet agents were continued, and the patient is asymptomatic. Three month later, a follow-up coronary CT angiography revealed that the aneurysmal CAF was completely occluded. (Figure 2). In comparison with many other devices, the AVP offers several advantages, including the ease of delivery, a wide range of device sizes, and the opportunity to reposition the device safely during and after the initial deployment. This morning, Dr. Choi said that "Our case is of particular interest - the fistula was partially ligated and had a very large reference diameter. We completely occluded the incompletely ligated fistula with a carefully selected vascular plug. Optimal result of our case suggests that it is feasible and safe to apply an AVP for transcatheter occlusion of a large coronary artery fistula."

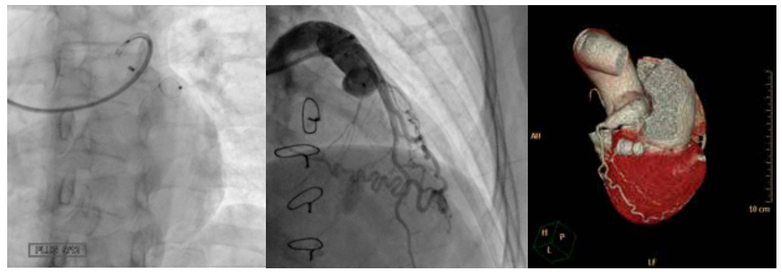


Figure 2. OCT images of the three most common underlying mechanisms for ACS/SCD - plaque rupture, plaque erosion, and calcified nodule.

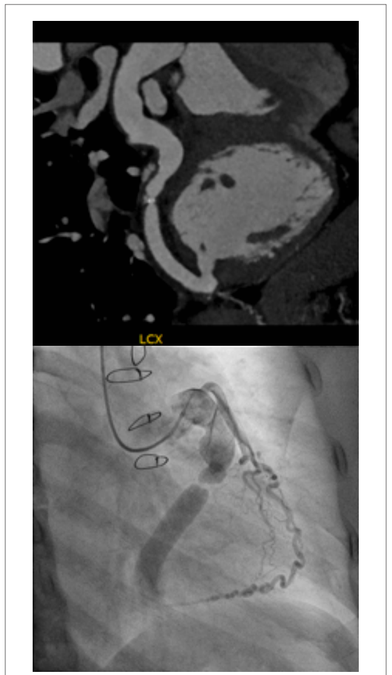


Figure 1. Pre-procedural CT and coronary angiogram

Moderated Complex Case Competition III

›› Tuesday, April 25, 8:30 AM ~ 8:40 AM
›› Case Zone III, Level 3

Clinical Outcomes of "Real World" Patients Receiving Novel Abluminal Coated Sirolimus Eluting Stent

Hot Ab

In the recent era, newer generation stent implantation has become the treatment of choice among patients with ischemic heart disease. Today afternoon, Dinesh Shah, et al. from India presented the clinical outcomes of novel abluminal coated sirolimus eluting stent. They aimed to examine the safety and efficacy of Abluminus® DES+, a novel abluminal coated sirolimus eluting stent, in real-world patients with coronary artery disease. The study is prospective, multi-center and enrolled patients from a real-world clinical practice. The principle endpoints were Major Adverse Cardiac Events (MACE) composite of cardiac death, target vessel myocardial infarction (TV-MI), or target lesion/vessel revascularization (TLR/TVR) and stent thrombosis (ST) within 2 years. ST was defined as per ARC. A total of 1,841 patients with 2,172 lesions were treated with 2,387 Abluminus® DES+ stents. Total population of the study was predominated by male patients (79.52%). 37.05% of the patients presented with concomitant diabetes and 44.98% patients presented with concomitant hypertension. Acute myocardial infarction accounted for 34% of the patients. The majority of the lesions were situated in the left anterior descending artery (49.13%). 1-year follow-up was available in 82.78 % patients and MACE rate was 2.36%. 59.58% of the patients in total completed 2 years' follow-up, and MACE occurred in 3.37%, mainly driven by TLR/TVR (2.46%), TV-MI (0.55%) and cardiac death (0.36%). ST was reported as 0.66% for 1 year. There was no increment of MACE at 2 years. They found that long-term clinical outcomes of ABLUMINUS® DES+ in "Real World" population demonstrated good performance, efficacy, and safety up to two years, with no late or very late stent thrombosis.

Moderated Abstract Competition I

›› Tuesday, April 25, 4:00 PM ~ 4:10 PM
›› Abstract Zone I, Level 3

Transcatheter Mitral Valve Repair for Subacute Infective Endocarditis

Jae Yoon Park, MD
Mayo Clinic, USA

Hot Ca

Transcatheter-based techniques for the treatment of significant mitral regurgitation (MR) have evolved tremendously in the past decade. Among all catheter-based mitral therapies, the leaflet repair MitraClip system has the largest clinical experience worldwide to date. MitraClip system has shown established and reproducible safety profile and effective reduction of MR with improvement of symptoms and quality of life in high-risk surgical patients. Today Dr. Jae Yoon Park, *et al.* from Mayo Clinic, USA, introduced a successful case of MitraClip repair for subacute infective endocarditis. A 75 year-old man with a recent diagnosis of enterococcus faecalis native mitral valve infective endocarditis (IE) four weeks prior on outpatient parenteral antimicrobial therapy presented with recurrent fevers and dyspnea. His medical history was notable for coronary artery disease status post four vessel coronary artery bypass surgery nine years prior, peripheral arterial disease, and type 2 diabetes mellitus. The repeat blood cultures were negative but repeat echocardiography was notable for severe mitral regurgitation (compared to mild four weeks prior) with a smaller vegetation on the atrial surface of the middle segment of the anterior mitral leaflet. In addition, head magnetic resonance imaging demonstrated two acute lacunar infarcts without neurologic sequelae. Despite continued medical therapy, he developed cardiogenic shock and renal failure requiring hemodynamic support. By transesophageal echocardiography (TEE), there were two jets of mitral valve regurgitation, one just medial and one just lateral of A2-P2, collectively severe in severity (Figure 1). As he was deemed an inoperable candidate, after a heart team discussion, he was felt to be a candidate for transcatheter mitral valve repair given his hemodynamic instability. In the catheterization laboratory, an 18F Dry Seal sheath was placed into the right common femoral vein. Subsequently, a trans-septal puncture was performed in the posterior and mid–to-inferior portion of the fossa ovalis with an 8F Mullins sheath. The interatrial septum was dilated with an Inoue dilator to facilitate the placement of a diagnostic catheter for continuous hemodynamic monitoring and the placement of the standard guiding catheter of the MitraClip system. After obtaining biplane and 3D imaging by TEE, the first MitraClip was placed in the A3-P3 position. The V-wave of the left atrium decreased from 54 mmHg to 41 mmHg, but there was still evidence of more than 2+ residual mitral regurgitation. As such, a second MitraClip was placed in the A2-P2 position. The V-wave was further reduced to 34 mmHg after the second clip was deployed. Also, the transmitral gradient was 3 mmHg at a heart rate of 62 bpm with only mild regurgitation **(Figure 1)**. Finally, the patient had a successful transcutaneous mitral valve repair with 2 MitraClip placement in the A2-P2 and A3-P3 scallops without complications. Dr. Jae Yoon Park summarized that *"Early valve surgery is critical in optimally managing patients with complicated IE. In those with high surgical risk or inoperable risk, percutaneous approach to valve repair may be considered only after a heart team and multidisciplinary discussion."*

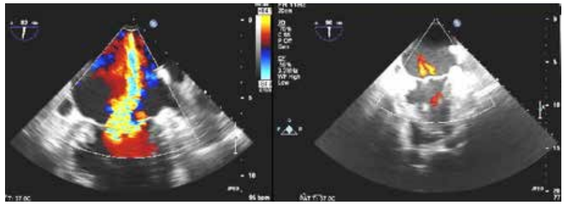


Figure 1. Pre- and post- TEE findings

Moderated Complex Case Competition I

›› Tuesday, April 25, 11:40 AM ~ 11:50 AM
›› Case Zone I, Level 3

Use Statins to Treat risks[1†], not just cholesterol

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※ **ALPS**(Atorvastatin Landmark ProgramS)? Extensively studied in more than 400 ongoing and completed clinical trials including more than 80,000 patients worldwide.[10]

LIPITOR® atorvastatin calcium trihydrate tablets

Reference 1. Stone NJ, Robinson J, Lichtenstein AH, Merz CN, Blum CB, Eckel RH, Goldberg AC et al.2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Circulation. 2014;129:S1-S45 **2.** Koren MJ, Hunninghake DB, on behalf of the ALLIANCE Investigators. Clinical outcomes in managed-care patients with coronary heart disease treated aggressively in lipidlowering disease management clinics: the ALLIANCE study. J Am Coll Cardiol 2004;44:1772-79 **3.** Sever PS et al. for the ASCOT investigators. Prevention of coronary and stroke events with atorvastatin in hypertensive patients who have average or lower-than-average cholesterol concentrations, in the Anglo-Scandinavian Cardiac Outcomes Trial – Lipid Lowering Arm (ASCOT-LLA): a multicentre, randomized, controlled trial. Lancet 2003;361:1149-58. **4.** Colhoun HM, Betteridge DJ, Durrington PN et al. Primary prevention of cardiovascular disease with atorvastatin in type 2 diabetes in the Collaborative Atorvastatin Diabetes Study (CARDS): multicentre randomised placebo-controlled trial. Lancet 2004;364:685-96. **5.** Athyros VG et al. Treatment with atorvastatin to the National Cholesterol Educational Program goal versus "usual" care in secondary coronary heart disease prevention. The GREek Atorvastatin and Coronary-heart-disease Evaluation (GREACE) study. Curr Med Res Opin 2002;18:220-28. **6.** Schwartz GG et al. Effects of atorvastatin on early recurrent ischemic events in acute coronary syndromes: the MIRACL study: a randomized controlled trial. JAMA 2001;285:1711-18. **7.** Cannon CP et al. Intensive versus moderate lipid lowering with statins after acute coronary syndromes. N Engl J Med 2004;350:1495-504. **8.** LaRosa JC et al. for the Treating to New Targets (TNT) Investigators. Intensive lipid lowering with atorvastatin in patients with stable coronary disease. N Engl J Med 2005;352:1425-35. **9.** Newman C, Tsai J, Szarek M, Luo D, Gibson E. Comparative safety of atorvastatin 80mg versus 10mg derived from analysis of 49 completed trials in 14,236 patients. Am J Cardiol. 2006;97[11]:61-67. **10.** Data on File, Pfizer **11.** IMS Patient Years Experience

[APPEARANCE] white, round, film-coated tablets. [COMPOSITION] atorvastatin calcium trihydrate 10.85mg, 21.70mg, 43.40mg, 86.80mg (equivalent to atorvastatin 10mg, 20mg, 40mg, 80mg) [INDICATIONS] Atorvastatin is indicated to reduce the risk of myocardial infarction, revascularization procedure, angina and stroke in adult patients with multiple risk factor but without clinically evident CHD; to reduce the risk of myocardial infarction and stroke in patients with type 2 diabetes and without clinically evident CHD but with multiple risk factor; to reduce the risk of nonfatal myocardial infarctions, fatal and nonfatal stroke, revascularization procedures, hospitalization for CHF and angina in adult patients with clinically evident CHD. Atorvastatin adjunct to diet in boys and postmenarchal girls and is indicated for administration by heterozygous familial hypercholesterolemia in pediatric patients (10-17 years of age) [DOSAGE AND METHOD OF ADMINISTRATION] The dosage of Lipitor is 10 to 80mg once a day. Doses may be given at any time of day and with or without food. [PRECAUTIONS FOR USE] Warnings Atorvastatin therapy should be discontinued if a significant increase of creatine kinase (CK) level is observed or if myopathy is diagnosed or suspected. In addition, atorvastatin therapy should be temporarily withheld or discontinued in any patient with an acute, serious condition suggestive of a myopathy or having a risk factor predisposing to the development of renal failure secondary to rhabdomyolysis (e.g., severe acute infection, hypotension, major surgery, trauma, severe metabolic, endocrine and electrolyte disorders, and uncontrolled seizures). (Please refer to Myopathy/Rhabdomyolysis section in General Precautions.) Contraindications 1) In patients with hypersensitivity to atorvastatin or any component of this medication 2) Active liver disease or unexplained persistent elevations of serum transaminases exceeding 3 times the upper limit of normal 3) Myopathy 4) During pregnancy or in women of child-bearing potential, while breast-feeding 5) Pediatric patients younger than 10 years old 6) Because of lactose contained in this drug, it should not be administered to the patients with hereditary problems of galactose intolerance, Lapp lactase deficiency or glucose-galactose malabsorption. Adverse Events Most frequently reportes adverse events reported in various clinical trials include, malaise, dyspepsia, nausea, flatulence, constipation, diarrhea, abdominal pain, headache, insomnia and myalgia regardless of casual relationship General Precautions Some evidence suggests that statins as a class raise blood glucose and in some pa-tients, at high risk of future diabetes, may produce a level of hyperglycaemia where formal diabetes care is appropriate. This risk, however, is outweighed by the reduction in vascular risk with statins and therefore should not be a reason for stopping statin treatment. Patients at risk (fasting glucose 5.6 to 6.9 mmol/L, BMI>30kg/m2, raised triglycerides, hypertension) should be monitored both clinically and biochemically according to national guidelines [EXPIRY DATE] 2015.08.28 Please refer to your local product labeling for full prescribing information.

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