CSI NIC Mid Term Meet 2023

UNUSUAL COMPLICATION OF ROTABLATION

Dr AB Mehta, Mumbai

Rota Burr implantation results when the burr fails to move. Burr entrapment occurs when the burr has surpassed the lesion but cannot be retracted. The causes of entrapped Rota Burr are forceful forward propulsion and small size.

The management of entrapped Rota burr includes manual retraction of burr in dynaglyde mode, using the pull-push technique to guide catheter extension, passing buddy wire from contralateral side and small balloon by the side and dilating the lesion, and vasodilator use.

Burr entrapment can be prevented by the use of gentle pecking motion and short runs during rotablation (<15 seconds), and in cases with eccentric and extremely calcified lesions, smaller burrs are used with high-speed rotation.

BUBBLES; CORONARY AIR EMBOLUS: WHAT TO DO?

Dr John F John, Kozhikode

Coronary air embolism is an uncommon complication encountered during cardiac catheterization with an incidence of 0.1% to 0.3%. They can be classified into small air embolism and large air embolus. The former are usually benign, whereas the latter can result in acute ischemia, electromechanical disassociation, bradycardia, ventricular tachycardia/ventricular fibrillation (VT/VF), cardiac arrest, death.

Most air embolization occurs when catheters used for vascular procedures are not adequately aspirated and flushed. The introduction of air into catheters can also occur by entrainment during balloon catheter or guidewire removal. Air embolization can also result from the rupture of balloon catheters, although in the case of coronary dilatation balloon, the amount of air is generally quite small. Furthermore, paradoxical embolism can occur when air/gas entrained in the venous circulation manages to enter the systemic arterial circulation causing symptoms.

Air embolization can be attributed to several factors, such as: suboptimal manifold preparation; poor connection of the manifolds pressure dampening; use of large devices (may entrain air); trapping technique without back bleeding; rupture of a poorly prepared balloon.

Hence, some of the tips to manage large coronary embolism, include: shrink the bubble – administer 100% oxygen and coronary wire to break up bubble. Push the bubbles through intracoronary epinephrine, and forceful boluses of saline. Aspirate the bubbles using thrombectomy catheter or guide extension catheter. Hyperbaric chamber. Support the patient using vasopressors, pacing and mechanical circulatory support, if needed.

RADIAL ARTERY ACCESS – TYPES AND TECHNIQUES

Dr Sanjay Chugh, Gurugram

Some of the common question asked during radial artery access, include how to puncture a blocked radial artery, why should a blocked radial artery be punctured, what to do if the punctured artery is blocked, etc. The first step to deal with such situation include palpating the radial artery at wrist with compressed ulnar before puncture.

A positive pulse indicates that the radial puncture can be performed. There are several types of radial access, such as: *Right radial at wrist:* RRA, standard sheath, GSS; *Sheathless* – Railway system; *Radial access in anatomical snuffbox:* dTRA; *Left radial – At wrist:* LRA and in anatomical snuffbox: L-dTRA; *Access in small diameter radial arteries:* SDRA.

In left radial access, puncture from left and work from right at groin level. According to the DATA-STAR study, When compared to SDRA, dTRA have several benefits, such as: convenience of and less time to hemostasis; less chance of forearm hemotoma resulting in reduced risk of compartment syndrome; distal radial access occurs superficial to fascial planes; RA is available as alternative route immediately after use of dTRA for a repeat procedure.

Hence, the recommendations to deal with small diameter radial arteries are: choose the biggest of four forearm arteries; compress other forearm artery while puncturing a small artery; downsize and use glide sheath slender; make the radial artery bigger; if both radial and ulnar are blocked distally, go high radially.

Lastly, remember "The best puncture is the 1st puncture."

DK CRUSH-STEPWISE APPROACH

Dr K Sivaprasad, Thiruvananthapuram

The DK crush technique is a specialized approach used in the treatment of complex coronary artery bifurcation lesions during percutaneous coronary intervention(PCI). It aims to provide optimal stent apposition, adequate coverage of the lesion and restoration of blood flow in both the main and side branches.

Hence, some of the steps that can be used to optimize the outcomes of the procedure are – *Access:* Radial access with a 6F guide catheter or femoral access with 7F/8F guide catheter, especially if there is calcification and tortuosity. *Guide:* ALO. 75/AL 1 for RCA and EBU XB for LCA LMB assess the vessels for angulation, calcification and tortuosity. Wire both SB/aSB and MV. *Prepare both lesions:* NCB is preferred, but SCB can be used if the lesions are not trackable. Also, atherectomy can be used in cases when arterial diameter is 0.25 to 0.5 mm or less.

The DK crush approach can be performed in step-wise manner as follows: wire MV and SB; balloon MV and SB; SB stenting with protrusion/MV balloon in position for crush; balloon crush of SB stent; re-wiring of SB through proximal strut; first kissing balloon inflation; MV stent deployment; POT; re-wiring of SB; final kissing balloon inflation; Re-pot.

ESSENTIALS OF CALCIUM MANAGEMENT

Dr Sanjog Kalra, Toronto

Appropriate imaging must be empahsized in coronary imaging, defining the pathology – intravascular imaging defines the calcium morphology and severity and is an important step in planning optimal treatment, and finally planning treatment – through calcium modification.

- In cases with intravascular calcium deposits, the coronary angiography may show – isolated radio-paque spots (mild), multiple radio-opacities (moderate), radio-opacities present in the both sides of the lumen observed without cardiac motion (severe).
- Tiny calcium deposits (based on the optical coherence tomography [OCT]-based calcium scoring system) may not be visualized in angiography.
- Calcium morphology can be – concentric, eccentric, nodular or mixed.
- Calcium severity can be defined by – the arc, length, thickness, depth and the presence of nodules.
- OCT calcium score and IVUS calcium scores can be utilized.
- Calcium nodules can be eruptive or fibrous; the severity must be ascertained before customizing the treatment strategy.
- Calcium modification can be accomplished through – fractures, reverberations, luminal gain and nodule debulking.

PRIMARY PCI IN HIGH-THROMBUS BURDEN

Dr Brian Pinto, Mumbai

Thrombus is observed in nearly 60% of the STEMI patients. Yet, there are no guideline recommendations to deal with thrombus burden. At present, TIMI thrombus grade is used to classify angiographically for the purpose of quantitative evaluation in clinical trials and day to day practice.

Thrombus Grade

Grade 0: no angiographic evidence of thrombus

Grade 1 (possible thrombus present): reduced contrast density, haziness, irregular lesion contour or a smooth convex meniscus at the site of total occlusion suggestive but not diagnostic of thrombus

Grade 2 (small thrombus): definite thrombus, with greatest dimensions ≤1/2 vessel diameter

Grade 3 (moderate thrombus): definite thrombus but with greatest linear dimension >1/2 but <2 vessel diameters

Grade 4 (large-sized thrombus): definite thrombus, with the largest linear dimension >2 vessel diameters

Grade 5 total occlusion – reassess after reperfusion

Meanwhile, it has been seen that large thrombus burden in PCI increase the likelihood of: PCI MACE rates; stent thrombosis; distal embolization/no reflow.

Also, no reflow condition can lead to larger infract, lower survival rate at 5 years, higher rates of congestive heart failure. Based on the findings of several studies, such as TAPAS trial, it has been suggested that thrombus aspiration must begin proximal to occlusion, with multiple passes, until canalization of the vessel is demonstrated. However, current guidelines do not recommend the routine use of thrombus aspiration in STEMI cases. It suggests that thrombus aspiration should be reserved for high thrombus burden cases. Additionally, it has been seen that early administration of DAPT with potent P2Y12 inhibitor can decrease thrombus burden. Similarly, prehospital administration of GPI rescues the thrombus burden. PLATO trial has shown that GPI is associated with very low rates of stent thrombosis.

Similarly, epinephrine, a potent beta-receptor antagonist can reduce the risk of thrombus by dilating the blood vessels in lower doses. COAR trial has shown that epinephrine was well-tolerated in patients with no reflow. The study showed that no immediate table death or VF was observed. Lastly, epinephrine effectively improved no reflow condition in patients with final TIMI 3 flow.

RETROGRADE CTO-PCI

Dr Prathap Kumar N, Kollam

A retrograde approach increases the success rate in chronic total occlusion (CTO) PCI. However, it is associated with a higher complication risk. Thus, the procedure must be undertaken in centers with adequate and sound infrastructure by experienced surgeons. In cases with poor-quality distal vessel or bifurcation at the distal cap where interventional collaterals are present, retrograde approach is preferred. Antegrade wire-based approach is contraindicated in cases with poor-quality distal vessel or bifurcation at the distal cap. In cases where interventional collaterals are present, retrograde approach can be chosen. Indications for the retrograde approach include:

Primary	Secondary
Proximal cap ambiguity – cannot be resolved with IVUS or CT scan	Failure of the antegrade attempts
Bifurcation at the distal cap	
Diffusedly diseased distal vessel	
Difficult to engage CTO-vessel – anomalous coronary arteries	
Flush aorto-ostial occlusion	

Before starting retrograde – the risk of ischemia must be assessed. Selecting an appropriate interventional collateral remains crucial. The collateral anatomy must be determined through – contrast injection or balloon occlusion for recruiting addition collaterals. Each collateral must be assessed for its size, anatomy – tortuosity/bifurcation, angles of entry and distance of the exit from the distal cap. SVG collaterals – patent or occluded, and septal collaterals pose lower complication risk, whereas, epicardial collaterals are associated with higher complication risk and unpredictable outcomes.

The steps to retrograde CTO-PCI are: Microcatheter removal; potential CC damage assessment; donor artery patency assessment; final assessment from antegrade injections.

Complications associated with retrograde CTO-PCI are: CC perforation; pre-procedural myocardial infarction; donor-vessel complications; vascular access complications.

ARTERIAL AVULSION: ACCESS-RELATED COMPLICATIONS

Dr George Joseph, Vellore

The access-related complications with arterial avulsion are:

- **Radial-access bleeding:** *Management of the access site bleeding includes* – BP cuff use, compression band repositioning, use of second compression band and manual compression. *Management of proximal bleeding involves* – advancing the catheter through perforation, prolonged balloon inflation and ACE wrap of forearm.
- **Puncture-induced radial artery spasm (RAS) management:** *Nonpharmacological* – forearm heating; flow-mediated dilatation (BP cuff). *Pharmacological* – NTG, SQ or PO. *Minimal arterial injury* – Ultrasound-guided access, Seldinger technique.
- **Retroperitoneal bleed due to high femoral puncture:** Always use USG guidance for CFA puncture; be equipped with a vascular USG probe; use Echo-tip needle for puncture.
- **Femoral pseudoaneurysm:** *USG-guided compression* – first-line management.

ANTEGRADE WIRE ESCALATION

Dr Byju CK, Coimbatore

The steps to antegrade wire escalation (AWE) include: Simultaneous angio; J-CTO score; shaping the guidewire; delivering microcatheter to the proximal stump; negotiating the wire through the body and exiting through the distal lumen; changing to workhorse wire; removing the microcatheter; ballooning and stenting; ruling out complications.

The angiogram should be carefully studied before planning the treatment strategy. The AWE should aim to achieve true lumen tracking through the intimal plaque. Lower J-CTO scores depict higher success rates and lower chances for complications.

Further, the anatomy at the site of entry must be accounted for. CTO body and exit segment must be determined to plan the wiring modification. This step improves AWE success rates.