Rotablation: Tips and tricks

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Rotational Atherectomy (RA) is "technique sensitive"

✓**Current techniques to just have plaque modification followed by stent implantation have markedly reduced the incidence of acute complications and improved initial success**

✓**Moreover, the efficacy of this device *__is highly operator dependent__* compared with other devices.**

✓**The differences in the complication rates between the various series are undoubtedly due to differences in the variable and increasing operator experience with the device, and the evolution of the technique.**

✓RA protocols

✓Guide catheter selection

✓Rota-wire

✓D.R.A.W. – Pre Procedure Test

✓Burr positioning

✓Ablating Technique

✓Other issues

✓Complications

- Burr entrapment

ROTATIONAL ATHERECTOMY PROTOCOLS

<u>What is my concept of “rotablating a lesion”</u>

To debulk plaque?

or

To modify plaque?

ROTATIONAL ATHERECTOMY PROTOCOLS

Different protocols for rotational atherectomy have been investigated <u>in an attempt to obtain the highest acute and at long-term success rate with the lowest risk of procedural complications</u>

<u>Particular attention has been paid to:</u>

- **Burr size (burr to artery ratio)**
- **Rotablation speed**
- **Motion pattern of the burr**

ROTATIONAL ATHERECTOMY PROTOCOLS

Burr selection is dependent on the treatment strategies with Rotablator.

- ***PRIMARY THERAPY:*** **Maximal safe debulking with no further adjunctive treatment.** ***Burr/Artery ratio 0.75-0.85/1***

- ***LESION MODIFICATION:*** **Improving lesion/vessel characteristics (compliance) in order to allow adjunctive technologies (DCA, PTCA, Stent).** **Burr/Artery 0.6-0.7/1**

STRATAS Study To Determine Rotablator And Transluminal Angioplasty Strategy

Routine strategy (plaque modification) is better than aggressive debulking.

500 patients

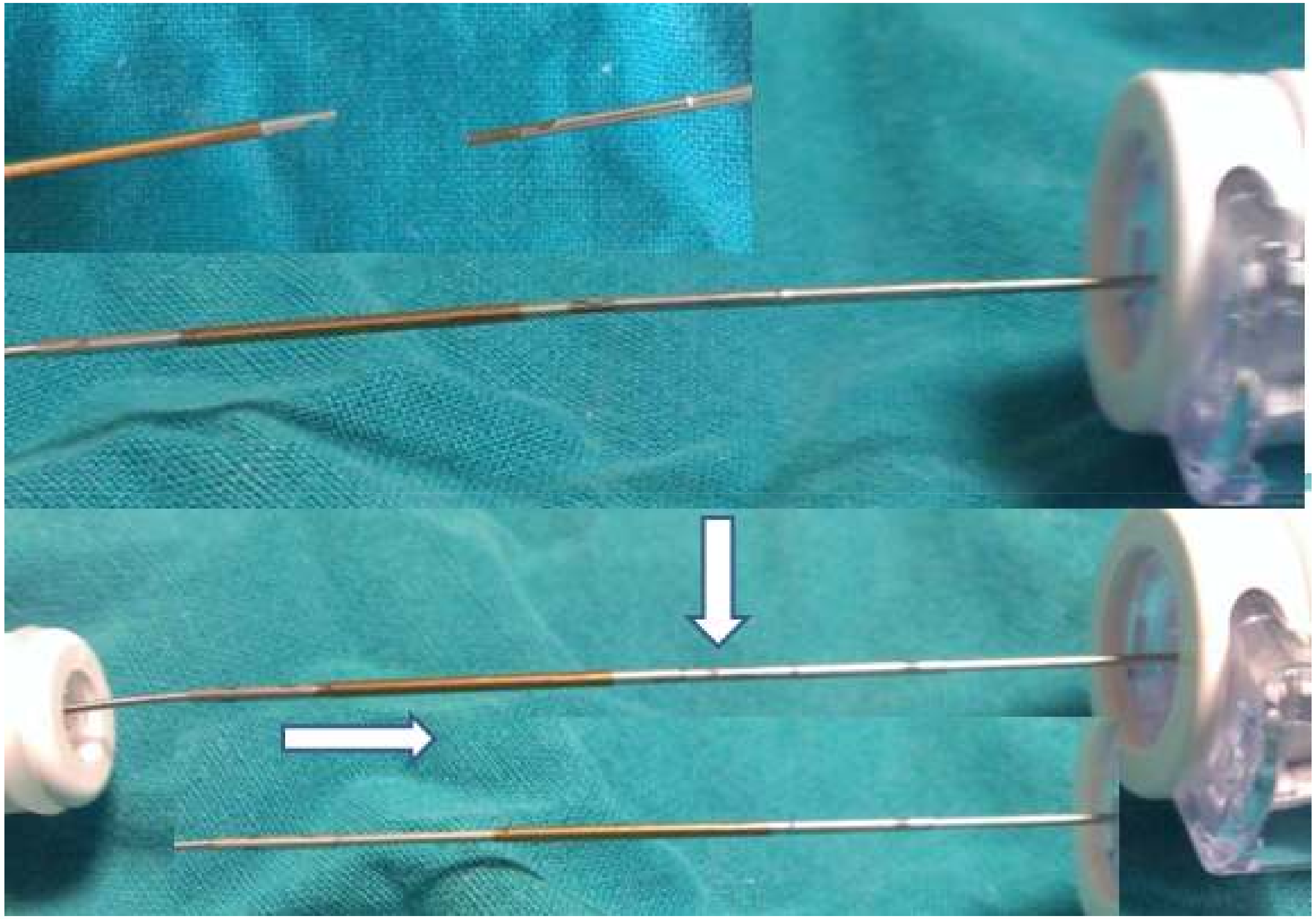
Agresive	**Routine**
Burr/artery ratio of 0.80 - 0.85	Burr/artery ratio of 0.70 - 0.75
with or without ≤ 1 ATM PTCA	Adjunctive PTCA ≥ 4 ATM

Results:	Routine	Aggressive
Procedural results:		
Max. Burr size (mm)	1.8mm	2.1mm
Burr/artery ratio	0.71	0.82
Burrs used	1.9	2.7
Acute results:		
final MLD	1.97	1.95mm
residual stenosis	26%	27%
clinical success	93.5%	93.9%
CK-MB rise >5 x nl	7%	11%
6 month results:		
TLR	22%	31%
MLD	1.26mm	1.16mm
loss index	0.54	0.62
angiographic restenosis	52%	58%

Rotablator has been newly re-defined as a tool for:

- modification of a plaque
- improving the plaque and vessel compliance
- better performing PCI in difficult situations

Always verify that the driveshaft is correctly locked and securely connected to the advancer.



Burr Size and Guide Selection

Burr diameter Mm	Inches	Recommended guide catheter (French)	Minimum ID required (Inches)
1.25	0.049	6.0	0.060
1.50	0.059	6.0	0.063
1.75	0.069	7.0	0.073
2.00	0.079	8.0	0.083
2.15	0.085	8.0	0.089
2.25	0.089	9.0	0.093
2.38	0.094	9.0	0.098
2.50	0.098	9.0	0.102

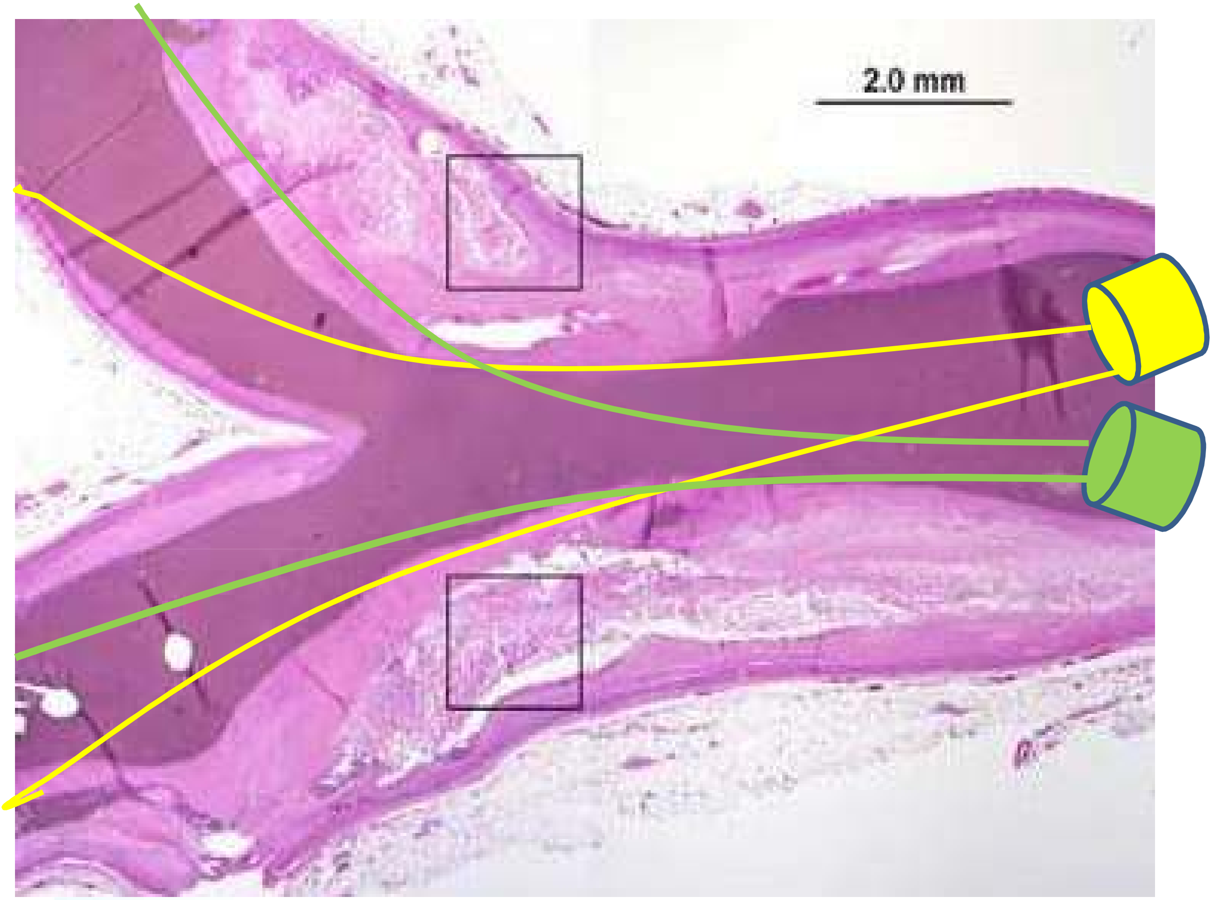
- Guide catheter with side holes
- Guide catheter that provides coaxial engagement will reduce unfavorable guidewire bias
- Guide catheter to accommodate the final burr size to be utilized

Recommended Curves*

Left	Right
Q Curve®	FR4
CLS™	Multi-purpose

* Avoid abrupt primary and secondary curves.

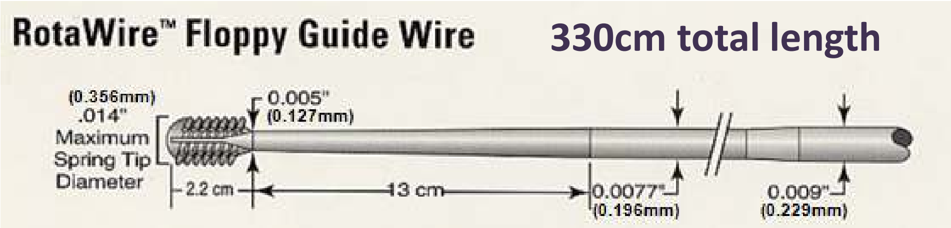
Guide wire bias (divergence from the central axis of the vessel)

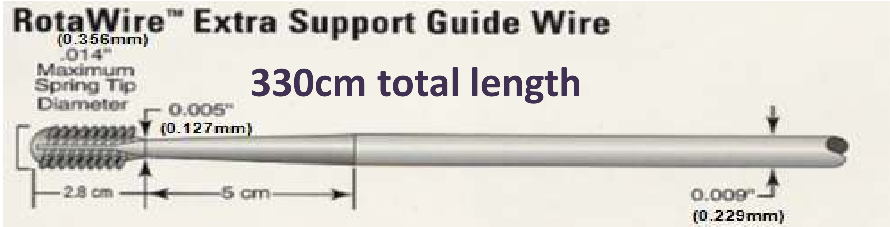


Assess different guide catheters and possible positions of the guide catheter and the impact on the guidewire

<u>The guidewire placement plays an important role in the efficiency of debulking</u>

Rotawire™ Floppy and Extra Support Guide Wire



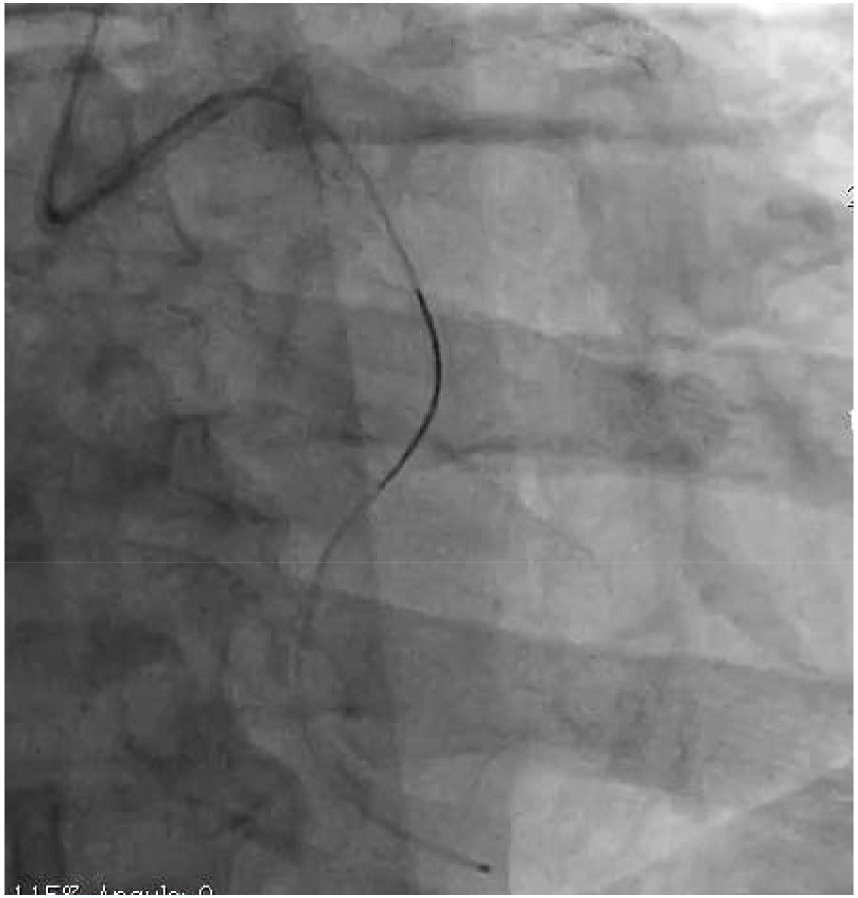


- Flexible and torqueable to enhance navigation
- Significantly reduced guidewire bias
- Short Spring Tip (2.2cm)
- Light rail support

- Spring Tip (2.8cm)
- Lead wire for those physicians requiring a "stiffer" wire

A stiffer GW dose not always produce an unfavorable bias but sometimes makes favorable bias which may help a sufficient ablation of angulated heavily calcified lesion.

Use more frequently microcatheters for wire exchange

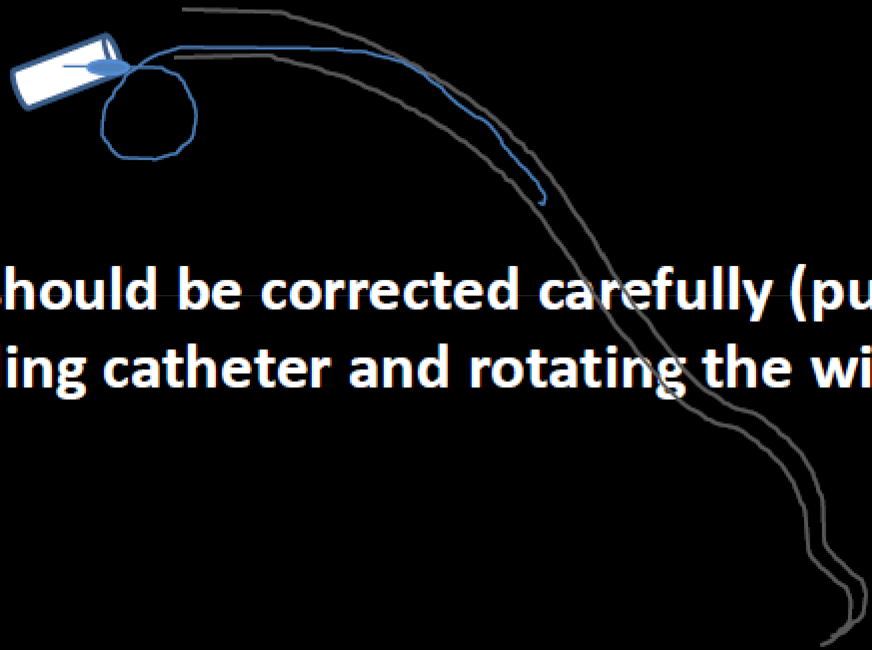


In cases where the rotawire cannot be advanced past the <u>lesion a conventional angioplasty wire with an exchange microcatheter can be used.</u> The rotawire can be advanced and positioned distally.

*** Finish the intervention on a normal wire

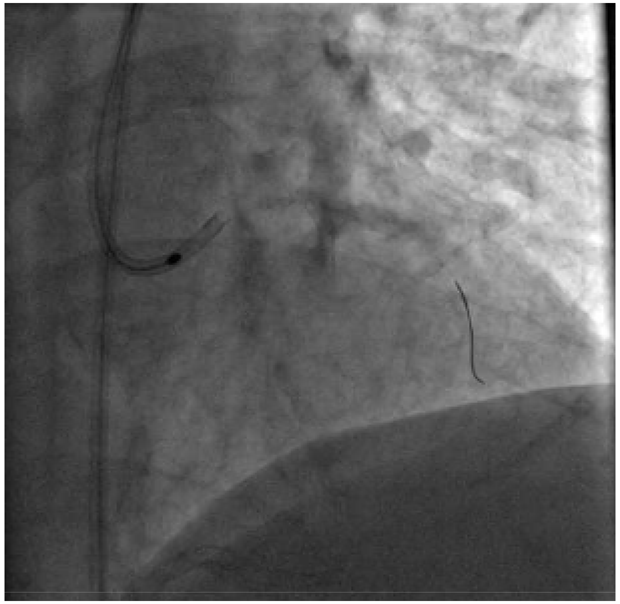
The rotablator wire

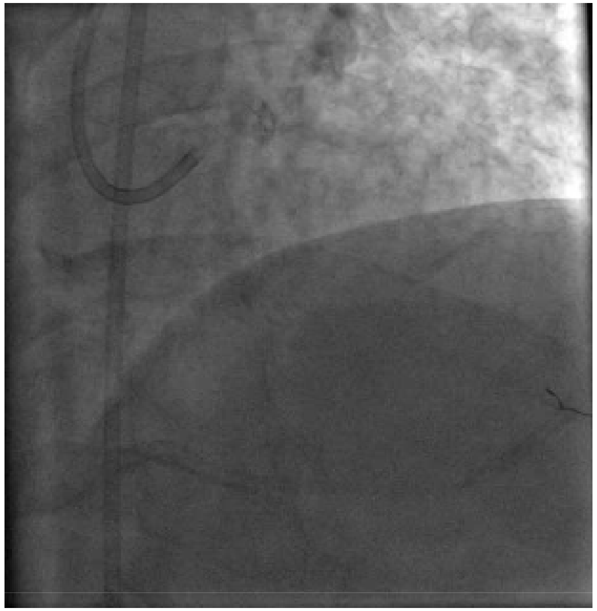
Be careful of guidewire loops that may form in the aorta, as the rotablator is advanced along the guiding catheter.



These loops should be corrected carefully (pulling back the guiding catheter and rotating the wire).

Be careful of the guidewire tip.





- ***Intended to prevent guide wire from spinning when brake defeat is activated***

D.R.A.W. – Pre Procedure Test

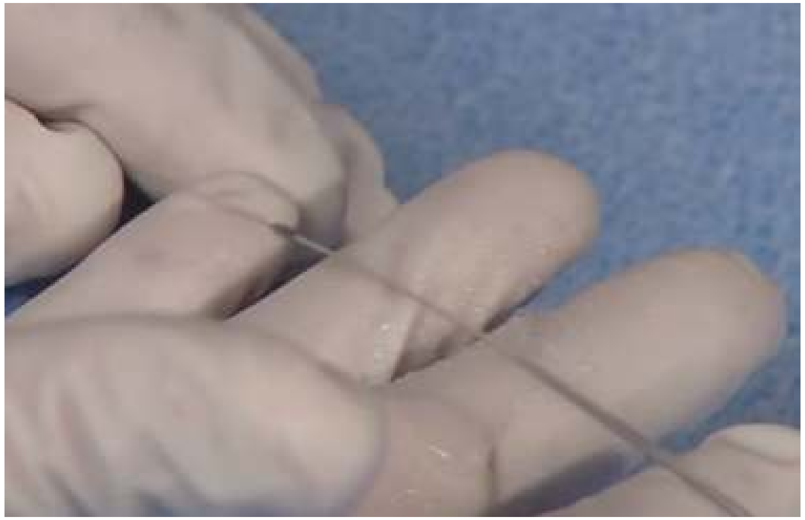
Drip – **Saline drip from bottom of advancer and catheter***

Rotate – **Burr is rotating and RPMs are stabile**

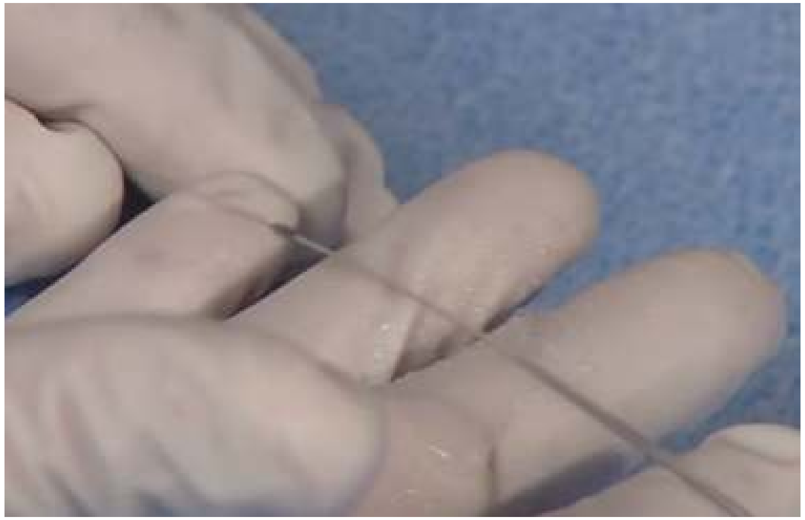
Advancer – **Free movement of advancer knob**

Wire – **Wire is visible and brake is functioning**

Drip – Saline drip from bottom of advancer and catheter*



Verify that there is irrigation from distal tip of the burr catheter



The drip rate should be increased when the system is activated with food pedal

<u>* Never operate the Rotablator Advancer without saline infusion.</u>

Flowing saline is essential for cooling and lubricating the working parts of the advancer.

<u>Operating the advancer without proper saline infusion may result in permanent damage to the Rotablator advancer</u>

Rotate – Burr is rotating and RPMs are stabile

Advancer – Free movement of advancer knob

Confirm that the advancer knob and burr move freely

Wire – Wire is visible and brake is functioning

Verify the break is holding the guide wire while the burr is spinning

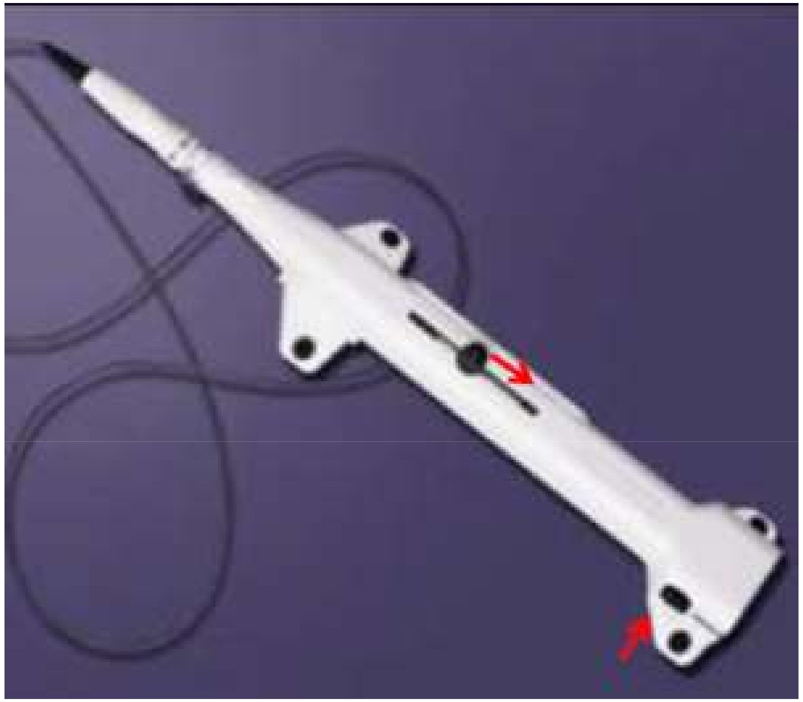
Burr positioning

✓Lock advancer knob 2-3cm forward before advancing burr into guide catheter

✓Advance burr forward while holding the wire

✓When burr is to proximal to lesion, relieve any forward tension on drive shaft by unlocking advancer knob and pulling it back

✓Relief of wire tension



Advancing the burr

✓ ***Nonactivated burr*** **advancement-reaching the platform segment**

✓ ***Activated burr advancement***

To reach the platform segment, low-speed (100- 120000 rpm) can be used to minimize ablation. The whole system can be advanced by defeating the brake and holding the wire.

✓ ***Dynaglide is not recommended for advancement*** **because the rotational speed does not fall when resistance is met.**

Dynaglide is a control that sets the rotation speed of the rotablator at 50.000-90.000 rpm and is used for reducing friction when removing the device.

Proper: Slow/Smooth/Short

Feedback During Ablation

- **Visual**
- Smooth advancement under fluoroscopy
- Contrast injection to discern lesion contours and borders
- **Auditory**
- Pitch changes relative to resistance encountered by burr
- **Tactile**
- Advancer knob resistance
- Excessive drive shaft vibration: excessive load on burr advanced too rapidly

ROTATIONAL ATHERECTOMY PROTOCOLS

stepped burr approach vs. single burr approach

- **Bigger burrs may debulk more of the lesion but they also may damage/activate more blood cells.**

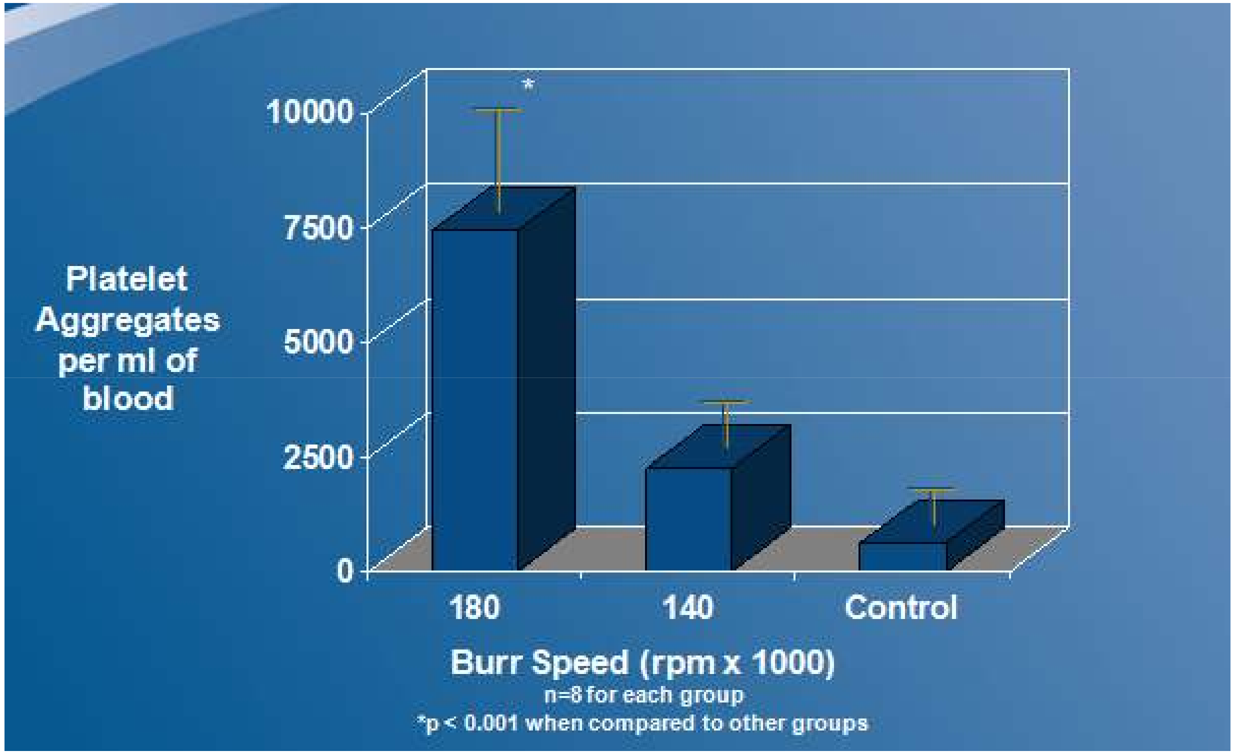
- **Starting with smaller burrs reduces the plaque burden to the distal bed and a patent lumen is achieved in a shorter period of time**

- ***A RotA technique with 2 burrs*** **may be chosen in order to reduce the incidence of the no-reflow phenomenon. The smaller burr (usually 1.25 mm) is used first, followed by a larger burr based on the size of the vessel, aiming at a burr/vessel ratio** ***that does not exceed 0.6-0.7*****. However sometimes a single small burr is sufficient.**

ROTATIONAL ATHERECTOMY PROTOCOLS

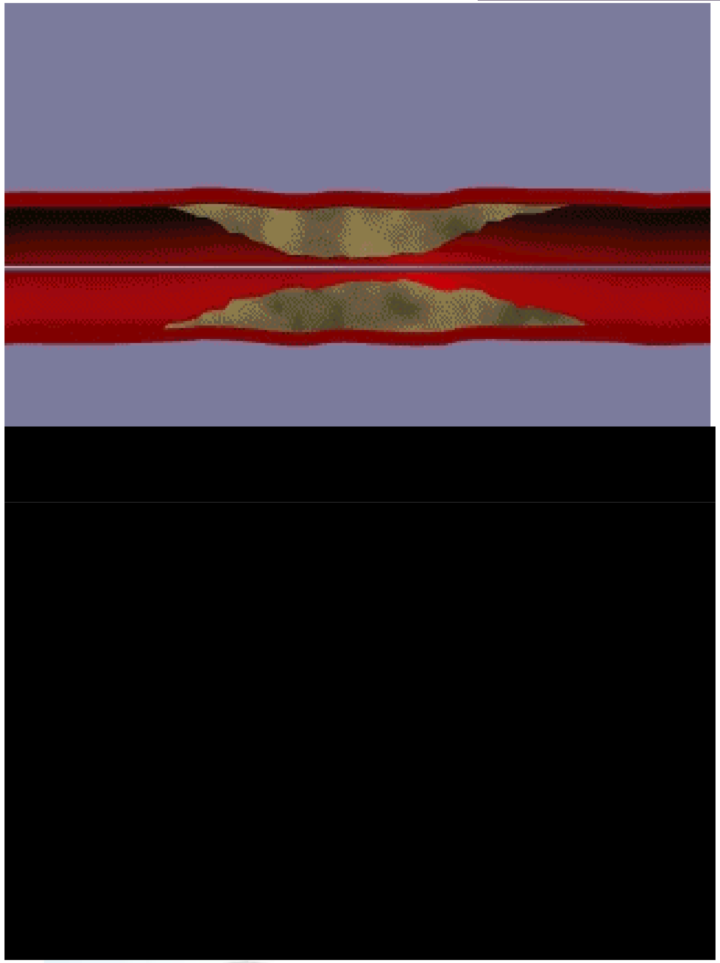
***The atherectomy speed must be approximately 140000 rpm*,**

although there is no clear cut-off and some operators use 150,000 rpm. (may be beneficial for the reduction of slow flow or no reflow)



The higher the rotational speed, the more platelets are activated

Motion pattern of the burr



Do not push the rotablator into the lesion.Use "Pecking" technique

"Pecking" technique is used, where the burr is moved forward and backward the lesion, avoiding crossing the entire lesion during the initial passage

"Pecking" **motion prevents "trenching" into arterial wall, allows wire to reposition as vessel compliance changes with debulking**

Time of runs 15"

Intermittent pull back for coronary perfusion and/or contrast injection

ROTAFLUSH - "COCKTAIL"

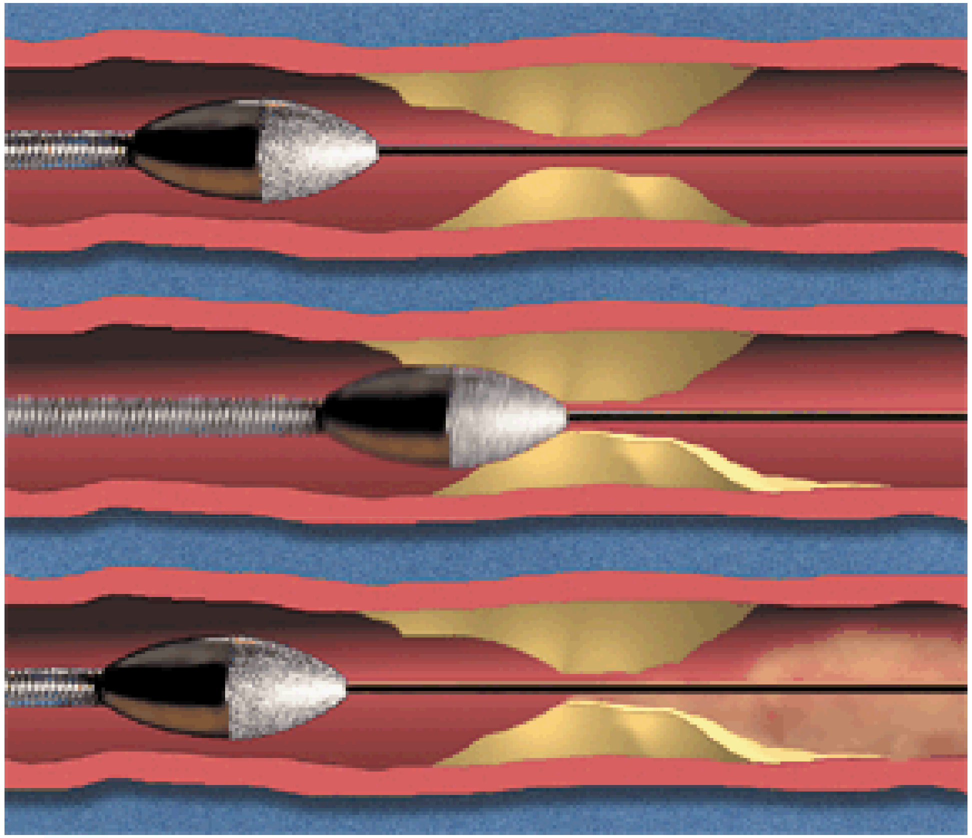
USE RotaFlush

CARAFE STUDY PILOT

Cocktail Attenuation of Rotational Ablation Flow Effects
Virtually eliminates "Slow Flow" and "No-Reflow" phenomenon when used with current technique modification:

- **During RotA, 500 ml of heparinised (5000 units) normal saline solution with 5 mg verapamil and 1000 μg nitroglycerine is administered locally, with a view *to preventing thrombus formation and vascular spasm, and avoiding the no-reflow phenomenon.***

Other cautions in Ablating Technique

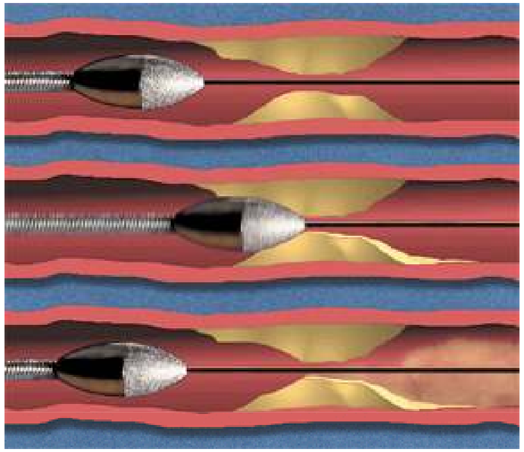


- ***<u>During the ablation, excessive deceleration (more than 5,000 rpm) must be avoided</u>*** **because it results in improper ablation and increases the risk of vessel injury, the formation of large particles, and ischemic complications related to excessive heat generation**

Other cautions in Ablating Technique

•Avoid rapid advancement, dottering, force

•Avoid stopping or starting the burr in the lesion



•Avoid stopping burr distal to lesion

•Avoid adjusting rpm's during ablation

•Avoid the burr to remain in one location while rotating at high speeds

- Avoid burring in the guide catheter
- <u>Finish with one polishing run.</u>
  - No RPM drop
  - Little to no resistance

Important reminder on the Y-adaptor

- The directions for use (DFU) for the Rotablator™ Rotalink™ Burr Catheters specify to advance the catheter through the hemostasis valve (Y-adaptor) and gently tighten the valve to prevent bleeding around the catheter sheath.
- The hemostasis valve should be closed just tight enough to prevent blood loss, but still allow the RotaLink Sheath to slide through the valve.
- If the hemostasis valve is tightened excessively, it can crush the sheath around the drive shaft and cause permanent damage to the RotaLink Catheter.
- Other possible failures stemming from a too tight hemostasis valve include a torn/split/kinked sheath that can leak and/or inhibit fluid flow which could cause multiple other product issues.

Other cautions in Ablating Technique

Never advance rotating burr to point of contact with the guidewire spring tip

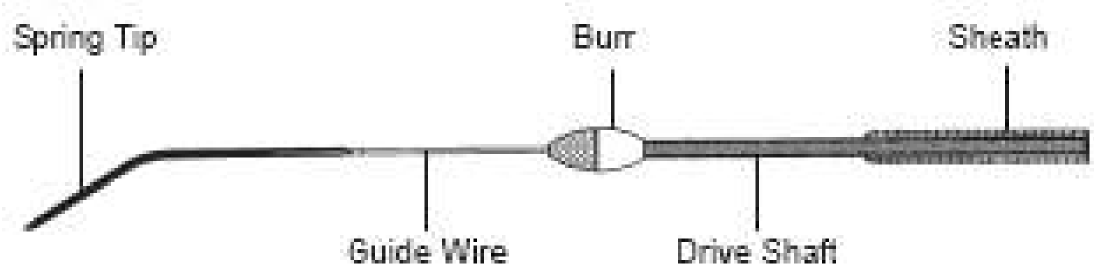
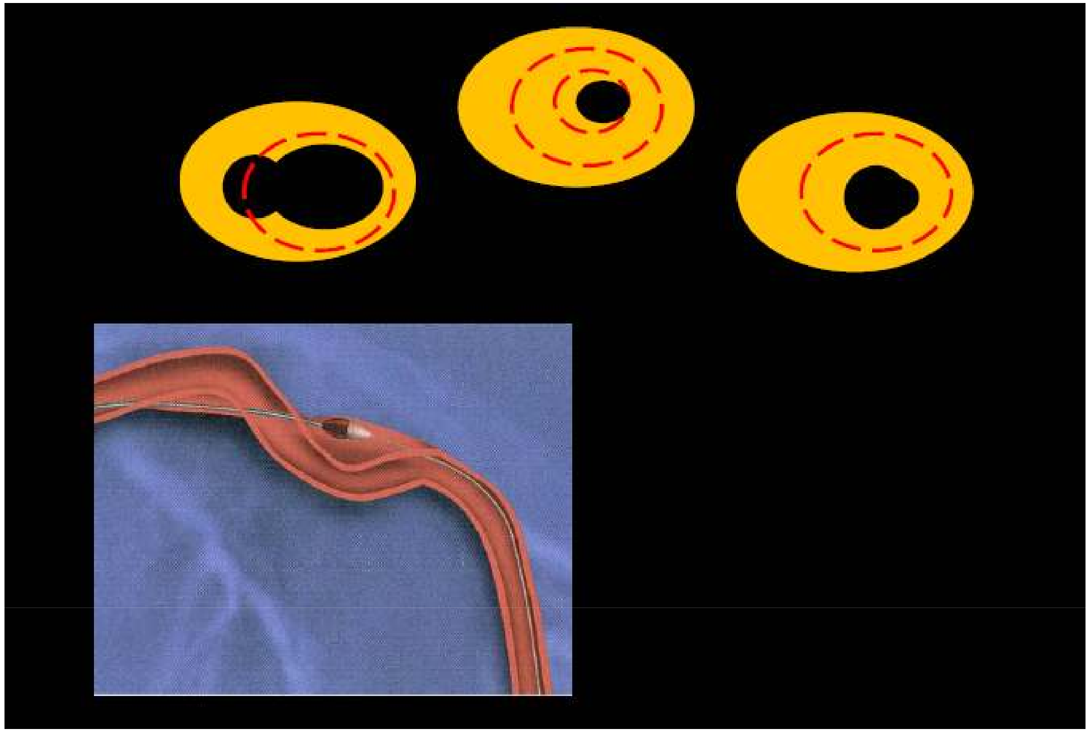


Figure 2
RotaLink Catheter Tip and Guide Wire

Important reminder on burr distance from spring tip

- **The directions for use (DFU) for the Rotablator™ Rotalink™ Burr Catheters specify that the physician must verify that the guide wire tip (Figure 2 Spring Tip) is distal to the lesion and will not come in contact with the rotating burr.**
- **Coming into contact with the guide wire tip could cause guide wire damage/fracture or cause the burr to be stuck on the wire and/or in the lesion.**

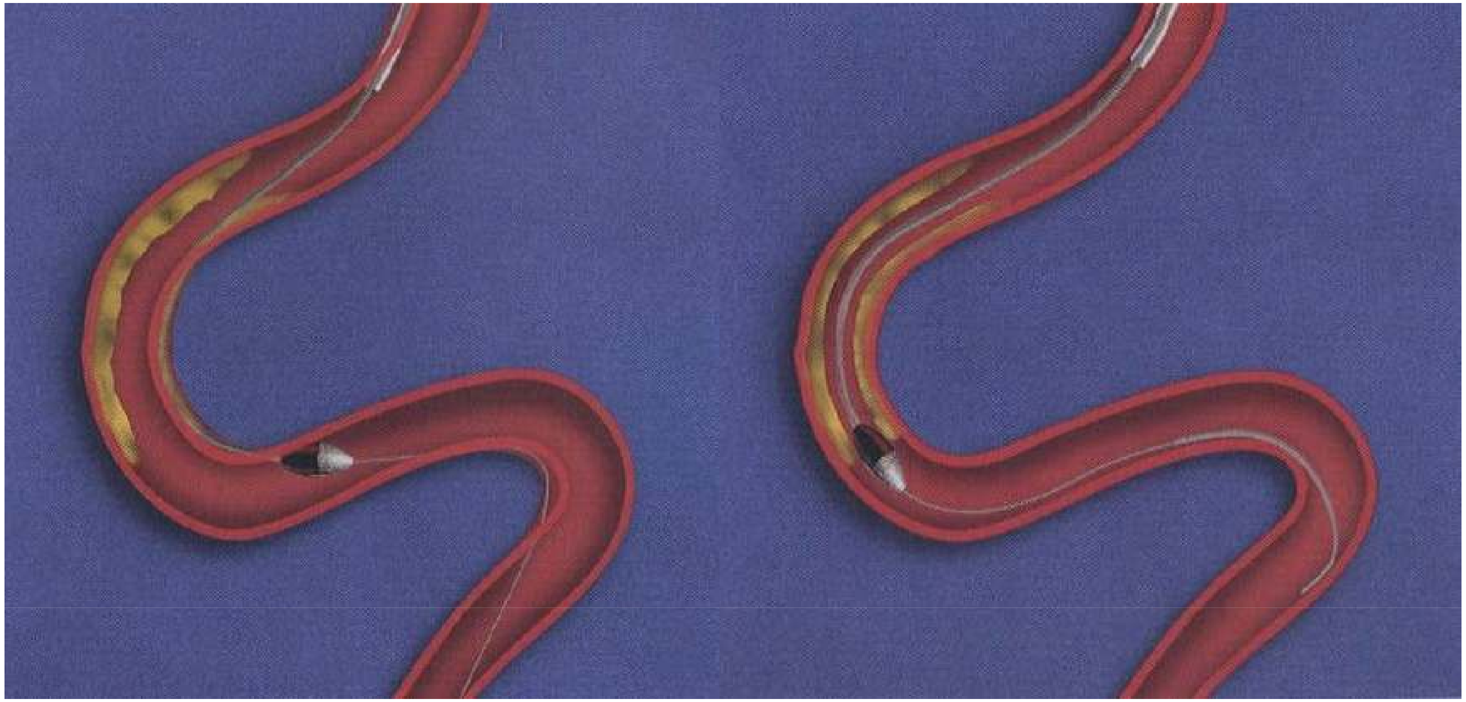
Tortuosity and Rotablation: a dangerous combination.



✓Wire bias can occur in tortuous vessels, increasing the risk of dissection or perforation

✓Ablation of normal tissue can occur if the tension on the wall exceeds the elasticity of the vessel

Guidewire bias (divergence from the central axis of the vessel)



✓Keeping the tip of the guidewire just beyond the lesion is essential in order to reduce sidewall tension.

✓A stepped-burr approach and the use of undersized burrs are recommended.

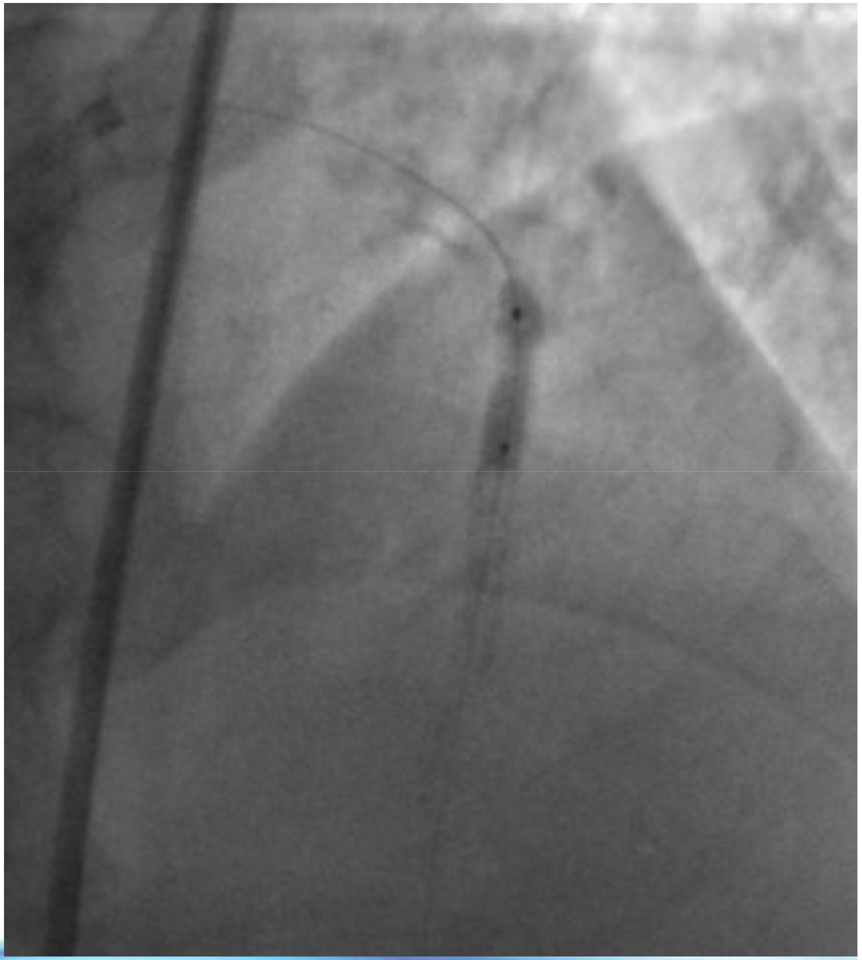
✓The activated burr should be advanced at low speed ensuring that there is no wire tension.

Low pressure balloon inflation is an important part of the rotablator technique

✓***<u>Localizes the areas of resistance.</u>***

✓**In long lesions may be helpful in improving flow.**

✓**May seal perforations.**



Other issues in Rotational Atherectomy

•***Prophylactic temporary pacemaker*** **is commonly used specially with rotational atherectomy of the left circumflex or right coronary artery to protect against the risk of complete temporary atrio-ventricular block**

•***Use of IIb/IIIa inhibitors during rotablation is not uniform*****, ranging from 0 to 45% of cases depending upon the operator´s discretion**

- **This reluctance can be partly explained *by the more hazardous management* of pericardial effusion and tamponade, if vessel perforation occurs during RA**

•**Promising new platelet inhibitors (prasugral and ticagrelor) have demonstrated a superior pharmacological and clinical profile than clopidogrel and *might be more effective alternative in preventing platelet activation induced by rotational atherectomy***

JUST DO IT …………. EARLY

<u>The decision to use rotablation should be made early, before large dissections appear.</u>

Complications specifically seen with Rotational Atherectomy

- ✓Slow Flow / No Reflow
- ✓Perforation
- ✓Lodged burr
- ✓Advancer stops
- ✓Stall light lights up

Stuck rotablator: the nightmare of rotational atherectomy

One rare but life-threatening complications is a stuck rotablator, also known as entrapment of α rotablation burr or trapped rotablator.

- **The event can be defined as entrapment of the rotablation burr in a coronary lesion with the impossibility to rotate or retrieve the burr.**

- **Stuck rotablator can lead to acute coronary occlusion and sometimes requires immediate cardiac surgery**

Burr entrapment occurs rarely with a reported incidence of 0.4%. (6 of 1,403 procedures)

EuroIntervention

Table 2. Patient, lesion and procedure-related characteristics of all published cases with entrapment of a rotablator burr.

Case	Author	Demographics	Clinical presentation	Lesion	Calcification (visual estimation)	Burr (mm); Burr/artery ratio	Peak motion speed (rpm)	Management
1	Alexiou et al[9]	68 years, male	SA	RCA	n/a	n/a	n/a	Surgical removal
2	Alexiou et al[9]	70 years, female	SA	RCA	n/a	n/a	n/a	Surgical removal
3	Endo et al[10]	75 years, male	ACS	LAD, native	severe	n/a	n/a	Surgical removal
4	Gambhir et al[11]	n/a	n/a	n/a	n/a	n/a	n/a	Surgical removal
5	Kaneda et al[12]	80 years, female	SA	LAD, native	severe	1.25; 0.5	200,000	Surgical removal
6	Shekar et al[13]	73 years, male	SA	LCX, perforation in old proximal stent with stuck rotablator	n/a, CTO	1.25; n/a	n/a	Surgical removal
7	Shekar et al[13]	58 years, female	SA	RCA, in-stent restenosis	n/a, CTO	1.25; n/a	n/a	Surgical removal
8	Sulimov et al	46 years, male	ACS	LAD, freshly implanted stent	moderate	1.75; 0.7	150,000	Second wire, post-dilatation in lesion
9	Sulimov et al	70 years, male	SA	RCA, native	severe	1.75; 0.58	150,000	Second wire, post-dilatation in lesion
10	De Vroey et al[14]	67 years, female	ACS	LAD, native	severe	1.5; 0.55	160,000	Second wire, post-dilatation in lesion
11	Grise et al[15]	83 years, male	SA	LAD, native	severe, CTO	1.25; n/a	150,000	Second wire, post-dilatation in lesion
12	Hyogo et al[16]	55 years, male	SA	RCA, native	severe	1.5; 0.52	170,000	Second wire, post-dilatation in lesion
13	Sakakura et al[17]	67 years, male	SA	RCA, native	severe	1.25; 0.42	217,000	Second wire, post-dilatation in lesion
14	Prasan et al[18]	77 years, male	ACS	LCX, native	severe	1.5; n/a	180,000	Percutaneous snare, disassembly of rotablator
15	Sulimov et al	38 years, male	SA	LAD, freshly implanted stent	no	2.0; 0.5	190,000	Deep intubation with manual pullback
16	Kimura et al[19]	84 years, male	SA	LCX, native	severe	1.25; 0.42	220,000	"Mother and child" catheter
17	Cunnington and Egred[21]	78 years, female	ACS	LAD, native	severe	1.25; 0.36	n/a	"Mother and child" catheter
18	Sulimov et al	72 years, female	SA	LCX, native	severe	1.25	160,000	Second wire, post-dilatation in lesion, strong manual pullback

n/a: data not available; ACS: acute coronary syndrome; CTO: chronic total occlusion; LAD: left anterior descending artery; LCX: left circumflex artery; RCA: right coronary artery; SA: stable angina

EuroIntervention 2013;9:251-258

Stuck rotablator: the nightmare of rotational atherectomy

Two mechanisms have been proposed previously.

1. **A small burr can be advanced beyond a heavily calcified plaque before sufficient ablation, especially when the burr is pushed firmly at high rotational speed.** During high speed rotation, the frictional heat may enlarge the space between plaques. Meanwhile, the coefficient of friction during motion is less than that at rest, which may facilitate the burr to pass the calcified lesion easily without debulking a significant amount of calcified tissue.

- In this situation, the ledge of calcium proximal to the burr may prevent burr withdrawal. **This phenomenon was named "kokesi"** after the Japanese doll by Kaneda *et al*

2. The burr can be entrapped within a severely calcified long lesion, especially angulated and concomitant coronary spasm.
   - **When a large burr was pushing vigorously against such lesion without sufficient pecking motion, the rotational speed may decrease significantly and this type of entrapment may occur.**

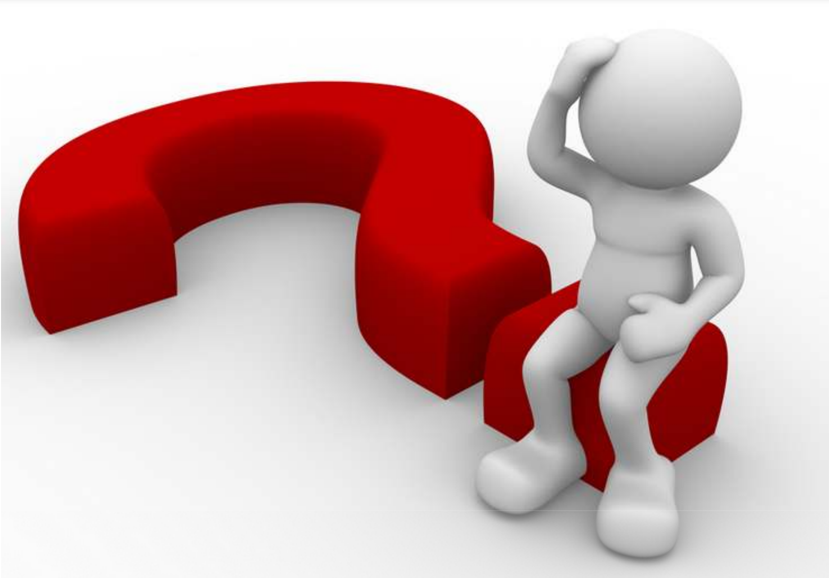
Accidental entrapment in or distally to the lesion. What to do????

1. Run away?

2. ***Pray hard?***

3. Surgical advise?

4. Pull forcefully?



5. Use strong spasmolytics and try to pull?

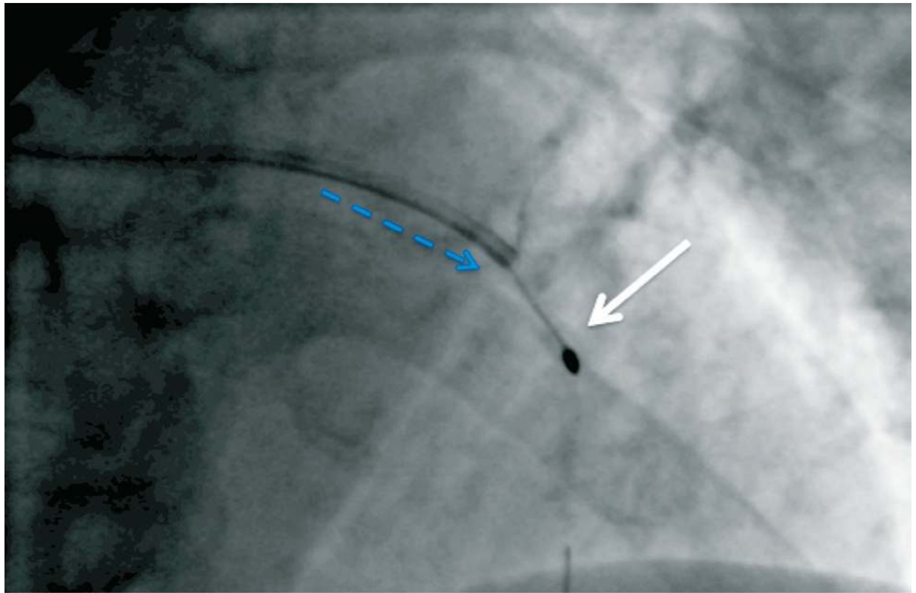
6. Use a parallel wire and dilate with a ballon and then try to pull?

7. Other options ?

The simplest method to retrieve the entrapped burr is pulling back the rotablator system manually.

In some cases the stuck burr can be withdrawal successfully by manual traction with on-Dynaglide or off-Dynaglide rotation

But…….

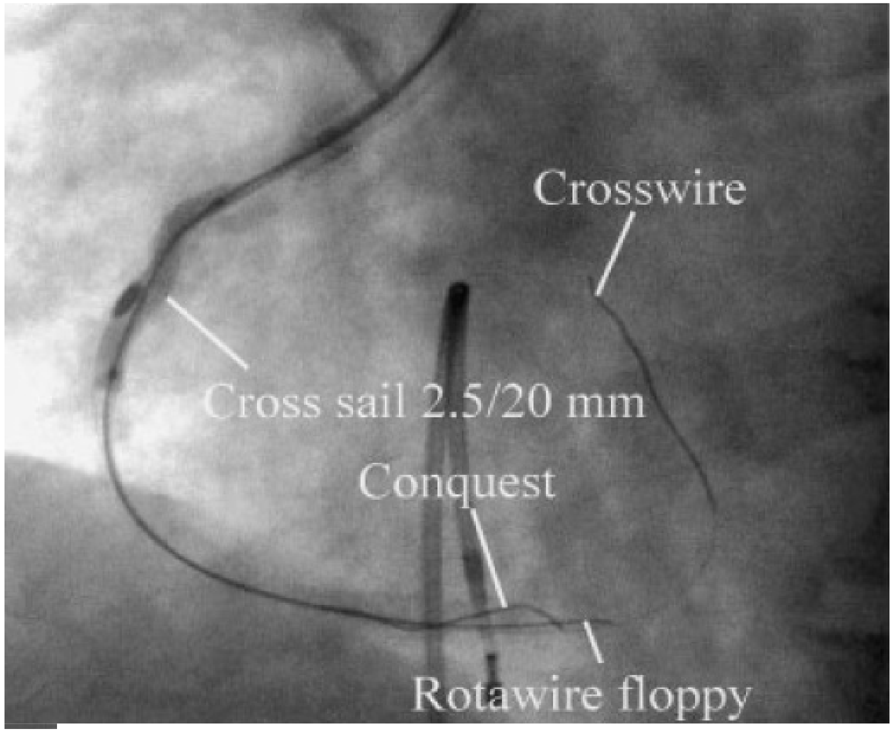


Attempting to withdraw the burr <u>pulls the guide catheter deeply down</u> the LAD artery (blue dashed arrow).

✓The vessel may perforate and proximal segment may be injured.

✓Extreme force on the burr and burr shaft may also result in shaft fracture.

Disengaged the GC from vessel ositum and sending another GW deep into aorta may prevent vessel injury by avoid deep seating of GC during traction.



Recrossing another guide wire just beside the entrapped burr and making a crack between the burr and vessel wall by inflating a balloon catheter might be a more promising strategy

The lesion surrounding the entrapped burr is always heavily calcified and usually need a <u>hydrophilic-coated wire</u> to pass it and sometimes <u>stiffer wire such as Conquest wire</u> may be needed to pass the adjacent hard plaque

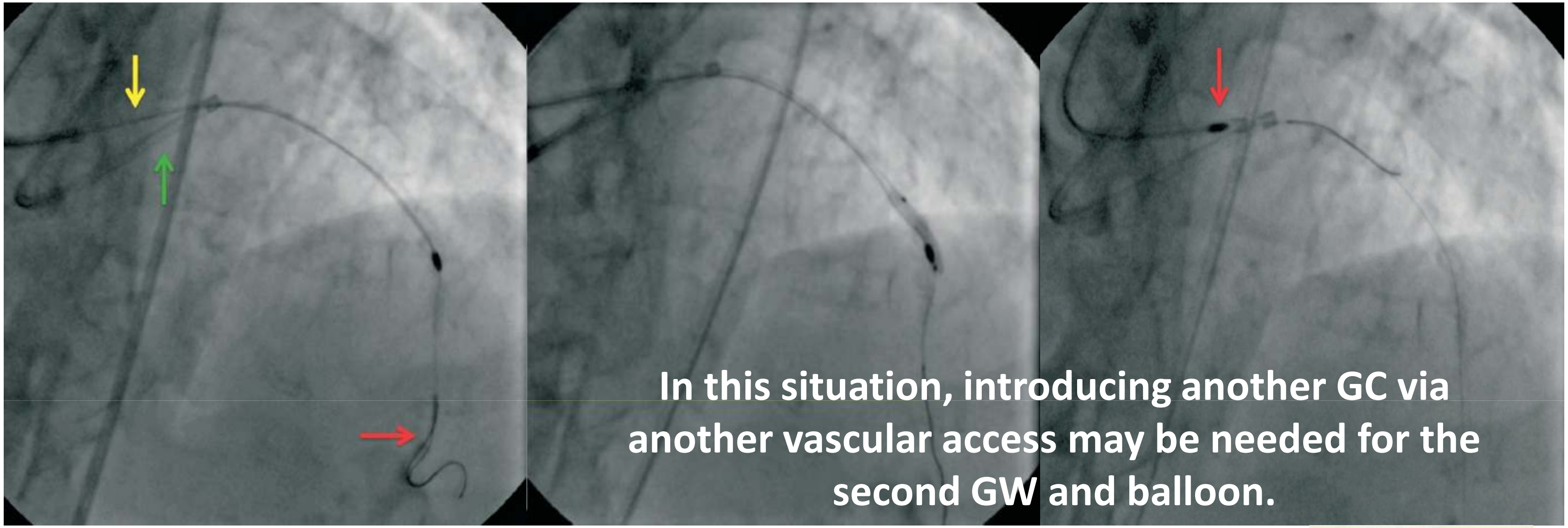
Usefulness of Conquest Guidewire for Retrieval of an Entrapped Rotablator Burr

Masayuki Hyogo,* MD, Naoto Inoue, MD, FSCAI, Reo Nakamura, MD, Takaomi Tokura, MD, Akiko Matsuo, MD, Keiji Inoue, MD, Tetsuya Tanaka, MD, PhD, and Hiroshi Fujita, MD, PhD

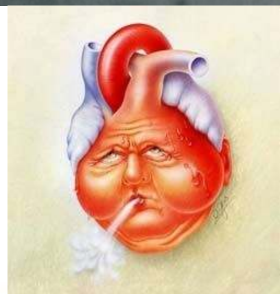
We experienced an entrapped rotablator burr that could not be retrieved even by deep seating of the guiding catheter. We successfully retrieved the burr by balloon inflation after the tapered tip of a Conquest wire managed to penetrate the quite hard plaque and pass through the outer lumen of the burr. *Catheter Cardiovasc Interv 2004;63:469–472.*

There is no space to advance guidewires or balloons through the 6F guide catheter

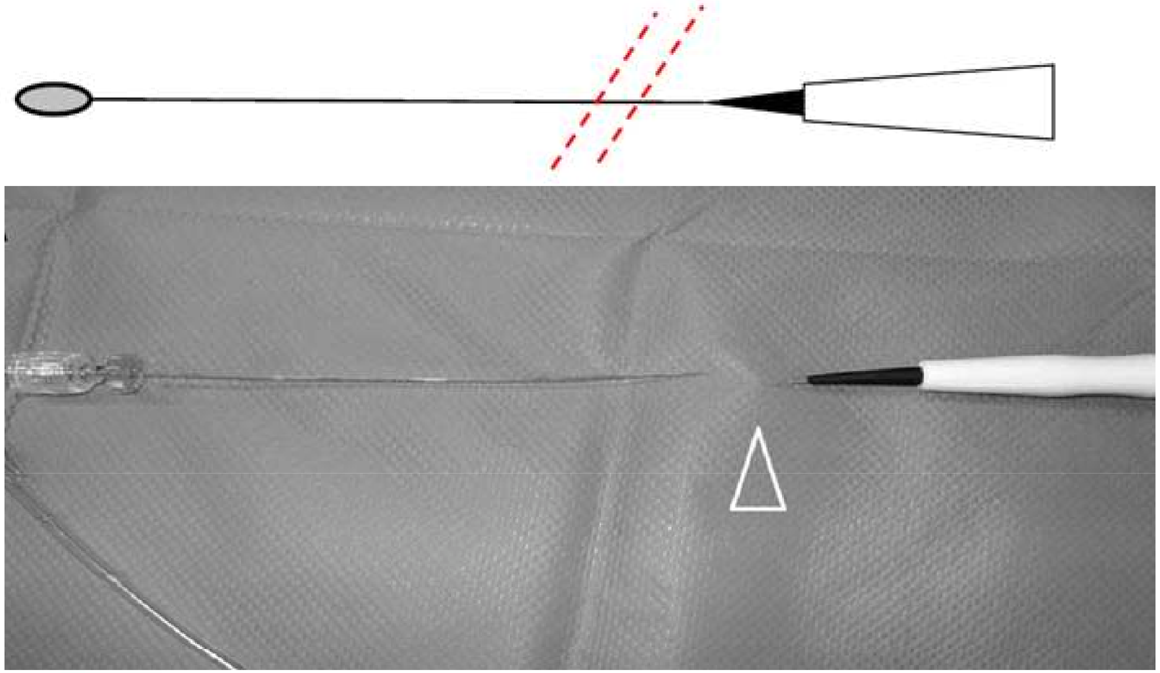
Dual Catheter Technique



The profile of the rotablation drive shaft sheath is 4.3 Fr, which may prohibit introducing of a balloon catheter (mostly 3 Fr in diameter) into the GC if it is a 6 or 7 Fr one.



Sakura *et al. demonstrated* a novel idea to remove the drive shaft sheath after cut off the system near the advancer.



To overcome this obstacle and utilise the same guiding catheter for additional devices, the rotablator system can be cut off (disassembled) distal to the advancer (including sheath, driveshaft and rotawire).

After removing the sheath and leaving only the slim driveshaft surrounding the rotawire in the catheter lumen, further devices can be advanced along the rotablator remnants through the same guiding catheter.

Disassembly of a Rotablator: Getting Out of a Trap

Ananth M. Prasan, MBBS, PhD, Manish Patel, MBBS, Mark R. Pitney, MBBS, and Nigel S. Jepson,* MBBS

The rotablator burr rarely becomes trapped within calcified lesions. Manual traction can be ineffective and dangerous. We report a case that illustrates a novel technique involving use of a percutaneous snare in conjunction with partial disassembly of the rotablator device to remove a trapped burr without need for open surgical intervention. *Cathet Cardiovasc Intervent 2003;59:463–465.*

Another approach, which requires a 7 Fr guide catheter, is to cut the proximal end of the atherectomy catheter shaft and RotaWire and advance a snare over the shaft down close to the lesion (Simultaneous traction on the snare and guiding catheter)

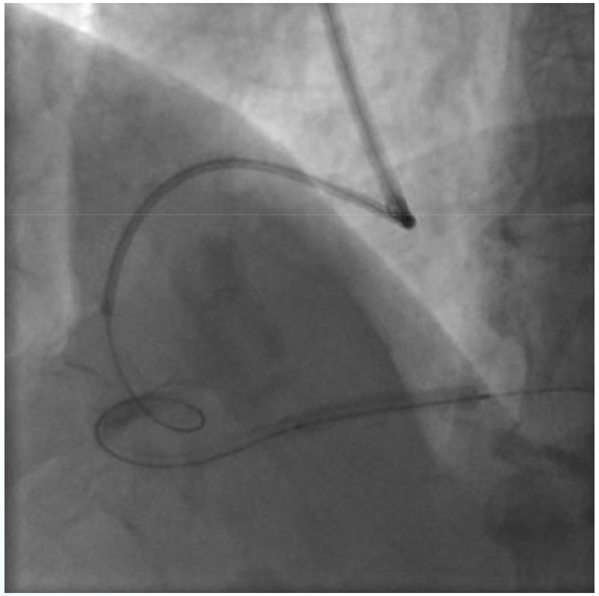
✓**This method, inspired by pacemaker lead extraction techniques**

✓**The use of a percutaneous snare in conjunction with partial disassembly of the rotablator apparatus allows the application of traction locally to the site of the entrapped burr in a more controlled fashion. This reduces the risk of traumatizing either the left main stem or other parts of the vasculature.**

Burr removal facilitated by deep catheter intubation

Deep intubation with subsequent pullback of all devices can be useful to focus the force on the burr and to protect the rest of the coronary artery.

Once again this can be facilitated by cutting off the system and introducing a second smaller guiding or extension catheter over the drive shaft.



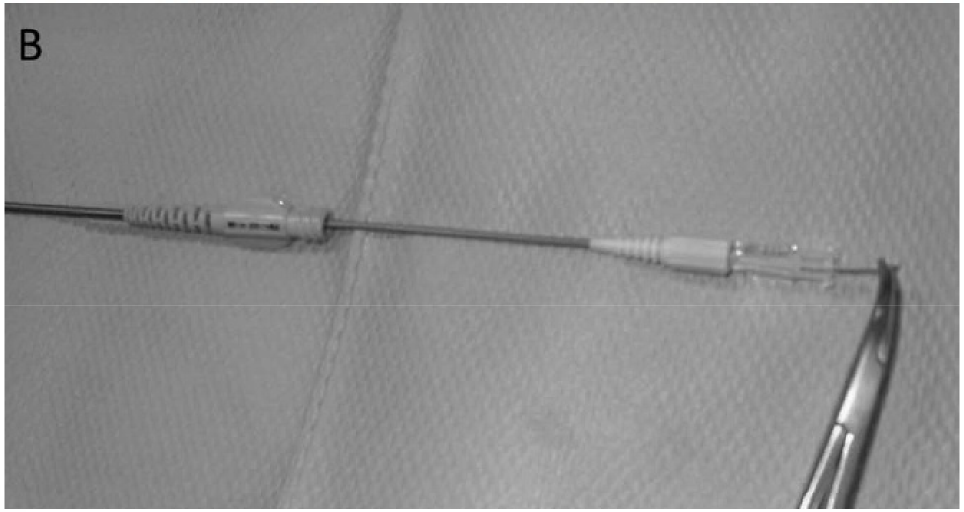
By simultaneous traction on the burr shaft and counter-traction on the child catheter, the catheter tip can act as a wedge between the burr and the surrounding plaque, *which may exert a larger and more direct pulling force to retrieve the burr*

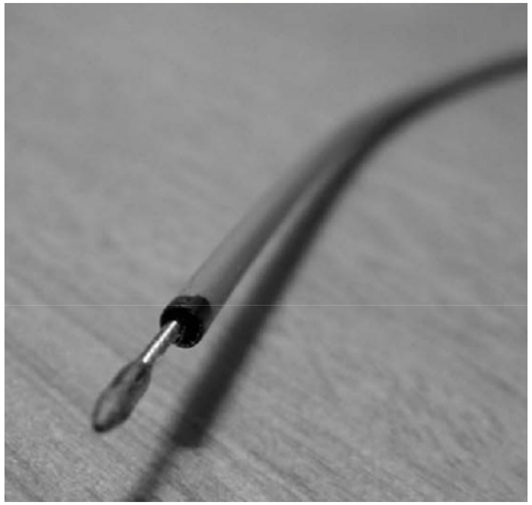
Successful Retrieval of an Entrapped Rotablator Burr Using 5 Fr Guiding Catheter

Catheterization and Cardiovascular Interventions 78:558–564 (2011)

Masayoshi Kimura,* MD, Jun Shiraishi, MD, and Yoshio Kohno, MD

the LCx and in the LMT without difficulty. Conclusions: The 5 Fr straight guiding catheter might be useful for retrieving an entrapped burr (1.25-mm burr).





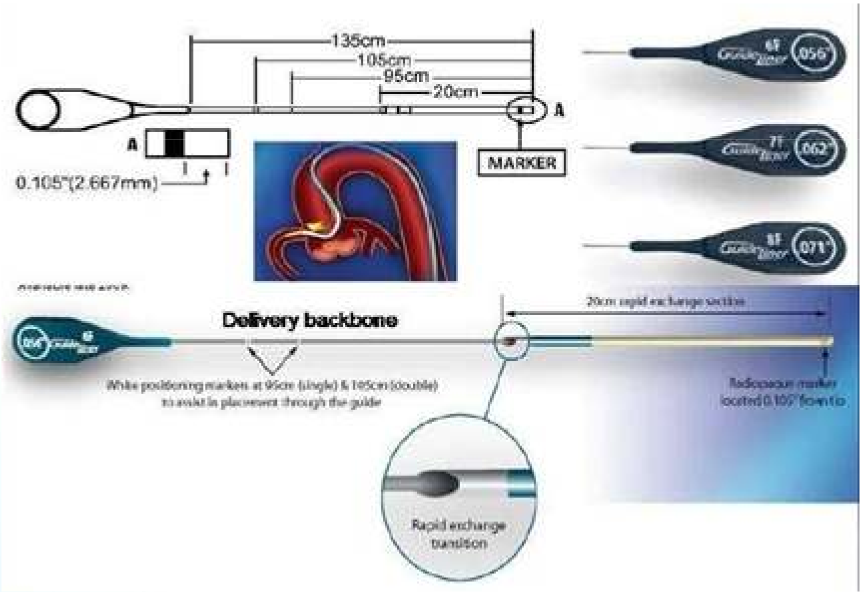
Alternatively, *after the shaft has been cut*, a child catheter (Heartrail® ST01; Terumo, Tokyo, Japan or GuideLiner®; Vascular Solutions, Minneapolis, MN, USA) can be advanced up to the burr: simultaneous traction on the burr shaft and counter-traction on the child catheter can result in successful retrieval of the trapped burr

GuideLiner, A Child-In-A-Mother Catheter for Successful Retrieval of an Entrapped Rotablator Burr

Catheterization and Cardiovascular Interventions 79:271–273 (2012)

Michael Cunnington, BMEDSCI, MBBS MRCP, MD, and
Mohaned Egred,* BSC(HONS), MB, CHB, FRCP, MD

can be attempted. We describe a novel technique to remove a trapped rotablator burr from a heavily calcified lesion using counter-traction with a GuideLiner, child-in-a-mother catheter, which successfully removed the entrapped burr without the need for surgery when simple traction alone had been ineffective.

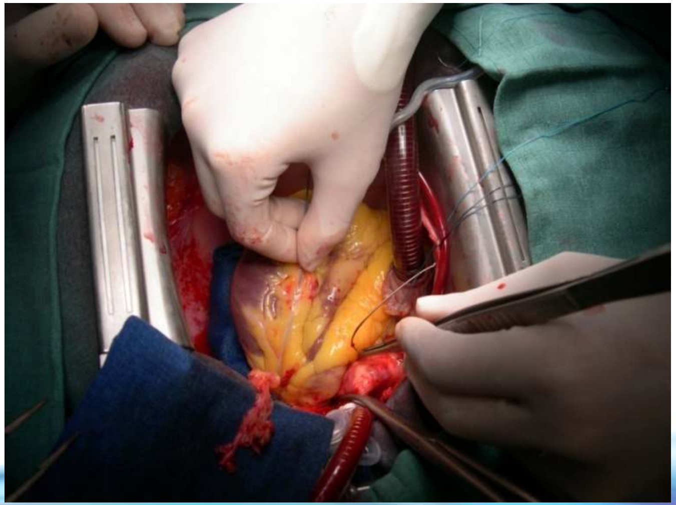


There are a number of manoeuvers which can be tried, but if all are unsuccessful, then the patient will require emergency surgery.

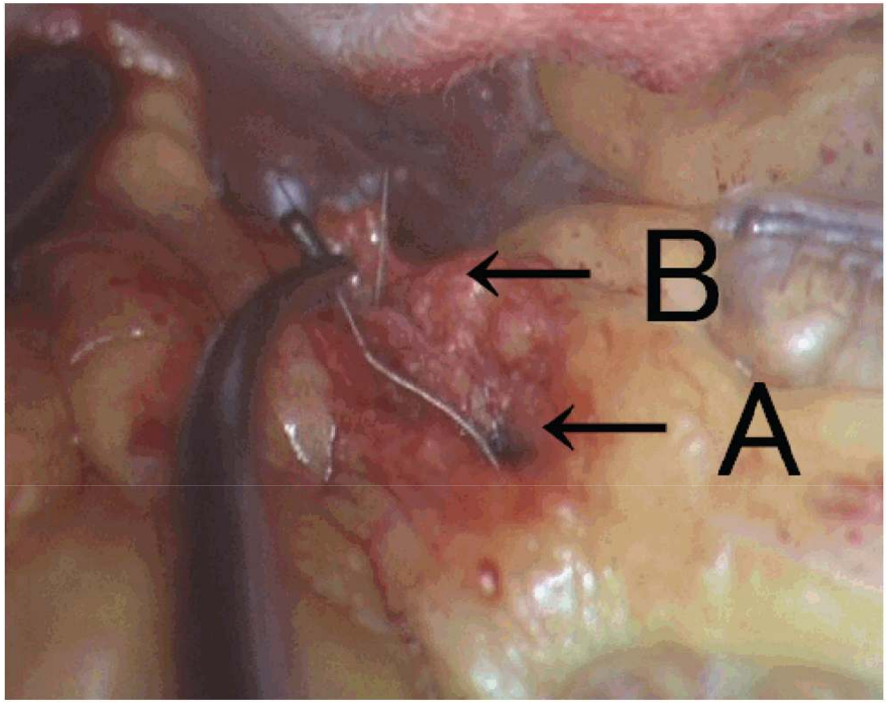
Trapped Rotablator: Kokesi Phenomenon

Hideaki Kaneda,* MD, **Shigeru Saito,** MD, **George Hosokawa,** MD, **Shinji Tanaka,** MD, **and Yoshitaka Hiroe,** MD

We experienced a rare complication of rotational atherectomy. The burr was trapped at the angled, calcified narrowing in the left anterior descending coronary artery. The burr was retrieved after the resection of the pulmonary artery and the left coronary artery. We will discuss the cause and prevention of this complication. *Cathet. Cardiovasc. Intervent. 49:82–84, 2000.*



An emergent open surgery would be the most reliable and always the last option for removing the entrapped burr.



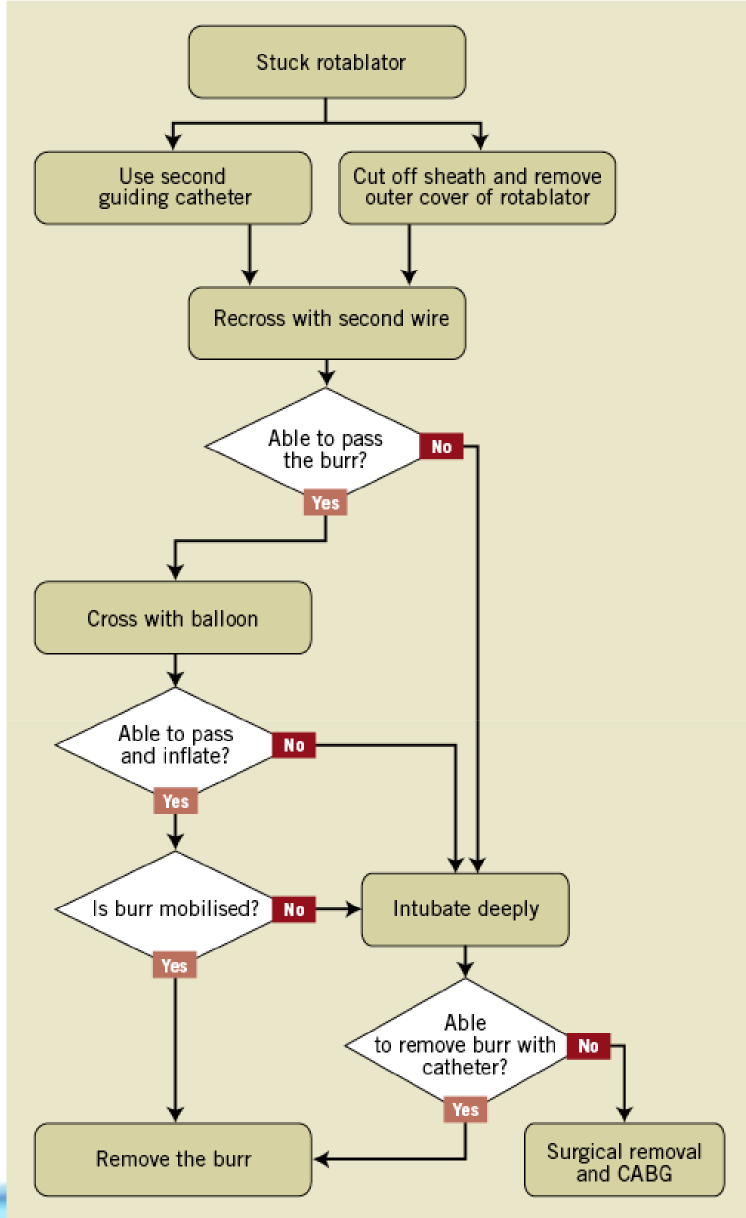
•However, surgical removal is invasive, time consuming and usually not immediately available, especially for hemodynamic unstable cases.

Before sending the patient to surgery, several non-surgical techniques may be tried to retrieve the stuck burr.

A step-by-step algorithm for the management of an entrapped rotablation burr

Interventional cardiologists using rotablator should be familiar with these tips and tricks to avoid and rescue this complication.

EuroIntervention 2013;9:251-258
Stuck rotablator: the nightmare of rotational atherectomy



How to prevent burr entrapment?

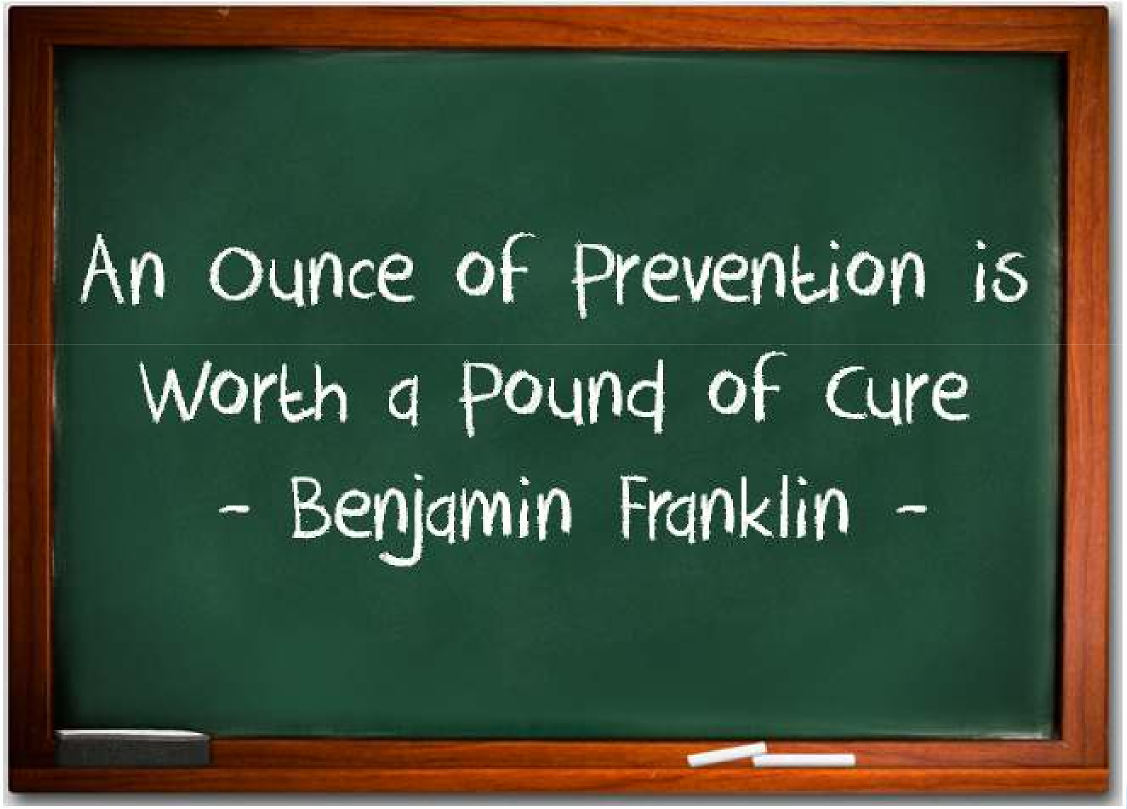
- ✓Gentle pecking motion and short runs of rotablation (< 15 s)

- ✓operators should start RA in eccentric and extremely calcified lesions with relatively small burrs and a higher speed of rotation.

- ✓ When a smaller burr was employed, more slowly advancement to ablate the plaque of proximal lesion sufficiently was recommended, and too high a burr speed should also be avoided to prevent “kokesi phenomenon

- ✓Operators should not exert excessive forward force during burr advancement and should avoid significant decelerations of rotational speed (>5000 rpm) in order to avoid entrapment.

The old adage in medicine that an ounce of prevention is worth a pound of cure, *holds especially true for interventional cardiologists using rotational atherectomy*



Thank you for your attention !!!!!!!!!

The Advancer was running, Now it is Not

✓**Check all connections**

✓**Check air source – make sure it is on & delivering 90/620.55 Kpa – 110 PSI/758.45 Kpa**

✓**likely a lack of saline allowed "burn out", which happens quickly**

✓**New advancer needed if no saline drip through advancer**

Stall light lights up

- ✓As a safety feature, the system automatically stalls when there is a > 15,000 rpm drop for a ½ second or more
- ✓Ensure the burr is not lodged.
- ✓Pullback and re-platform proximal to the lesion.
- ✓Ensure all connections are secure.
- ✓Ensure air supply
- ✓Ensure saline flow.

Console problems

✓Ensure all connections are secure

✓Ensure adequate air supply; > 500 PSI/3447.5 Kpa in tank.

90/620.55Kpa – 110 PSI/758.45 Kpa delivered to console

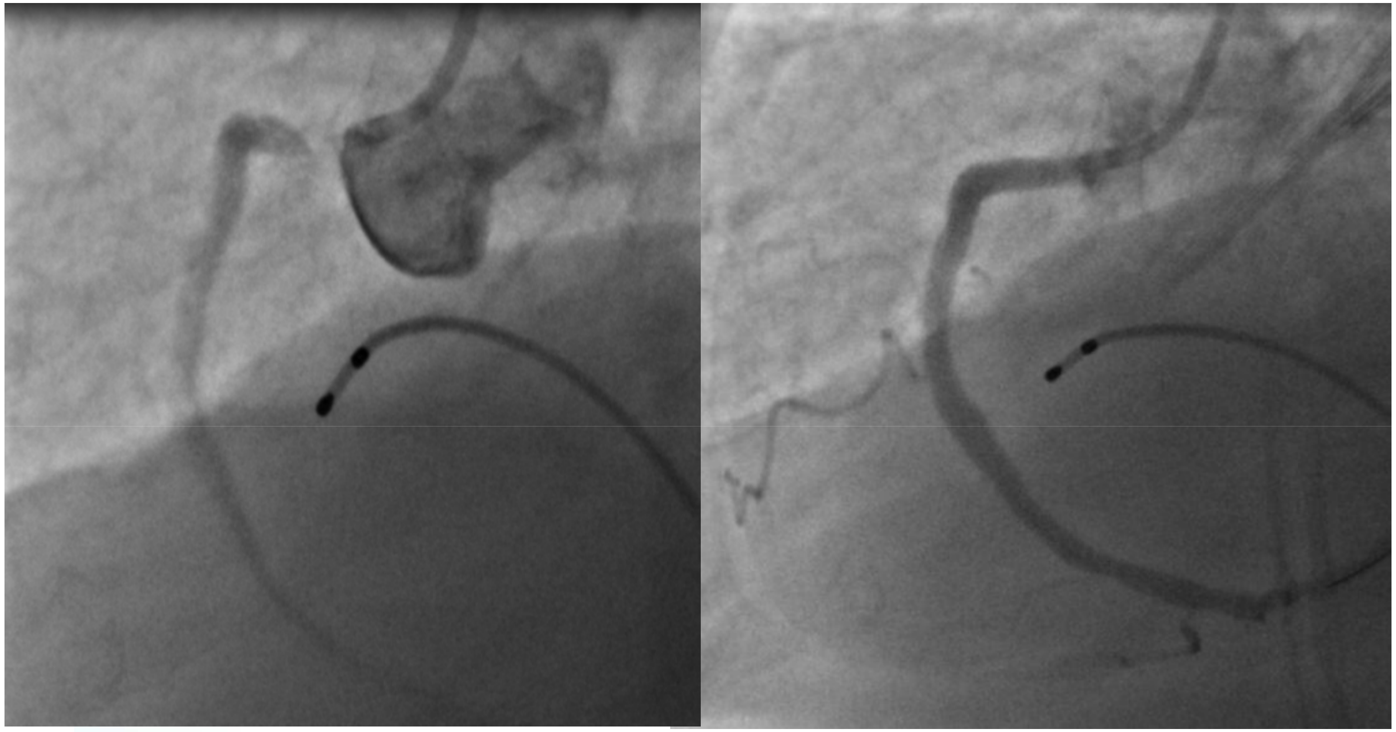
✓Ensure console is plugged in, correctly setup and connected.

✓Double check airflow regulator to secure tank connections

and quantity of pressure output tank

Rotablator :ostial lesions

In ostial lesions (specifically in RCA) the frequent fibrocalcific characteristics of these lesions make them well suited for rotablation treatment.



- ✓**<u>Coaxial placement</u> of the guiding catheter is mandatory (assess in two projections-best RAO).**
- ✓**<u>Straight alignment</u> of the guide catheter is essential in order to center the guidewire (extra support).**

The lie of the guidewire is essential and <u>keeping the tip just beyond the lesion may improve the centering.</u>