Hydrodynamic boost: a novel re-entry technique in distal BTK vessel: when and how to do it

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Disclosure

I have the following potential conflicts of interest to report: consulting, travel reimbursement, teaching courses, training, proctoring:

- Medtronic
- Boston Scientific
- Abbott
- LimFlow
- Terumo
- Cook
- Biotronik
Hydrodynamic Boost: A Novel ReEntry Technique In Distal BTK Vessel: When And How To Do It

1. The concept
2. The patients
3. The technique:
   • Dorsalis pedis artery
   • Plantar artery
4. What to do in case of failure
5. Results

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Manual injections of contrast were used in an attempt to directly open the distal dissection into the true lumen. Once successful, a conventional floppy wire was then manipulated through the dissection plane into the distal true lumen. This technique was considered to be feasible and relatively safe. They also described the “storm cloud dissection”, a diffuse staining of contrast media probably indicating vessel dissection with contrast extravasation into the adventitia, a clear sign to continue the procedure using other approaches.
Vascular surgeons used fluid injection (gas or water) to perform endarterectomy. This surgical technique provides uniformly smooth endarterectomy dissection planes over the entire length of operated vessel, and had demonstrated to be easier and safer than conventional endarterectomy.

Surgical treatment of chronic internal carotid artery occlusion by saline endarterectomy.

Gas endarterectomy. Techniques, applications, and initial results.

Review of femoral-popliteal reconstruction utilizing gas endarterectomy.
The concept of a “fluid” dissection is not new.

We applied this concept in subintimal angioplasty of distal BTK and BTA vessel re-entry.
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280 tibial CTO extended to the ankle or below-the-ankle level 100%

103/280 Endoluminal approach 37%
177/280 Subintimal approach 63%

8/177 Failure to get the ankle 3%
169/177 Able to get the ankle 60%

61% 25% 14%
104/169 Standard technique Wire able to get the true lumen in the most proximal part
42/65 Retrograde approach because of calcification or disease of the target vessel
23/65 Hydrodynamic boost in case of a healthy distal target vessel

- February 2014 - March 2015
- 432 CLI pts
- 544 endovascular procedure

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The hydrodynamic boost was applied in 14% of subintimal re-entry, only in case of:

1. Tibial CTOs extended to the ankle or below-the-ankle level

2. Failure of the wire to re-enter into the "most proximal part" of the distal target vessel

3. Absence of calcification and/or disease of the distal target vessel
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The exploring system
A: 4 French, hydrophilic, diagnostic Berenstein catheter
B: Y-shaped connector
C: stopcock
D: syringe with diluted contrast dye
E: inserter
F: wire
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PATIENT 03
PATIENT 07
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PATIENT 04
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• In 19/23 (83%) cases, the HB was effective in creating a connection between the subintimal space and the true distal lumen and it was possible to advance a wire and to conclude the procedure.

• In 4/23 (17%) lesions, the HB failed and the procedure was successfully completed by retrograde approach.

• No major complications occurred.

• Mean length between catheter tip and re-entry point was 8.2±5.3 mm.
HB is a feasible, safe and effective re-entry technique in distal below-the-knee vessels.

This method represents an easy option for re-entry that extends the possibility of antegrade approach to obtain a successful revascularization.
HB is an option to use in very particular cases where the success can be achieved also with standard techniques! However it is useful to demonstrate that:

1. **Subintimal space is not one!** It is a “family” of anatomical planes with different physical properties and it is essential in subintimal angioplasty to be able to recognize these properties.

2. **Only a high volume center can guarantee a deep knowledge of every possible approach in distal CTOs**

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