The PIERCE technique for recanalization of heavily calcified arteries in hemodialysis patients.

How I do it.

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- **Disclosure**
- Speaker name:
- Tomoyasu Sato
- I have the following potential conflicts of interest to report:

☐ Consulting

☐ Employment in industry

☐ Stockholder of a healthcare company

☐ Owner of a healthcare company

☐ Other(s)

☐ I do not have any potential conflict of interest

Heavy calcification is one of the most challenging lesion characteristics for EVT especially HD pats.

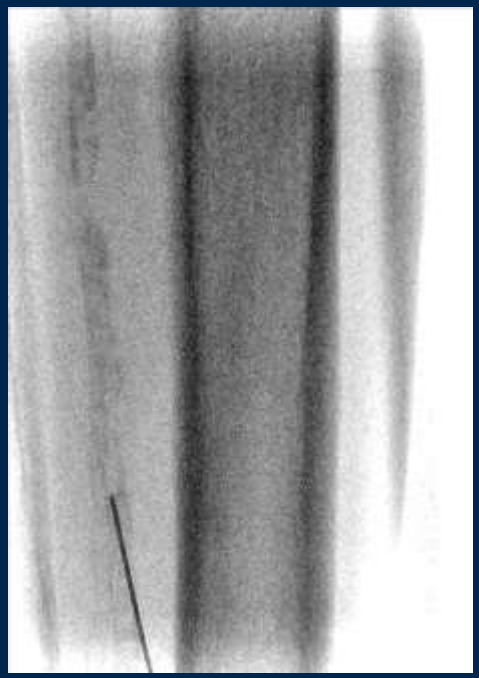
Difficulty in

- Wire penetrating of calcified CTO.
- Device crossing or dilating the lesions..
- Long time patency.

Guidewires
Bidirectonal approach

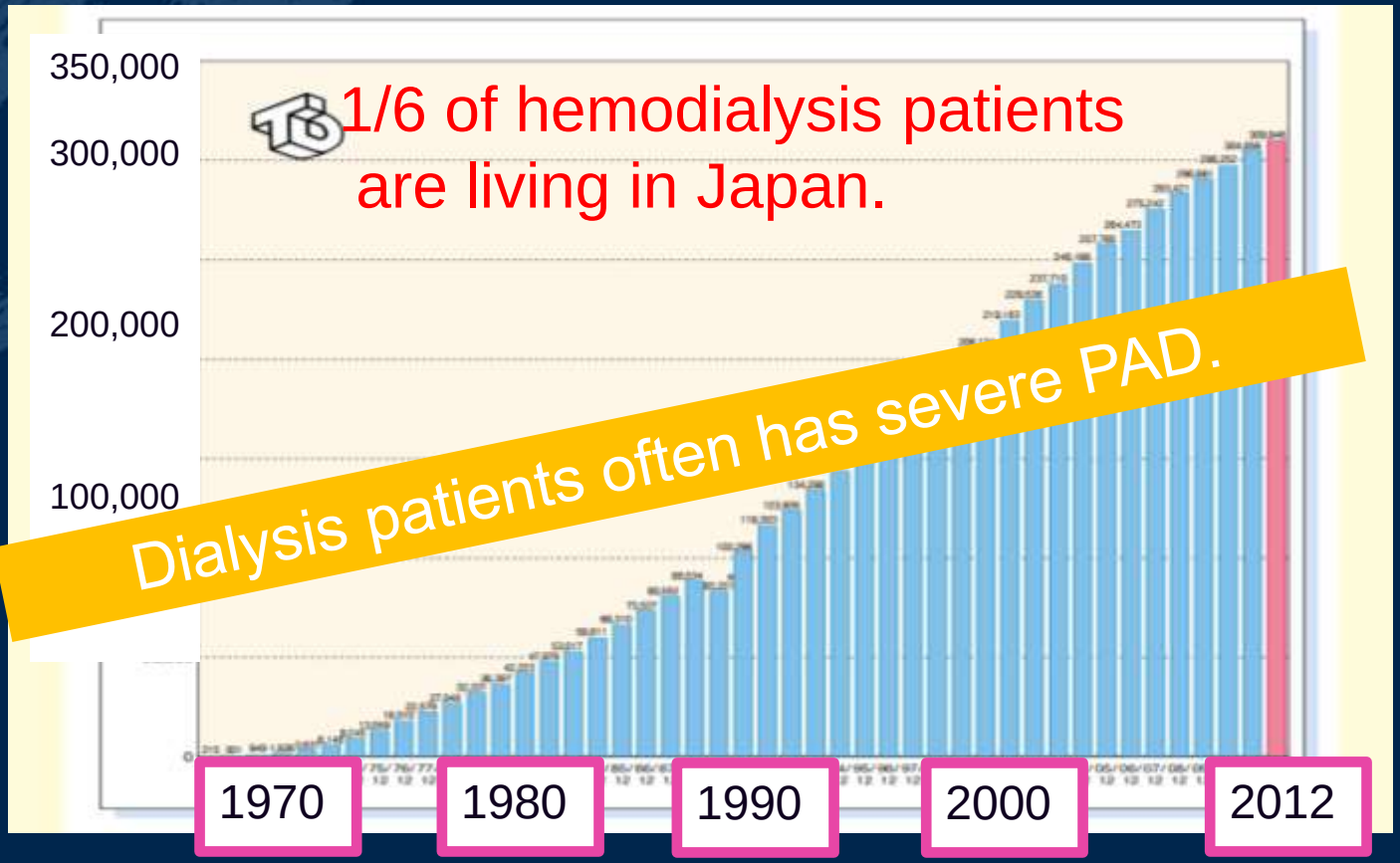
Crossing devices
PIERCE technique

Drug solutions



A lot of dialysis patients are living in Japan.

Due to increase of aged and diabetic people



(Annual review of Japanese society for dialysis therapy 2012)

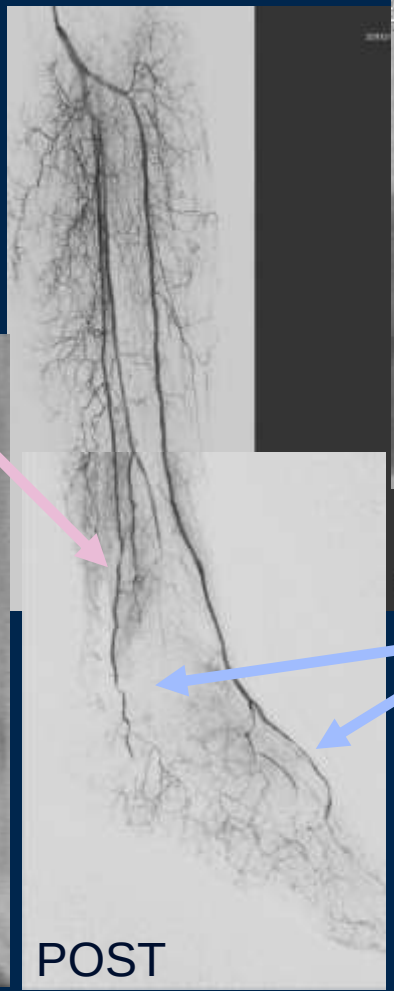
We often experience these cases in HD patients.

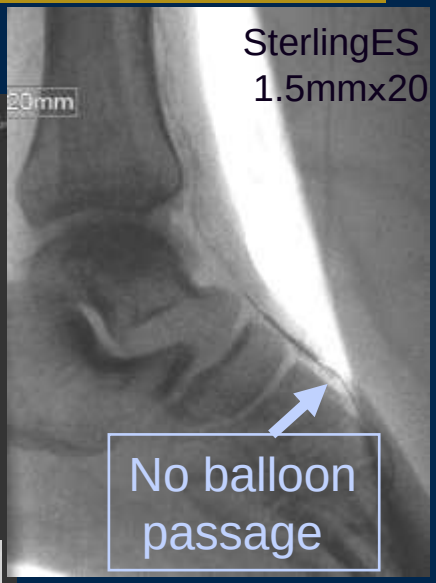
Case: 63y.o. male:

DM, HT, 10 years history of hemodialysis
Intractable toe ulcers of both foot.
SPP = 25mmHg.

Some unfavorable dilatation due to calcification even though guidewire has passed.

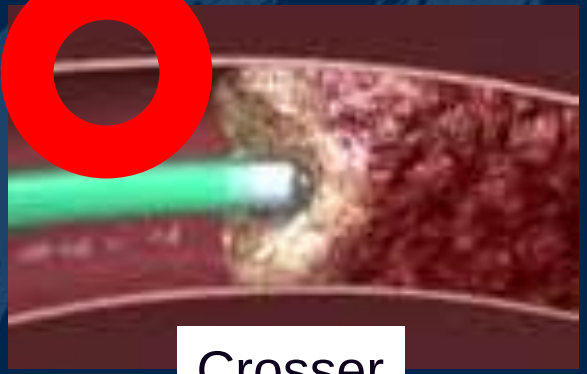
Unable to dilate even in high pressure





No balloon passage

In Japan, most of the other debulking devices for calcified lesions are not available except Crosser.



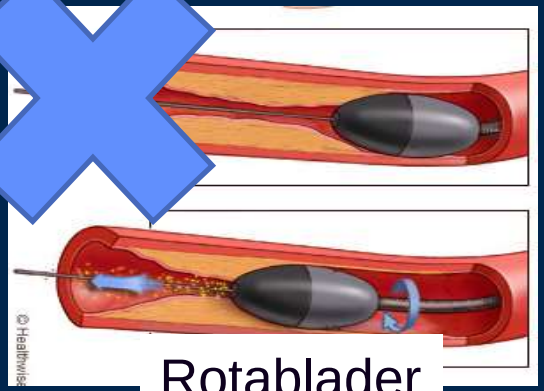
Crosser

Figure 4. *JETSTREAM cutter and XC catheter. Five flute design on the distal end of the cutter of all currently available JETSTREAM devices is shown (A). The XC cutter demonstrates the aspiration port on the shaft of the catheter and the expandable blades. The blades are either up or do* *ue of the drive shaft within the sha*

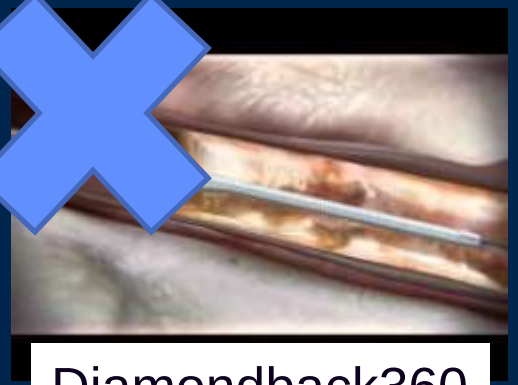
Jetstream

Phenix

Excimerlaser



Rotablader



Diamondback360

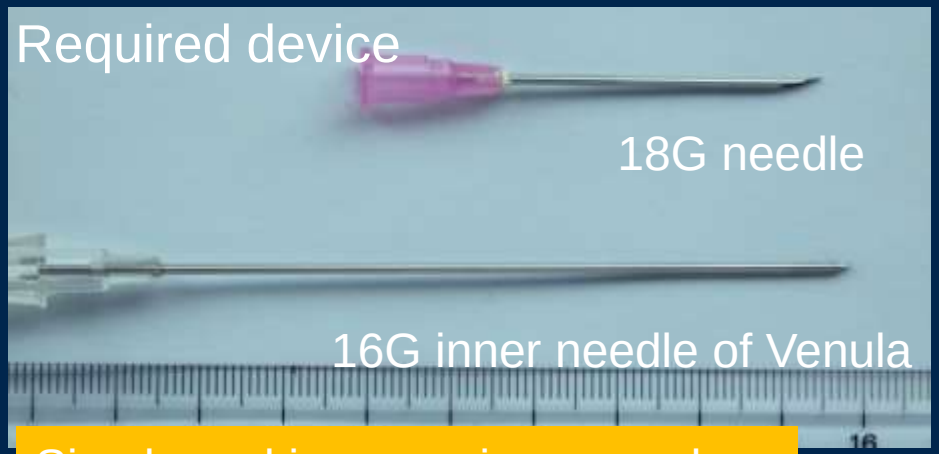
We hit on the " PIERCE technique " :

(Percutaneous direct needle puncture of calcified plaque during recanalization of heavily calcified plaques)

Ichihashi S, Sato T. et al: J Vasc interv Radiol 2014; 25: 784-788.

Percutaneous cracking of heavily calcified plaques and facilitates guidewire, catheter passage or lesion dilatation.

Required Device: 21G to 16G needle



Simple and inexpensive procedure

Merit:
Easy to perform.
Extremely inexpensive.

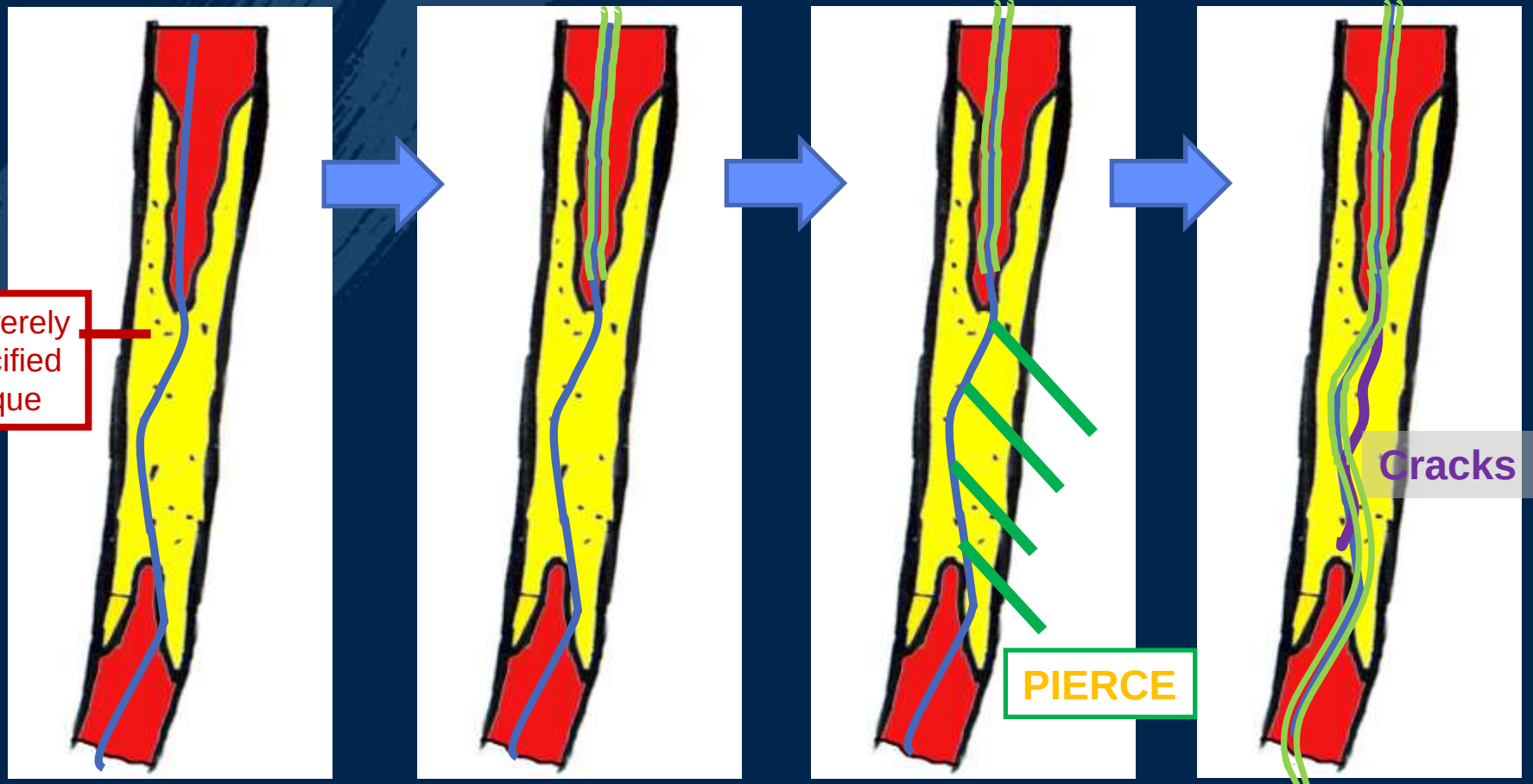
Contents

I. Basic concept and technique of the PIERCE technique.

2. Tips and tricks which enhance the effects of the PIERCE technique.

Schema of the PIERCE technique

This technique is designed to make some cracks in the calcified plaques to obtain device crossing and favorable dilatation of severely calcified lesion.



Though CTO wire has crossed, any balloon or microc-atheter does not cross.

PIERCE is done.

Microcatheter or balloon can cross.

Representative PIERCE cases:

Case 1.

Case 1: 75 years old female

Lt. toe gangrene (Rutherford 5)

15 years of history of hemodialysis due to diabetic nephropathy

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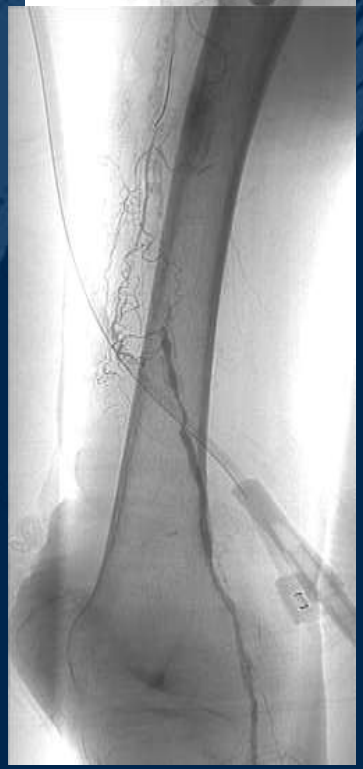

CTO with
massive calcification

Anable to dilate due to
circumferential calcification .

(sapphire NC
4x40 27atm)

After the PIERCE,
Dilated successfully

Representative PIERCE cases:

Case 2.

Case 2: 84 y.o. female

HD, DM, un-healing ulcer of her Rt. foot.
Iliac arterial stenting was done 2 weeks ago.
SPP was not improved. Additional PTA was planned.

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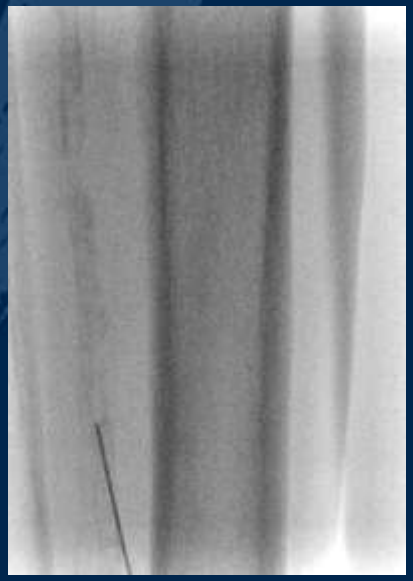
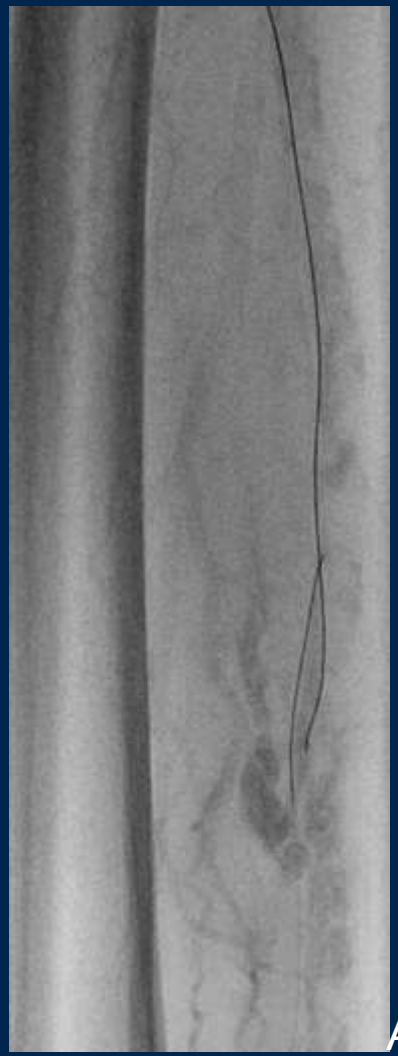
HD, DM, unhealing ulcer of Rt. foot.



ATA was punctured.
A 4F introducer was inserted.



Bidirectional wiring was done

A 0.018 wire could cross.
Any device could not cross the calcification.

The lesion was so hard that we put the needle on an syringe to achieve firm grip. After the PIERCE technique, device passage was obtained and stent was placed entire SFA.

PIERCE was done

A syringe enables firm grip and high destructive performance of the needle.

After stent

Representative PIERCE cases:

Case 3.

Case 3: 70 years old male patient.

10 years of history of hemodialysis due to diabetic nephropathy.
Intractable ulcer in his right 3rd,4th finger and heel (Rutherford 5).
We intended to recanalize PTA because of the heel ulceration.

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Intractable ulcer in his right 3rd,4th finger and heel (Rutherford 5).
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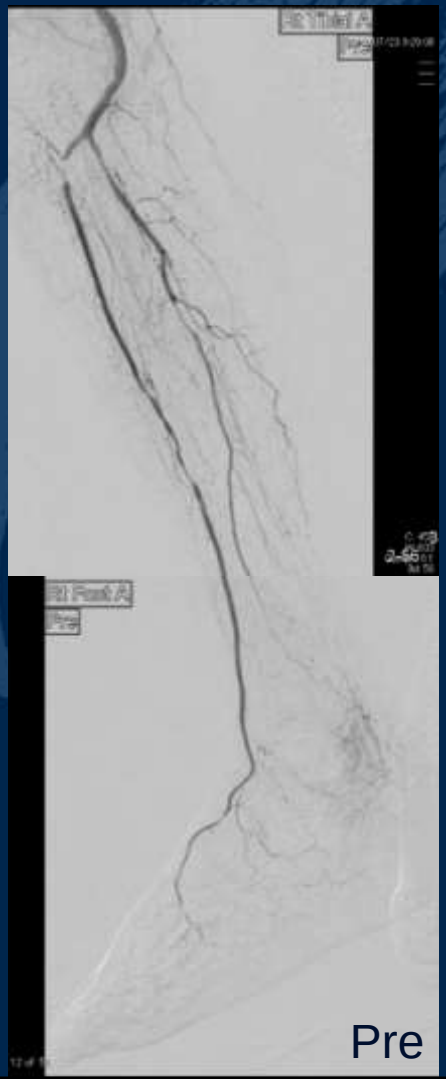
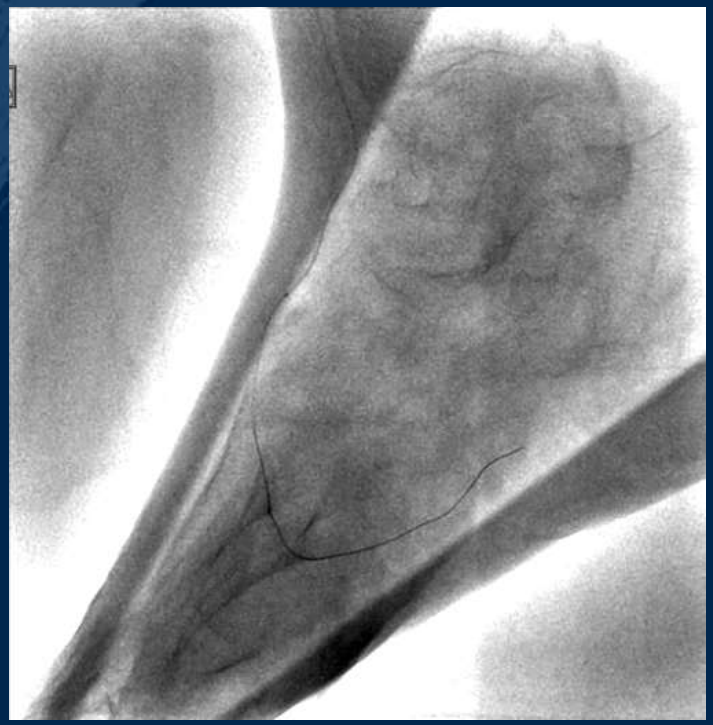
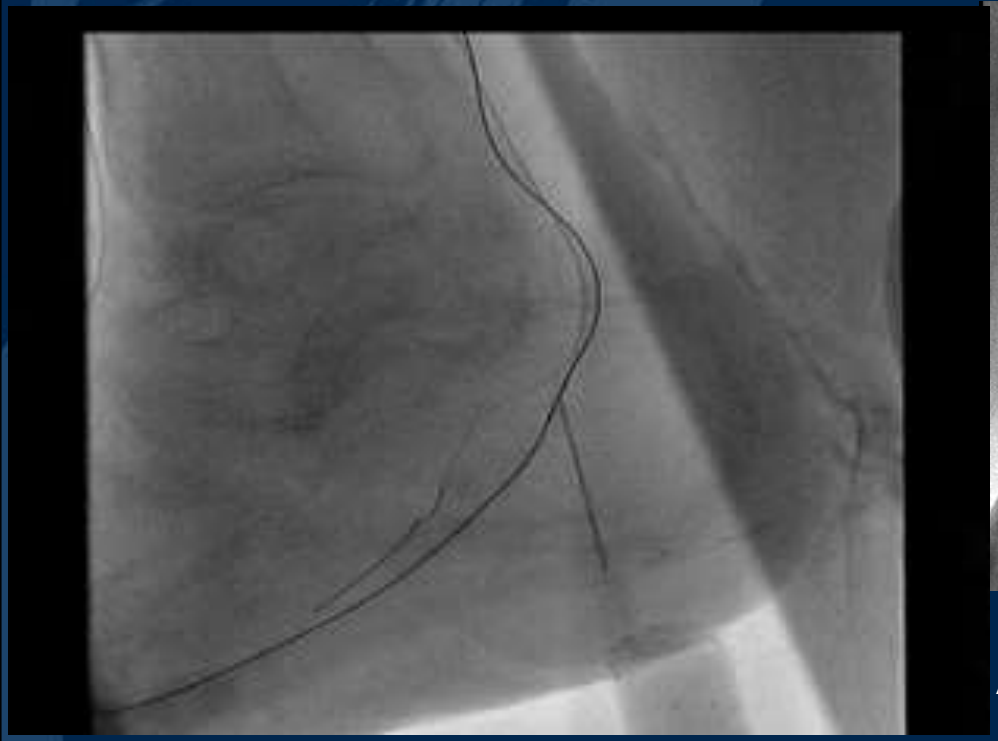


Pre



A guide wire has passed plantar arch and made it made it pull-through.

Microcatheter could not cross the lateral planter artery.



The PIERCE was done.

After the PIERCE, a balloon could cross the lesion .

Final angiogram

Representative PIERCE cases:

Case 4.

Case4: 81 yo, female. HD for 15years.
Intractable ulcer of her rt. big toe and rest pain.
Failed Crosser passage of ATA.

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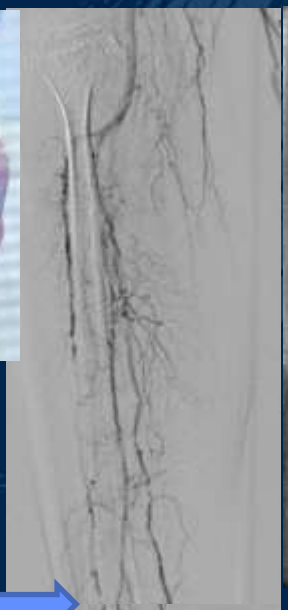

Occlusion of ATA ( ).
SPP=10mmHg

The PIERCE was done.

Piercing point of the skin.

Test injection after the PIERCE.
Hemostasis was obtained by intra-arterial balloon.

Results

Between May 2012 and December 2016, 11cases, 13 legs were tried to recanalize by the PIERCE technique.

Failed device passage was seen in 1 lesion at lateral tarsal artery.
We experienced a case of severe hemorrhage of ATA who need embolization by gelatin sponge.

		No. of lesions	Success Cases
SFA		2	2 (100 %)
BTK	ATA	3	2 (67 %)
	PTA	1	1 (100 %)
	Pero.	2	2 (100 %)
BTA	Dorsal Pedis	4	3 (75 %)
	Plantar	1	1 (100 %)
total		13	11 (85 %)

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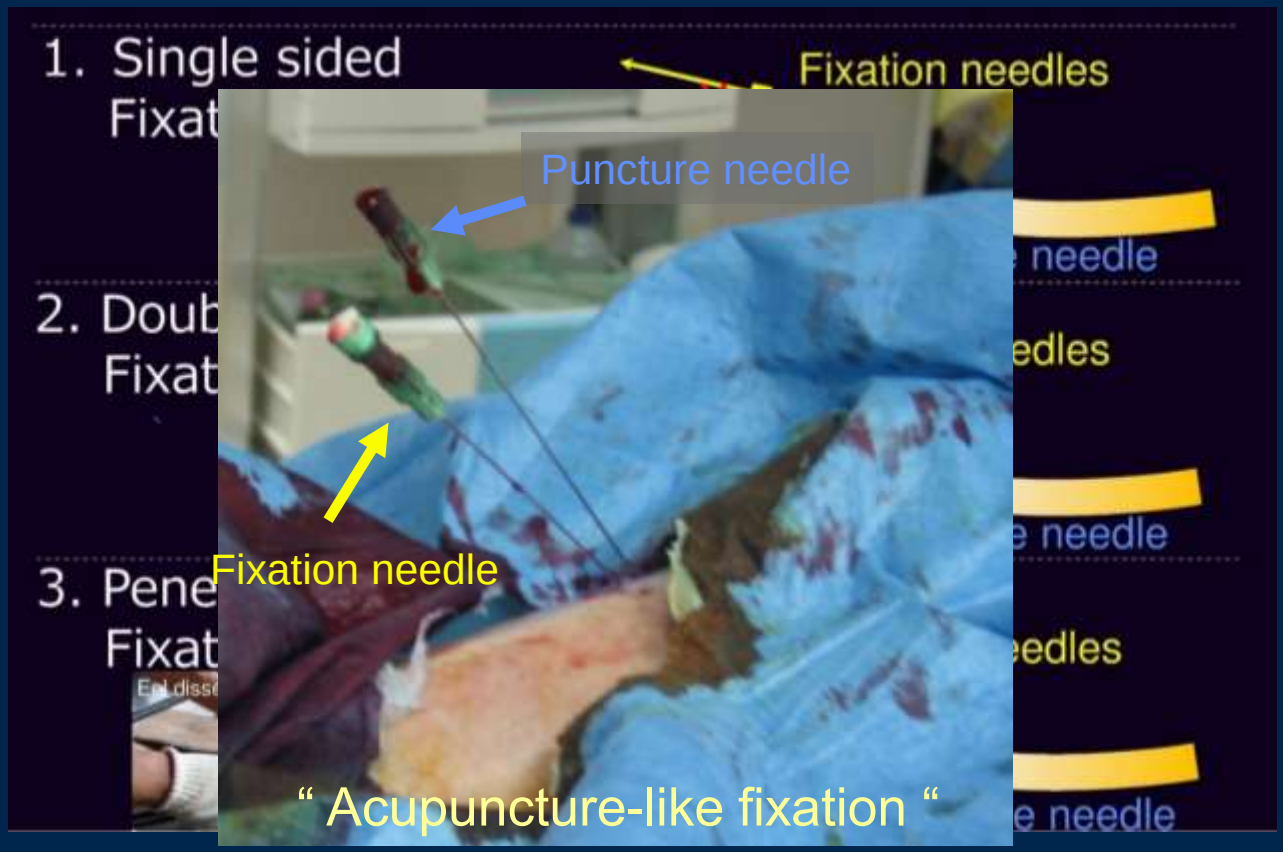
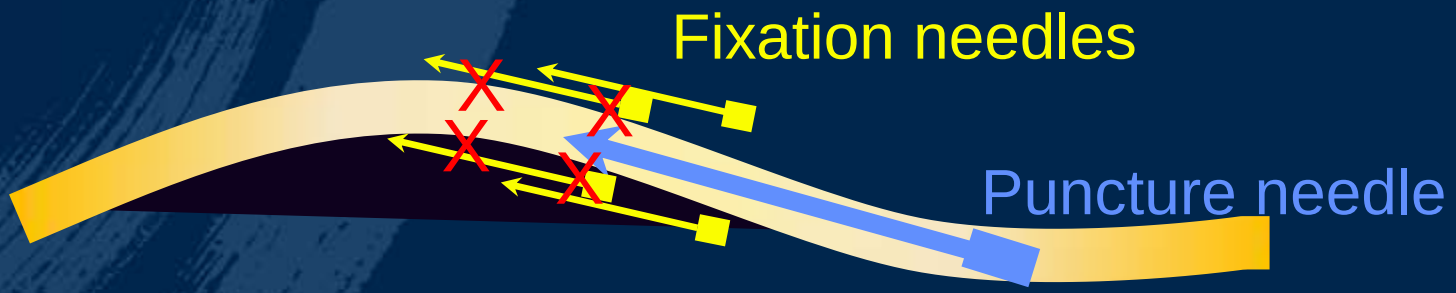
Acupuncture-like fixation.

The movement of the target artery is sometimes annoying for the PIERCE technique and distawill be dl puncture.
We can fix the artery by the needles.

We named this technique as " Acupuncture-like fixation method "

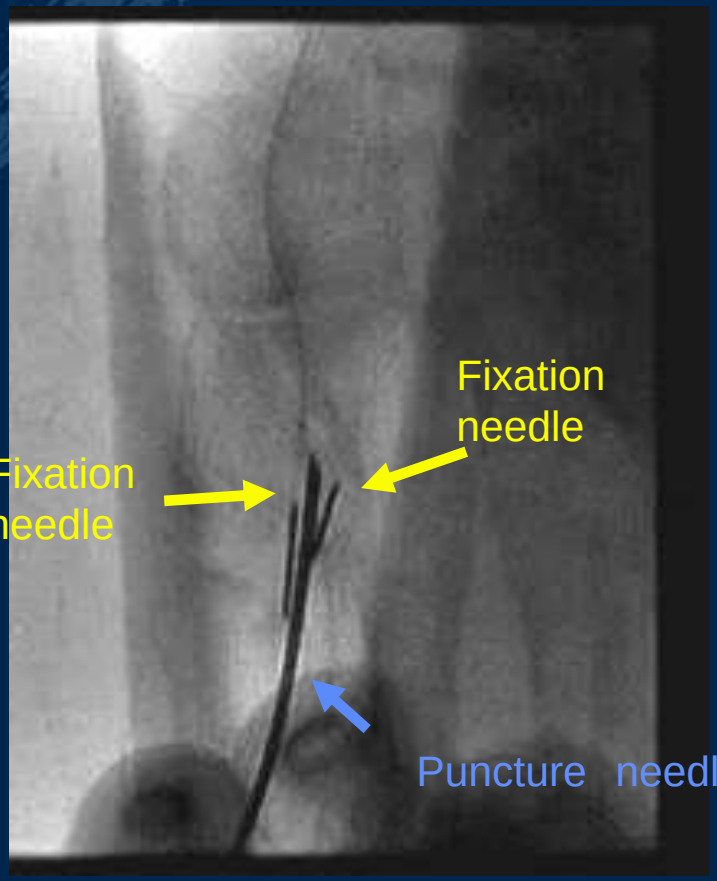


2. Double sided Fixation



PRE

PIERCE



After PIERCE

Take home messages

Recanalization of heavily calcified arteries is still challenging. By dedicated guidewires and crossing catheters, success rate is improving even in conventional procedures.

PIERCE technique requires only commonly used needles and is extremely low cost compare to crossing devices. Arterial fixation is highly required to successful PIERCE technique.

PIERCE technique still plays an important role during recanalization of heavily calcified arteries.

Thank you for your attention.

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