

The logo for LINC (Lung Cancer International Network for Clinical Research) features a stylized, colorful graphic of a lung or a flame in shades of red, orange, and yellow, set against a dark blue background with a brushstroke effect.

LINC

Distal Embolization after DCB: True or false?

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Disclosure

Speaker name:

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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)

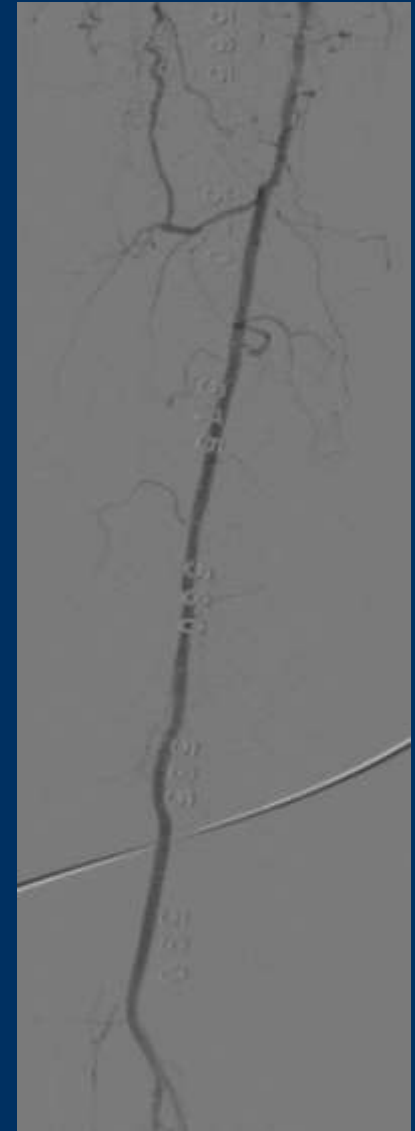
- I do not have any potential conflict of interest

Let's begin with a case

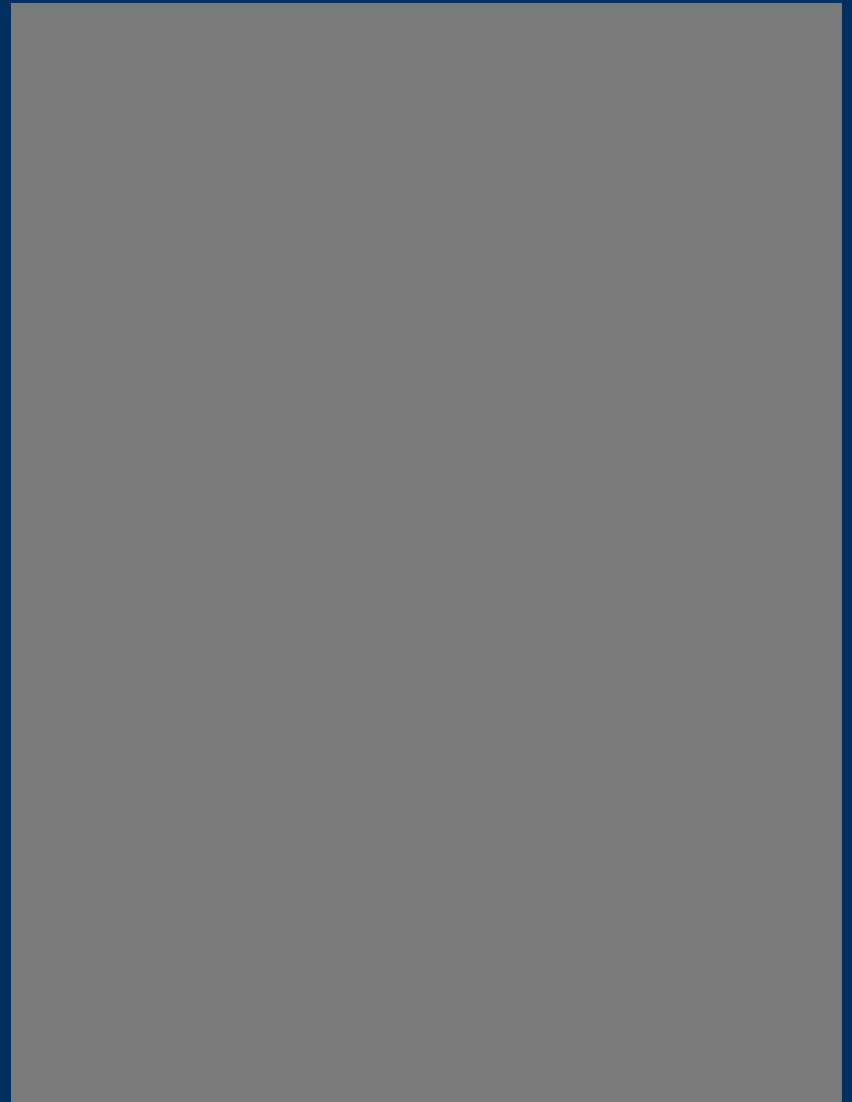
- Male, 75y
- Intermittent Claudication
in right leg



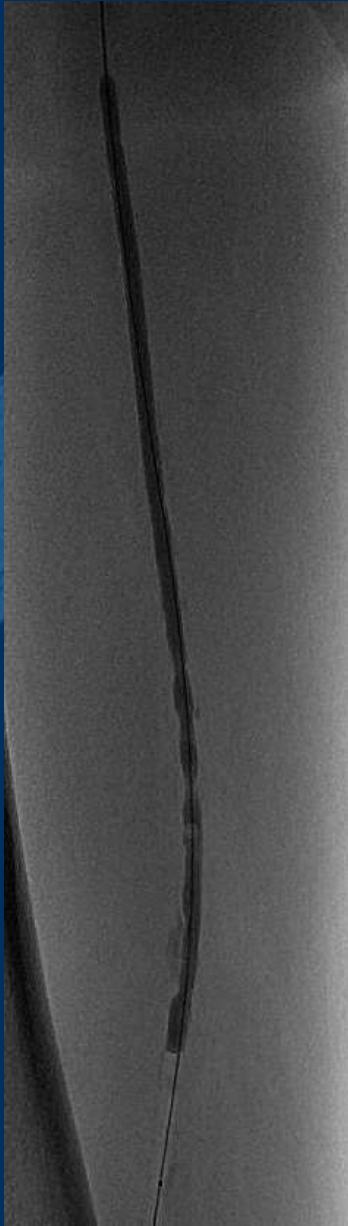
SFA stenosis



Popliteal patent



peroneal and posterior tibial artery patent



4 mm pre-dilation



5*300 mm DCB (Acotec)



SFA patent without dissection



Guidewire
Catheter
Nitroglycerin
Heparin NS



Distal embolization in PT

PT is patent, peroneal with high resistance

Question

What's the cause of “**distal embolization**” after DCB?

Is it caused by the **drug particles**?

Study: Embolic Protection Device + DCB

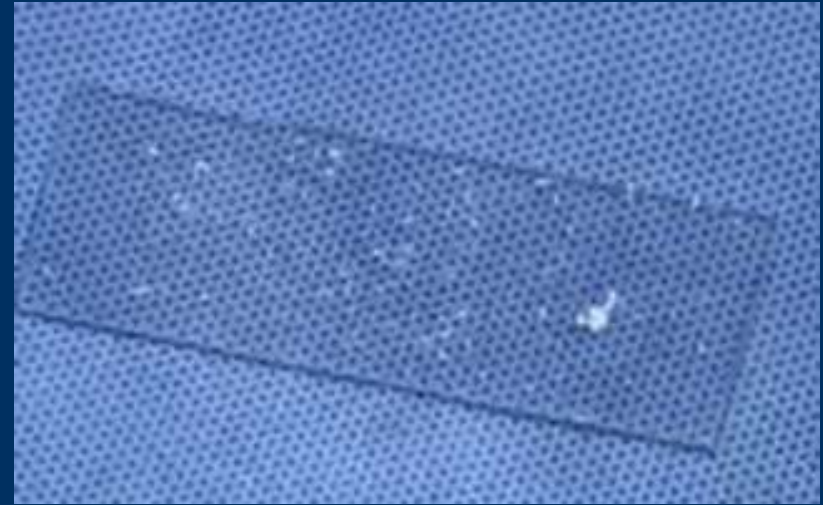


- Capture the embolus
- Drug solution test
- Paclitaxel detection

DCB (Acotec)

Spider (80-210 μm) (Medtronic)

Drug Solution Test



Drug particles from a real balloon



Drug particles soluble in **organic solvent**

Case 1: DCB for SFA



Thin piece material in filter net:
big drug particles?

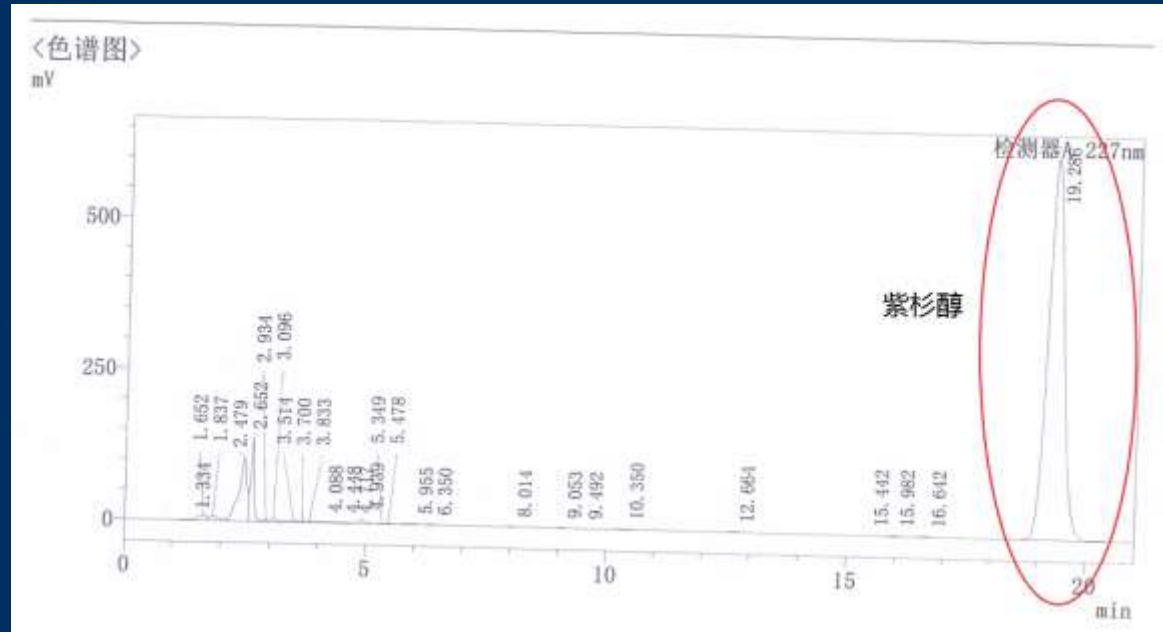
Typical plaque

Drug Solution Test

- Filter in solvent for 2 min
- Thin piece material: **insoluble !**
- **It is not drug !**

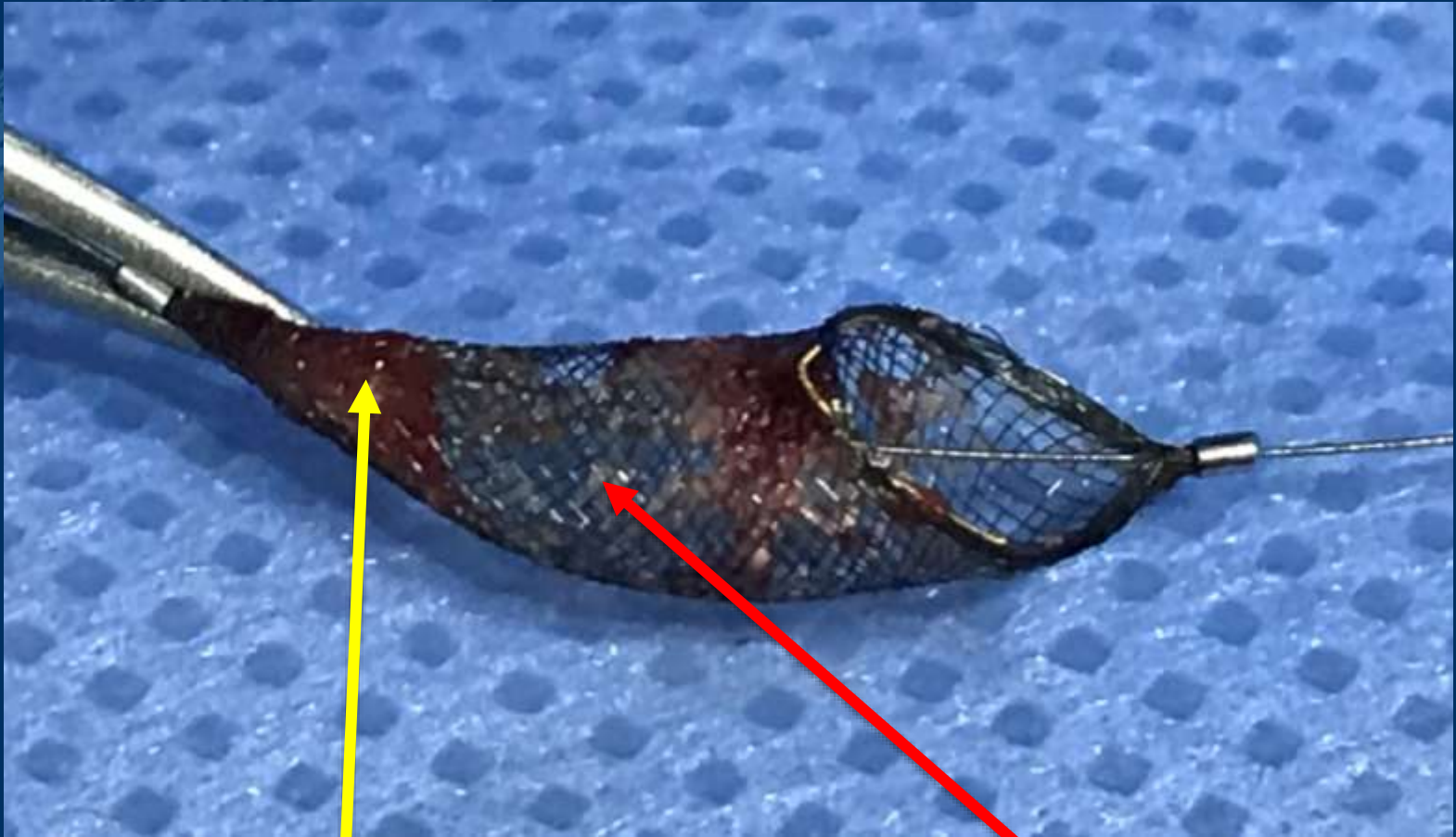


Paclitaxel Detection



Paclitaxel in the filter: **3.65%** of total amount of 5*300mm DCB

Case 2: TurboHawk + DCB



Tissue from Hawk atherectomy

Thin piece material in filter net

Case 3: TurboHawk + DCB

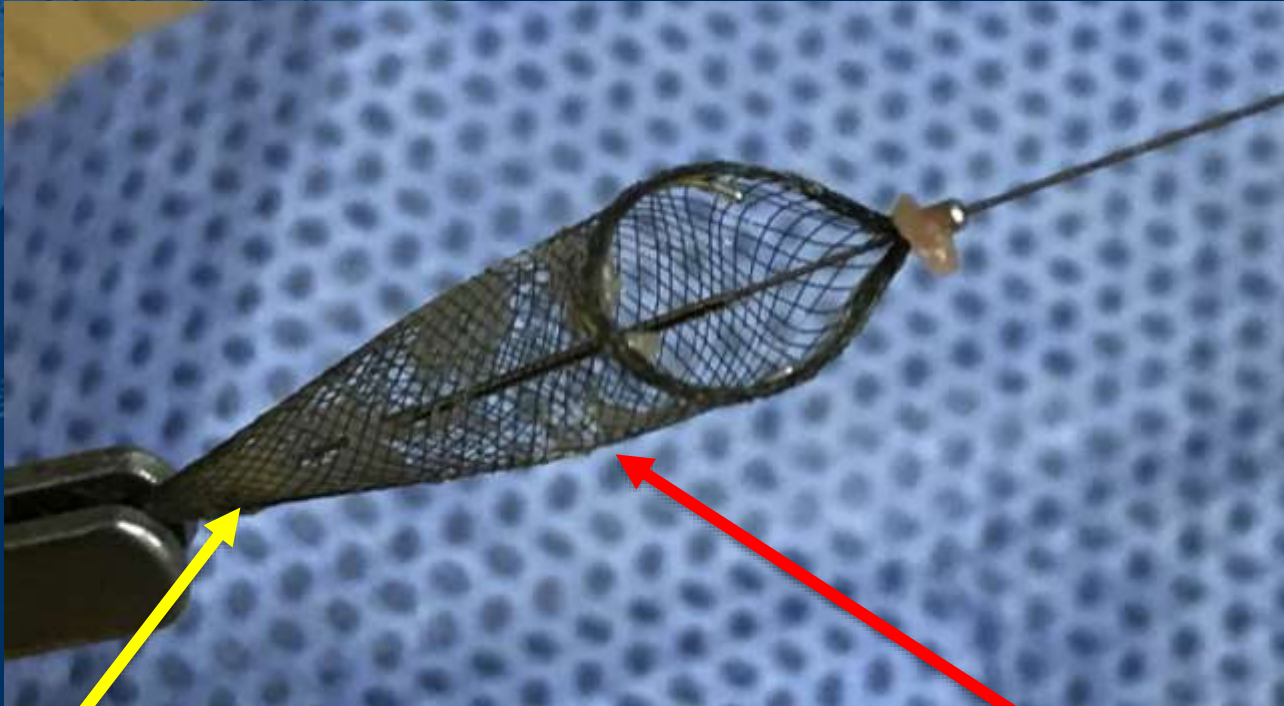


Tissue from Hawk atherectomy



Thin piece material

Case 4: TurboHawk (without DCB)



Tissue from Hawk atherectomy

Thin piece material

Results 1

CASE	Hawk	DCB	Filter bottom	Filter net	Solution test	Paclitaxel content
1	/	5*300	Typical plaque	Thin piece material	insoluble	3.65%
2	Yes	5*300		Thin piece material	insoluble	0.9%
3	Yes	5*200		Thin piece material	insoluble	0.39%
4	Yes	4.5*150		Thin piece material	insoluble	0.29%
5	Yes	/		Thin piece material	/	/

Conclusion 1

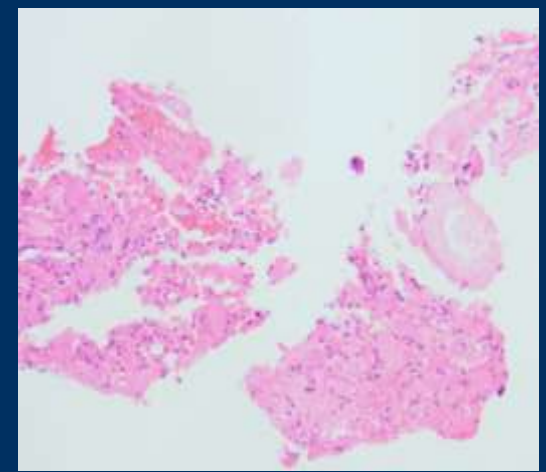
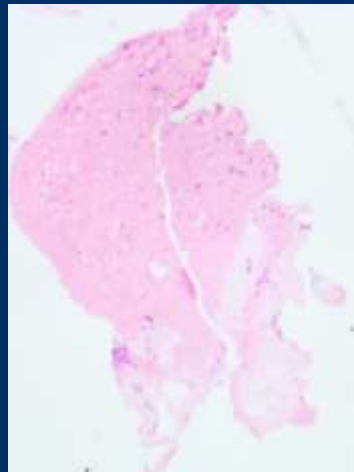
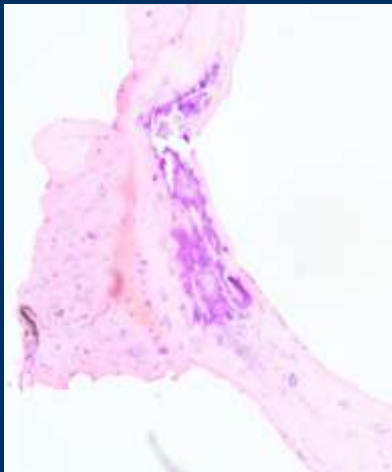
- **Distal embolization in filter:** plaque, thin piece material
- **Thin piece material:** undefined, not drug particles
- **Drug particles rushed away:** partly captured by filter, paclitaxel content 0.29%-3.65%

Question 2

What is the “thin piece material”?

Where does it come from?

Study 2: pathological examination



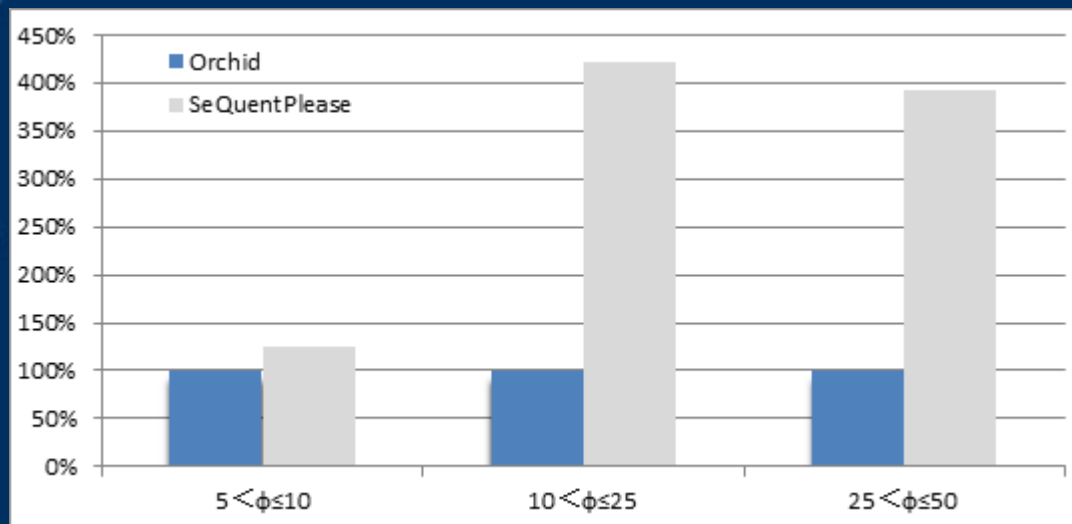
Thin piece material: hyaline degeneration and calcification (arteriosclerosis)

Question 3

What's the size of drug particles rushed down?
Will it cause below the knee artery embolization?

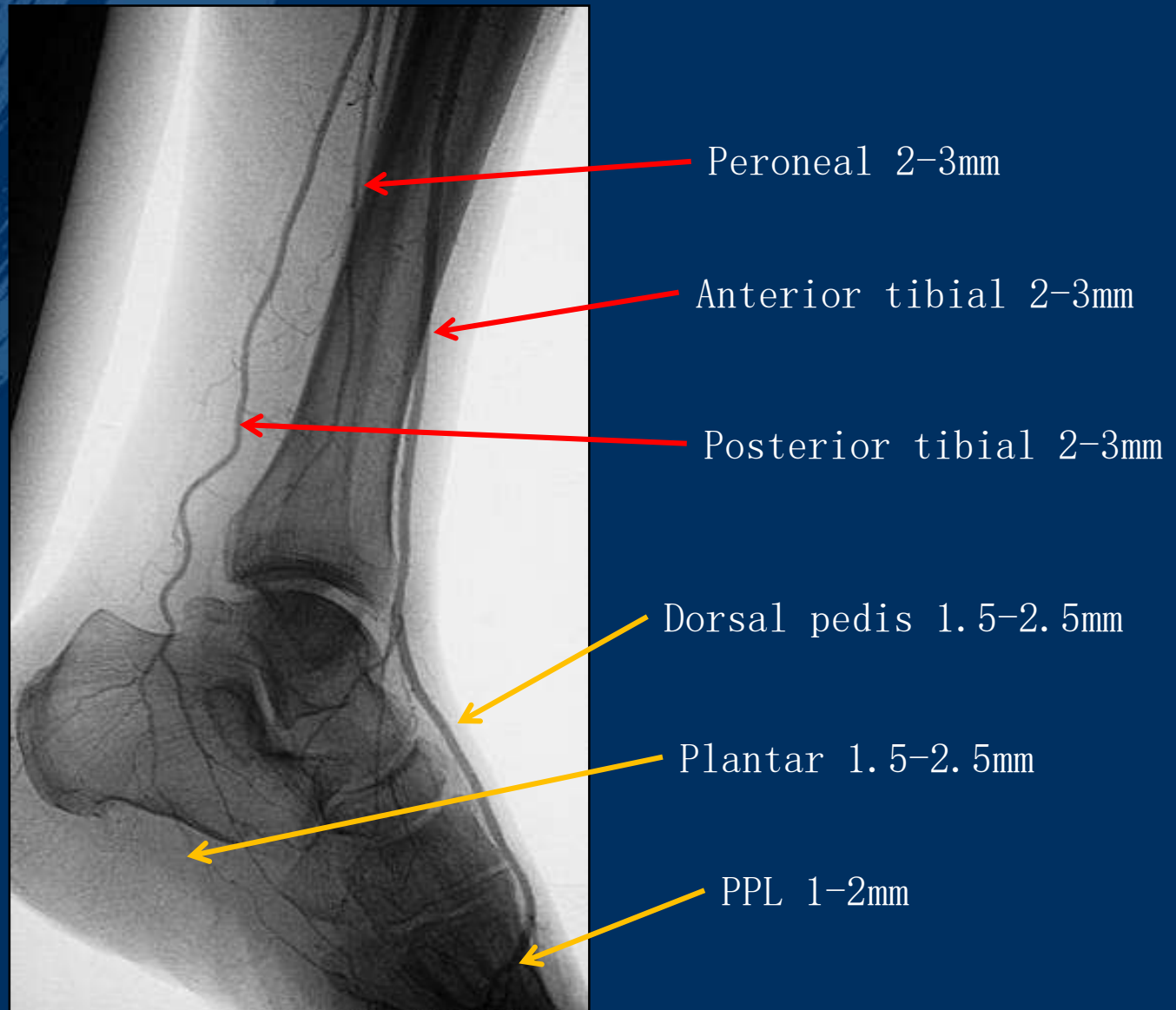
Study 3: particle size

DCB	Total amount	Amount of particles with different size (μm)/ml				
		$5 < \phi \leq 10$	$10 < \phi \leq 25$	$25 < \phi \leq 50$	$50 < \phi \leq 100$	$100 < \phi$
Acotec 4*40mm	6006	3855.3 (64.19%)	2105.8 (35.06%)	36.5 (0.61%)	8 (0.13%)	0.4 (0.01%)
SeQuent Please	9248	3222.7 (34.85%)	5922 (64.04%)	95.3 (1.03%)	7.4 (0.08%)	0.3 (0.00%)



Experiments to gather the particles and measure the size

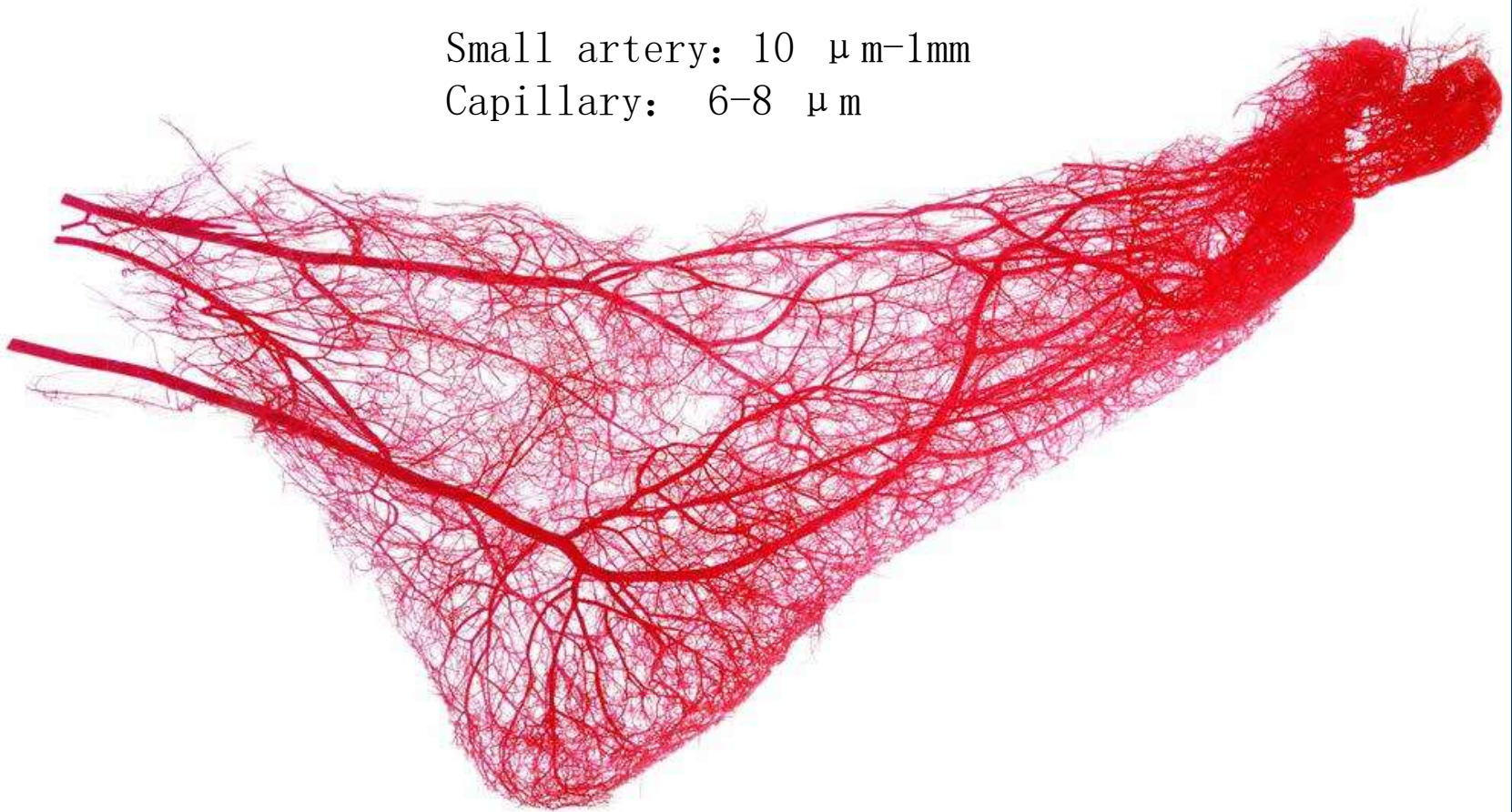
Size of BTK artery



Size of small branches in foot

Small artery: $10\ \mu\text{m}$ – 1mm

Capillary: 6 – $8\ \mu\text{m}$



Plaque v.s. Drug particles

	Plaque	Drug particles
Diameter	90 μ m-2mm, or larger	<10 μ m,64.2% 10-25 μ m,35.1% <50 μ m,0.61%
Main artery	Embolization	no
Small branches		Hyper-resistance
Effect on the patency	No flow	Patent with hyper-resistance
Self-cure	no	Yes it is soluble

Embolization v.s. Hyper-resistance

Conclusions

- **Distal embolization in main artery:** by different forms of plaque
- **Drug particles rushed down:** do exist, will not cause typical embolization in main artery, but hyper-resistance in small branches
- **Future studies:** decrease particles rushed down, hydrophilic or lipophilic, ...

THANK YOU

