29th TCTAP2024

How to Prevent & Treat Transfemoral Access Site Complications During TAVR

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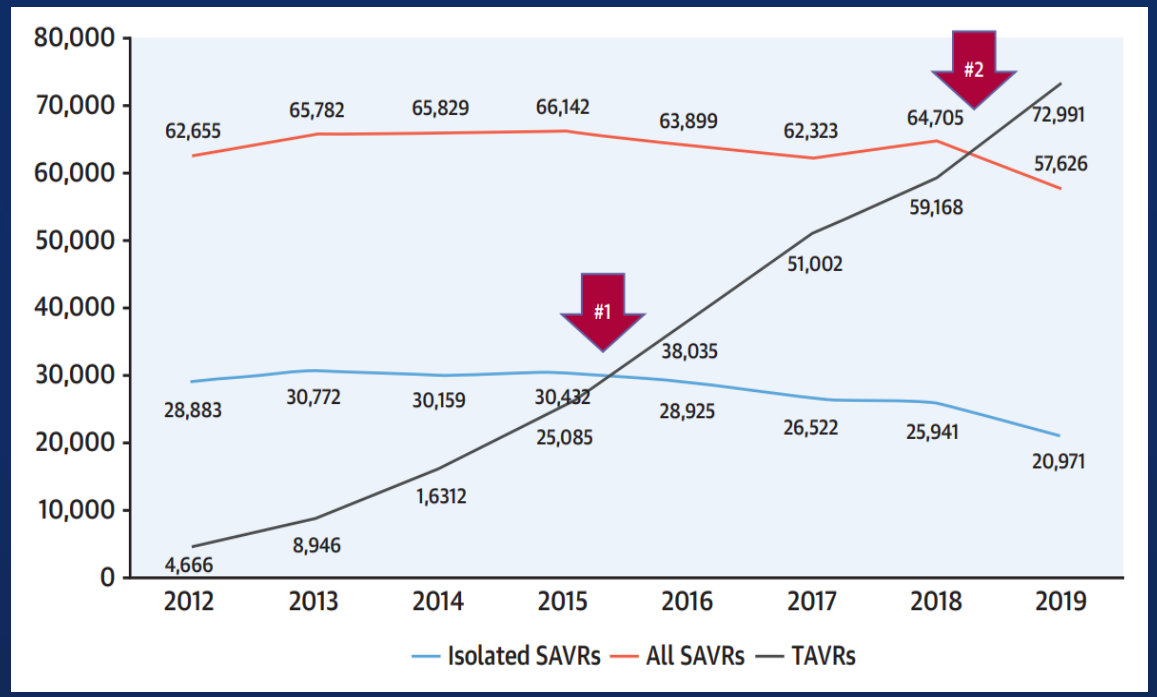
이승용

CVRF

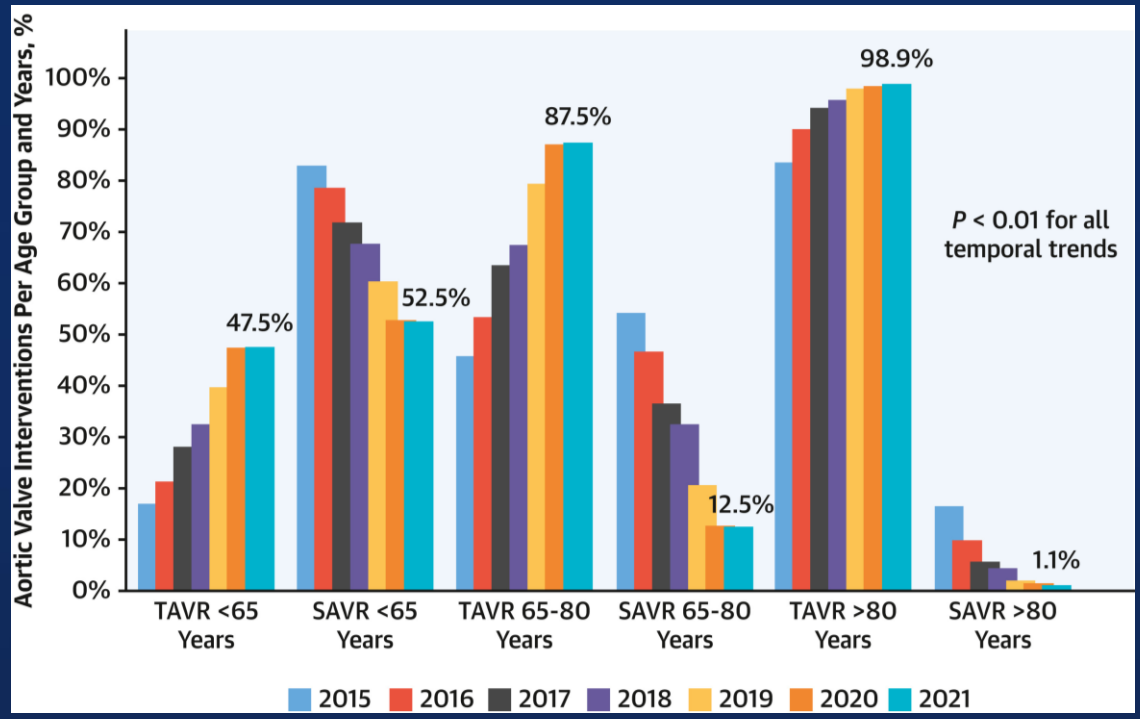
Current Status of TAVR in US

STS-ACC TVT Registry



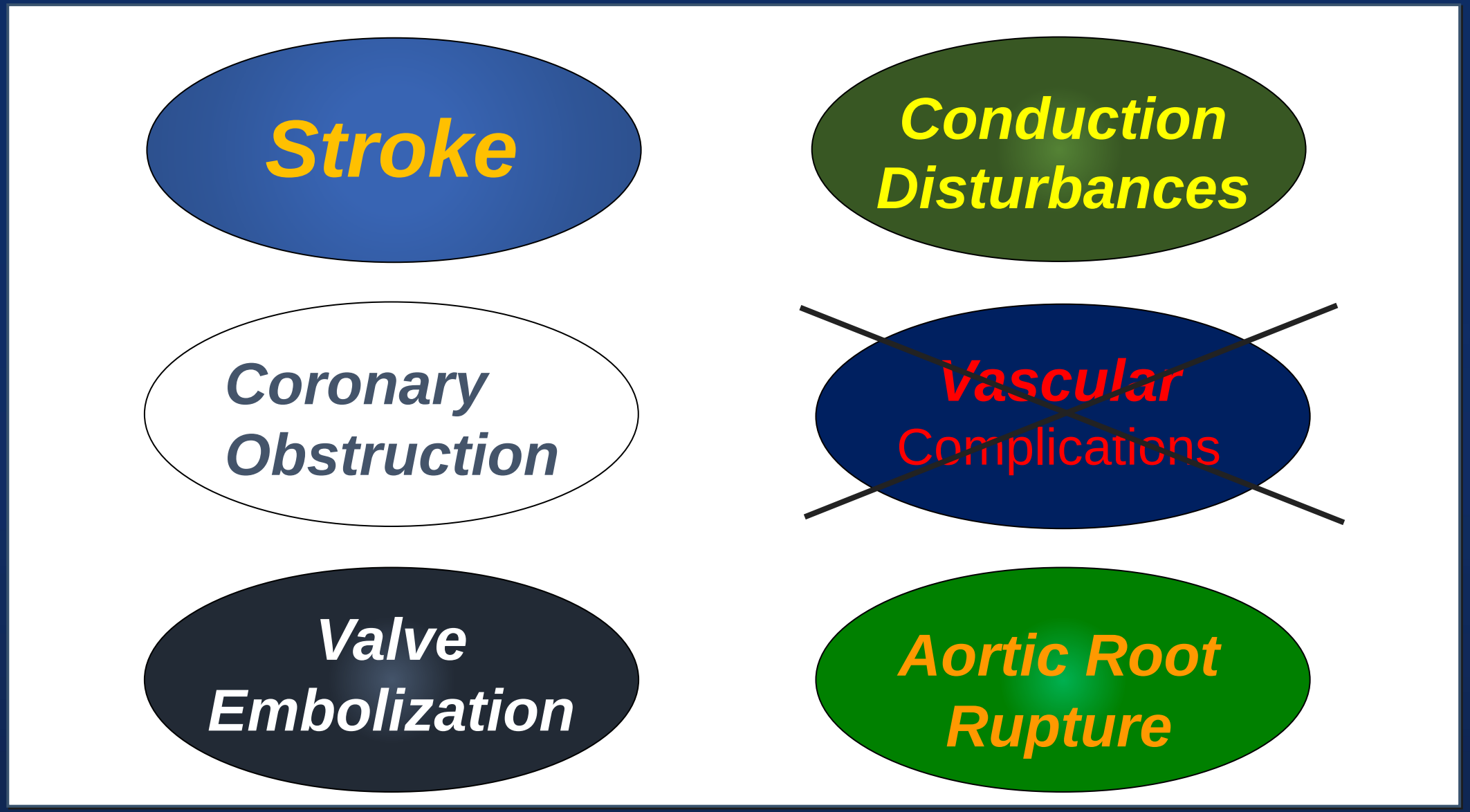
J Am Coll Cardiol 2020;76:2492–516

The Vizient Clinical Data Base



JACC 2022 Nov 22;80(21):2054-2056

TAVR Complications: Overview

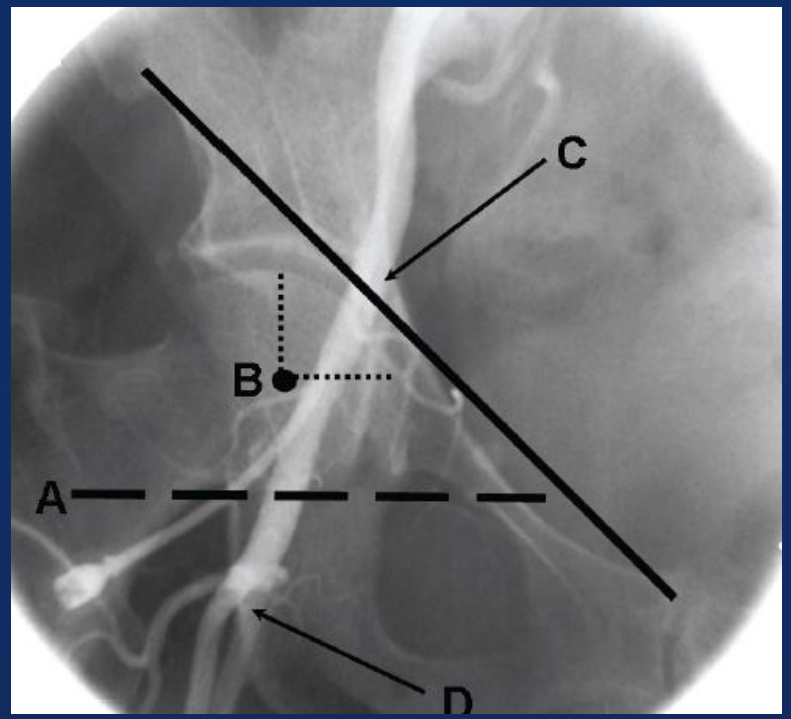



Ø 4.7 / 6.1 mm
Ø 3.4 / 5.4 mm

Vascular Access

Goals of Arterial Puncture

- Anterior wall stick
- Center of common femoral artery
- Below inguinal ligament
- Above any areas of calcification or plaque
- Avoid small branches
- Above femoral bifurcation



A. Bottom of the Femoral Head
B. Center of the Femoral Head
C. Approximately Location of the Inguinal Ligament
D. Femoral Bifurcation

Considerations in Difficult Femoral Arterial Access

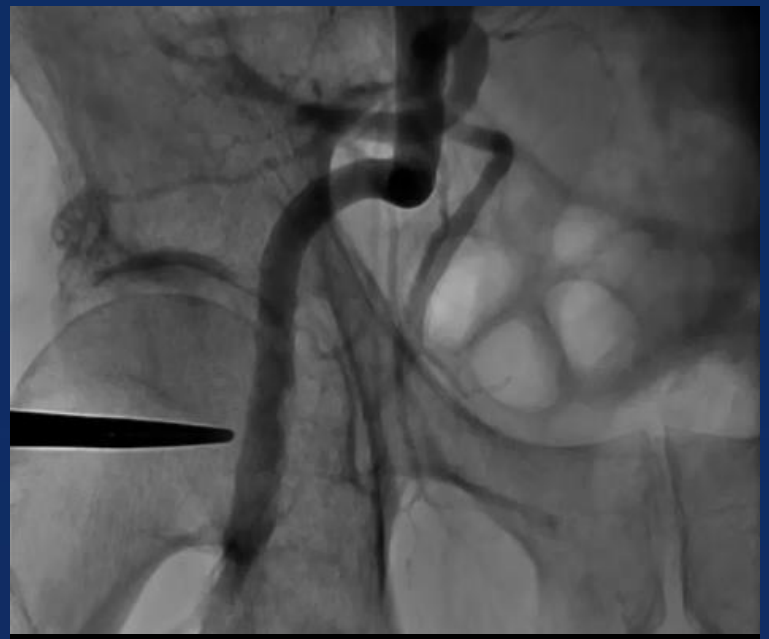
- Iliofemoral bypass grafts
- Prior femoral arterial access and closure device used
- Prior femoral arterial access site complications (dissection, pseudoaneurysm, ischemic limb)
- Active groin infection
- Prior groin surgery (excessive scarring)/radiation therapy
- Tortuous iliofemoral arterial system
- Calcified common femoral artery
- Aneurysms of the iliofemoral or aortoiliac system
- Morbidly obese

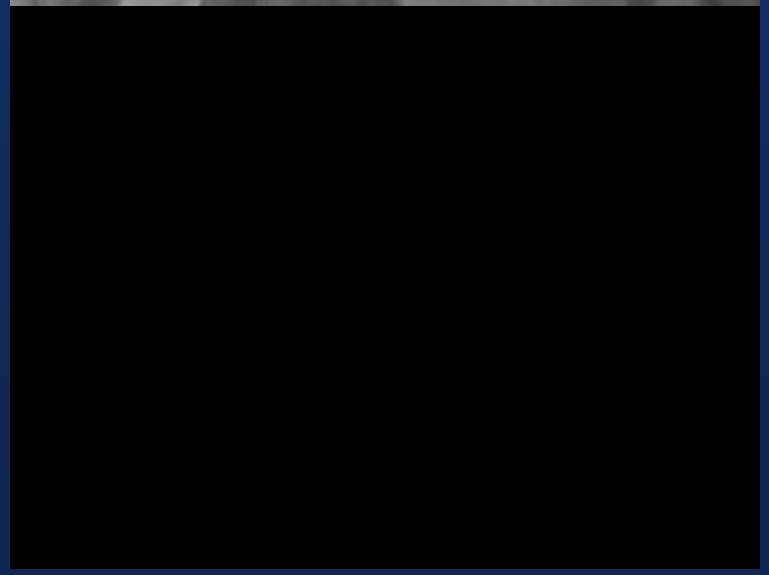
Vascular access complications

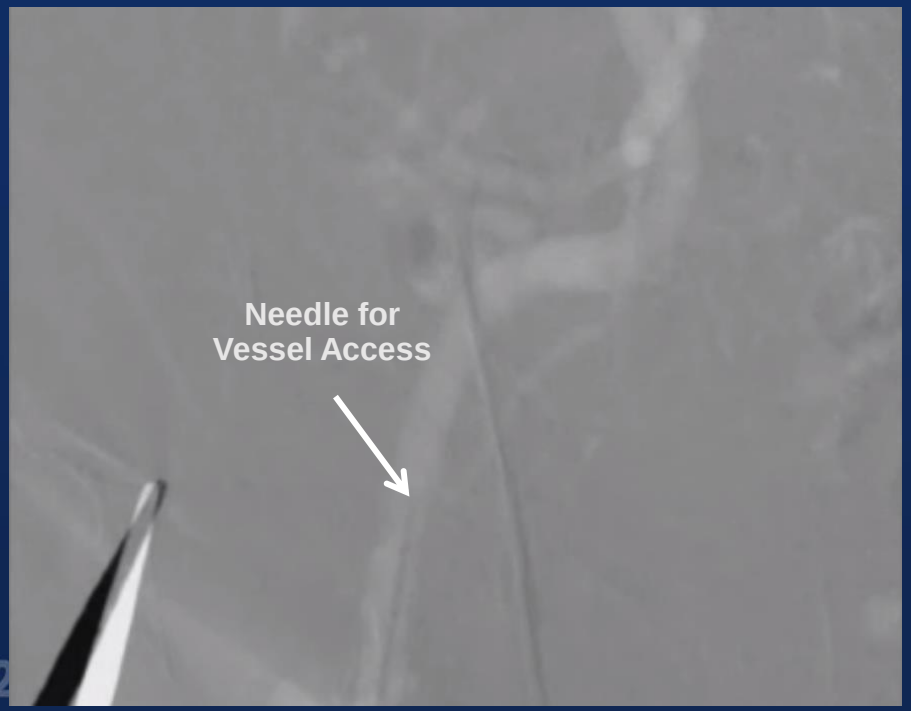
- Hematoma,
- Pseudoaneurysm,
- Arteriovenous (AV) fistula,
- Vessel laceration,
- Intimal dissection,
- Acute vessel closure (thrombosis of small artery lumen), retroperitoneal hemorrhage,
- Neural damage, infection, venous thrombosis.

Angio guided puncture

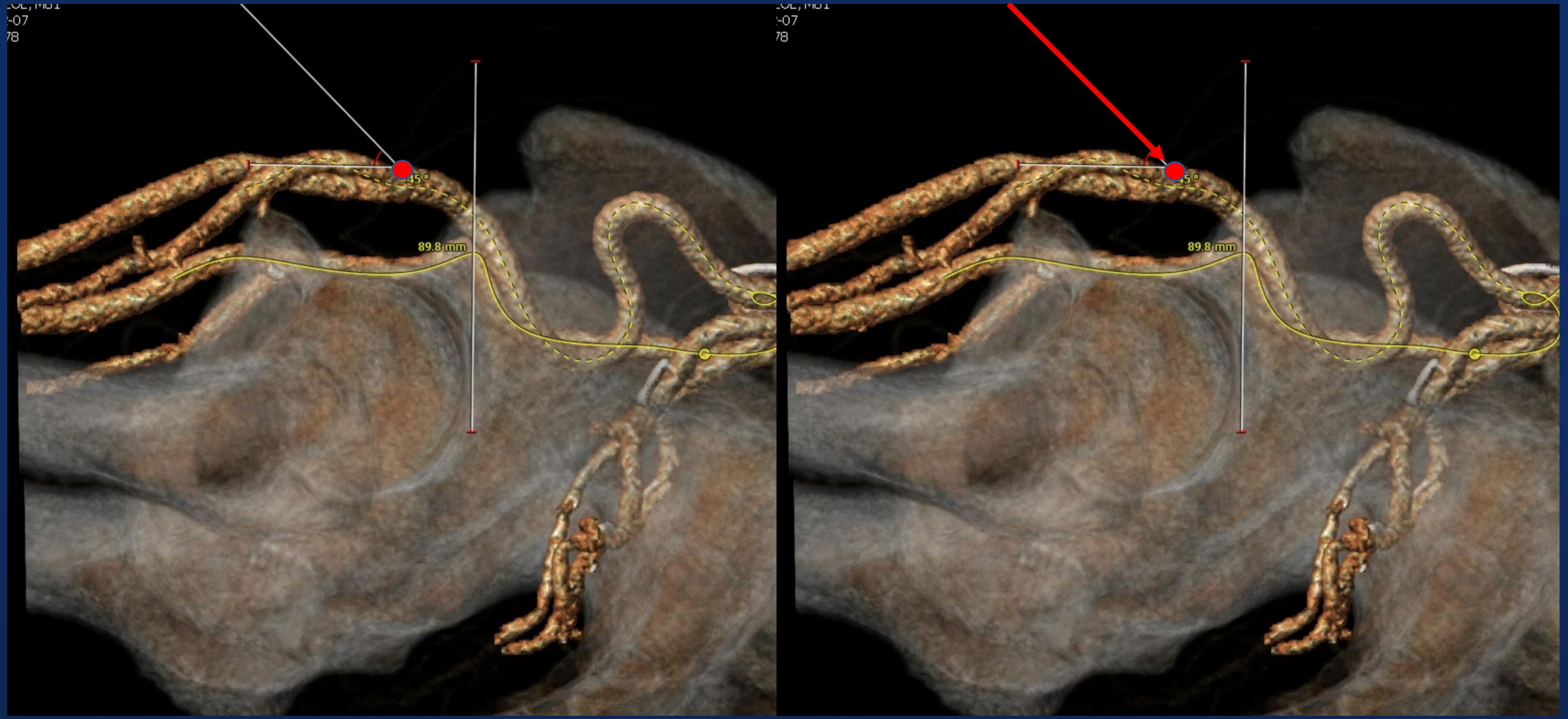
- Micropuncture kit
- Puncture location methods
  - Iliac angiogram
  - Road mapping
  - Pigtail – crossover



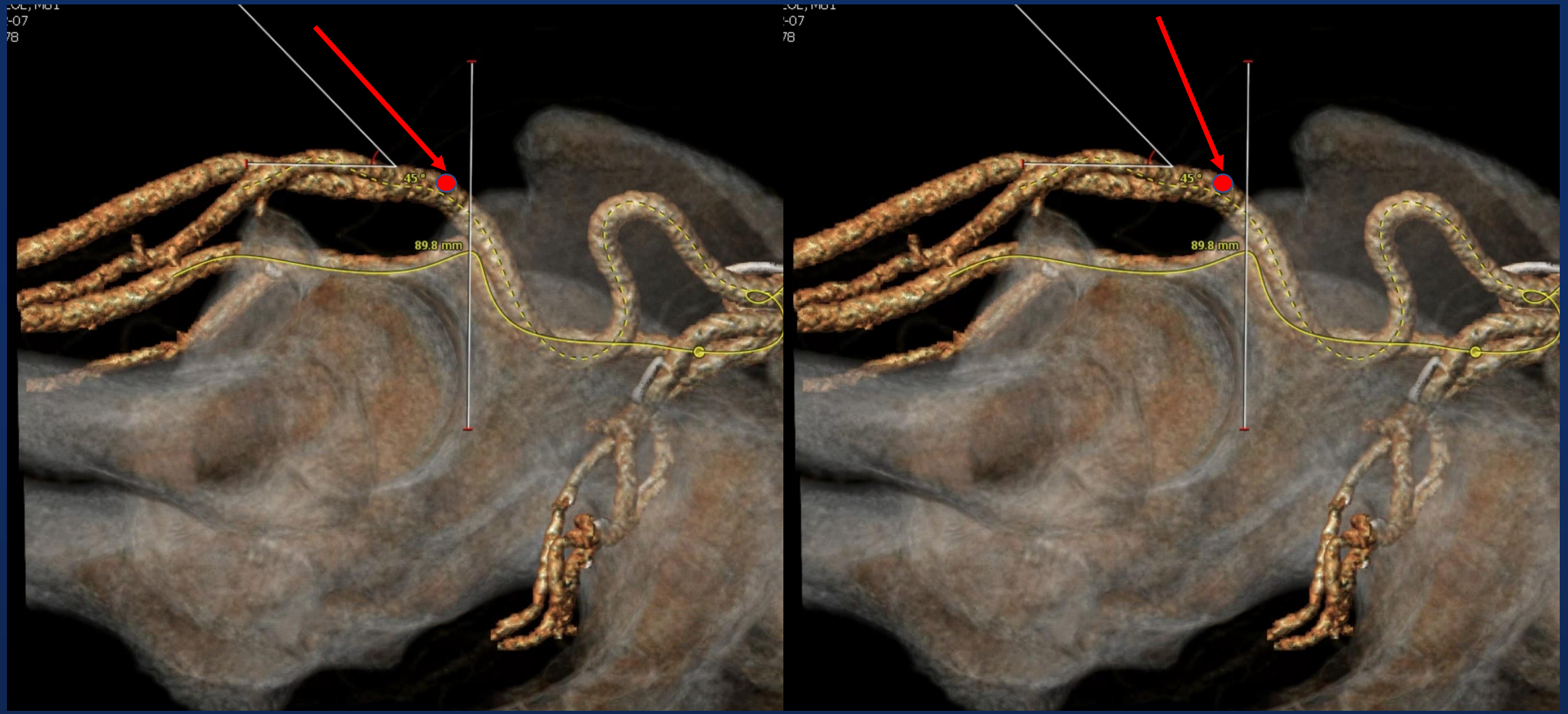




CT guided puncture



CT guided puncture



ASAN Medical center

- More than 600 TAVR Jun 2021 - Jun 2023
- 98% Ultrasound guided + CT planning
- Vascular complications < 3%

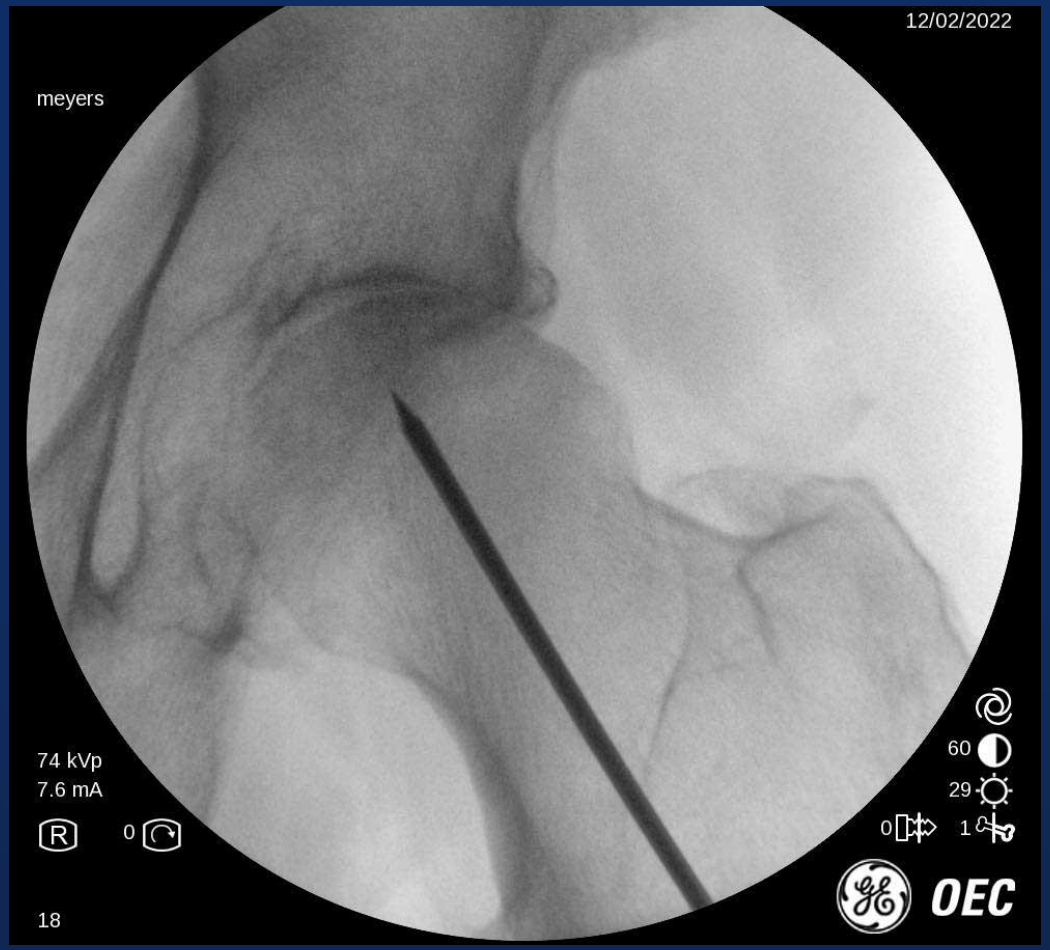
CT-Planning +Sono Guidance

Simple tips & tricks to get successful anterior wall puncture:

- Identify the puncture safe zone by fluoroscopy(mid of femoral head)
- Identify the direction of common FA by US or Fluoro angio (or CT planning) and rotate the probe accordingly.
- Keep US probe perpendicular (vertical) on top of mid of femoral head(safe point) and Keep the artery at the center of screen.
- Always rest your hand on the patient move slowly and apply very gentle pressure just to make clear picture.

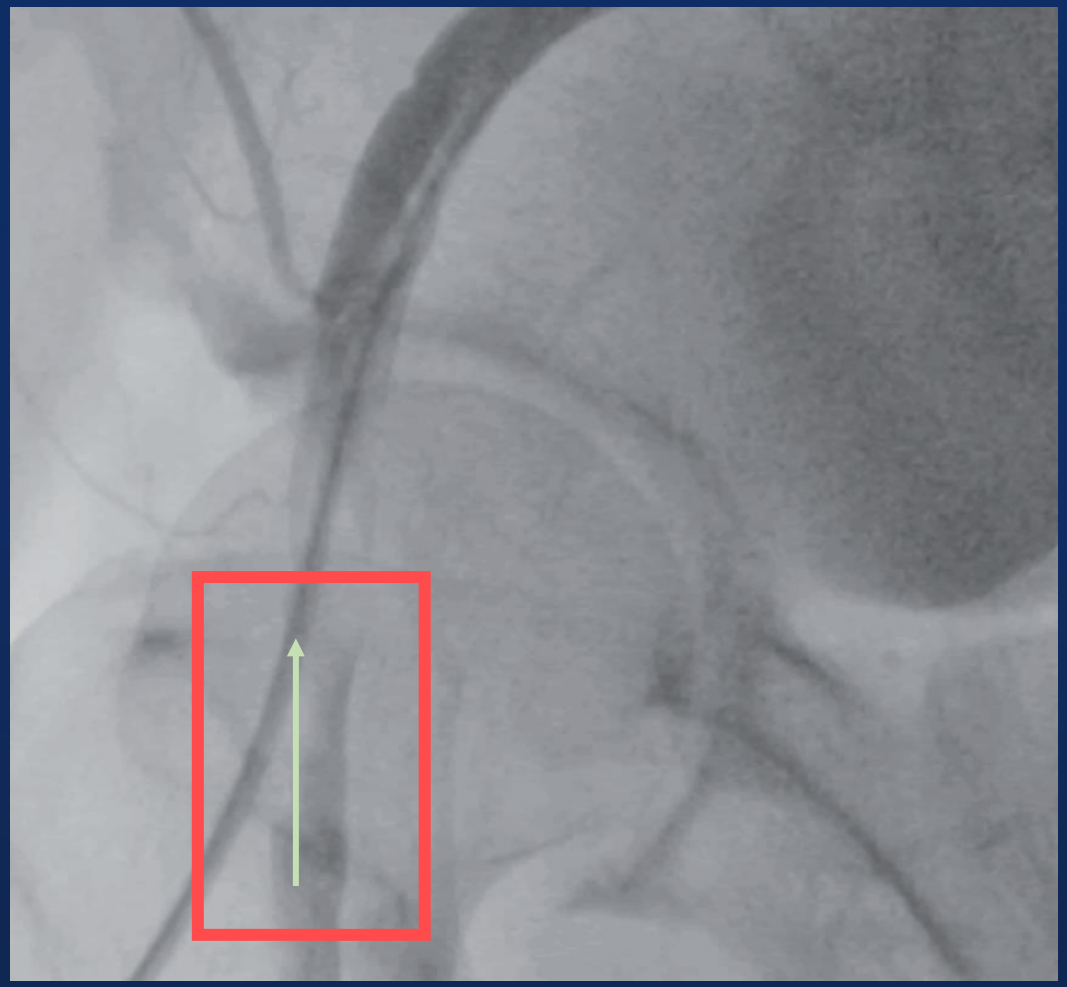
CT-Planning +Sono Guidance

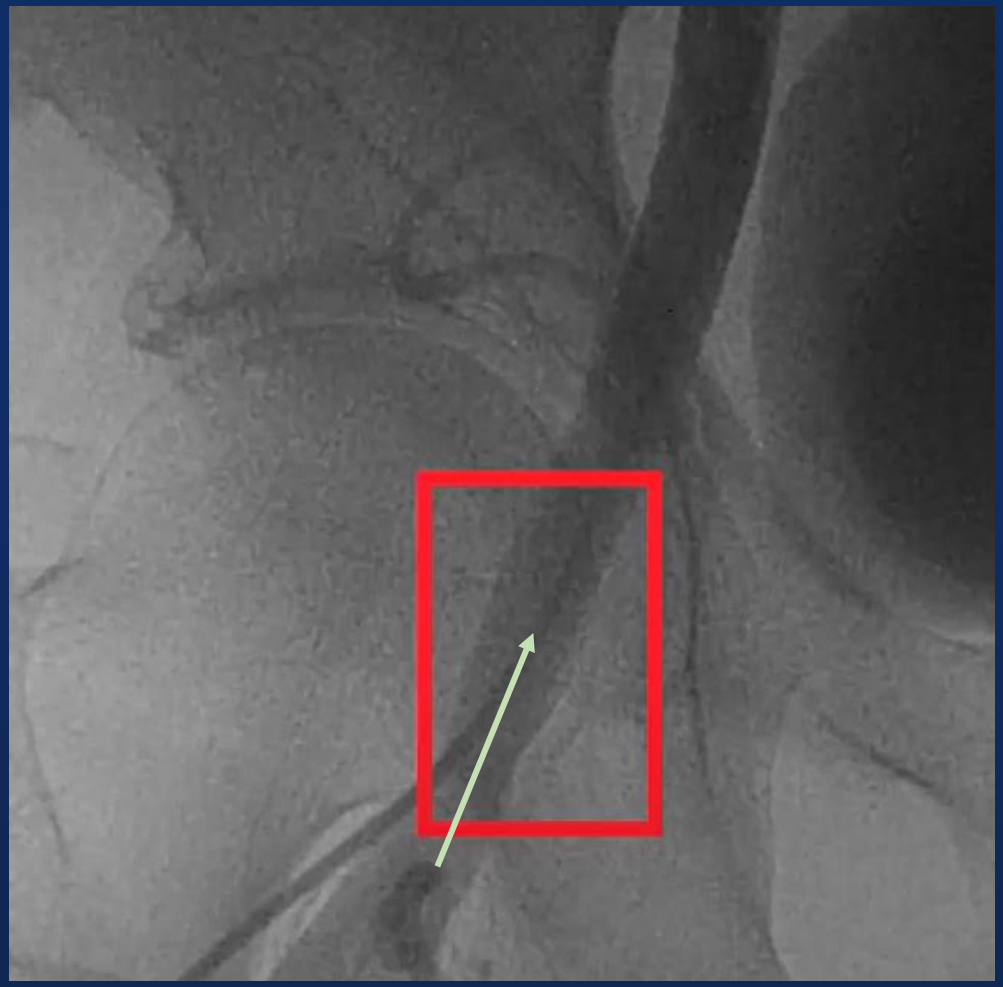
Identify the puncture safe zone by fluoroscopy(mid of femoral head)



CT-Planning +Sono Guidance

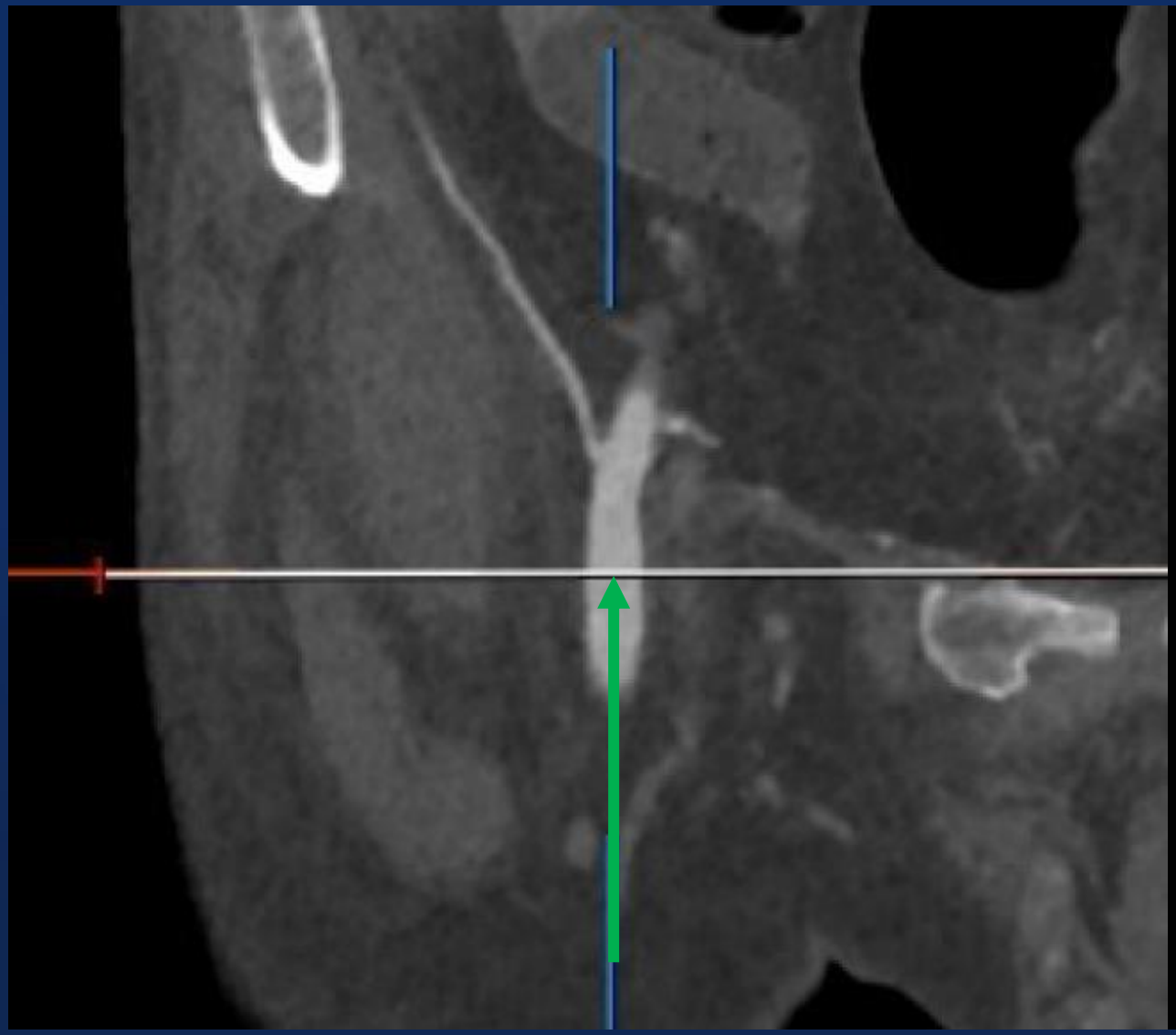
Iidentify the direction of common FA by Fluoro angio

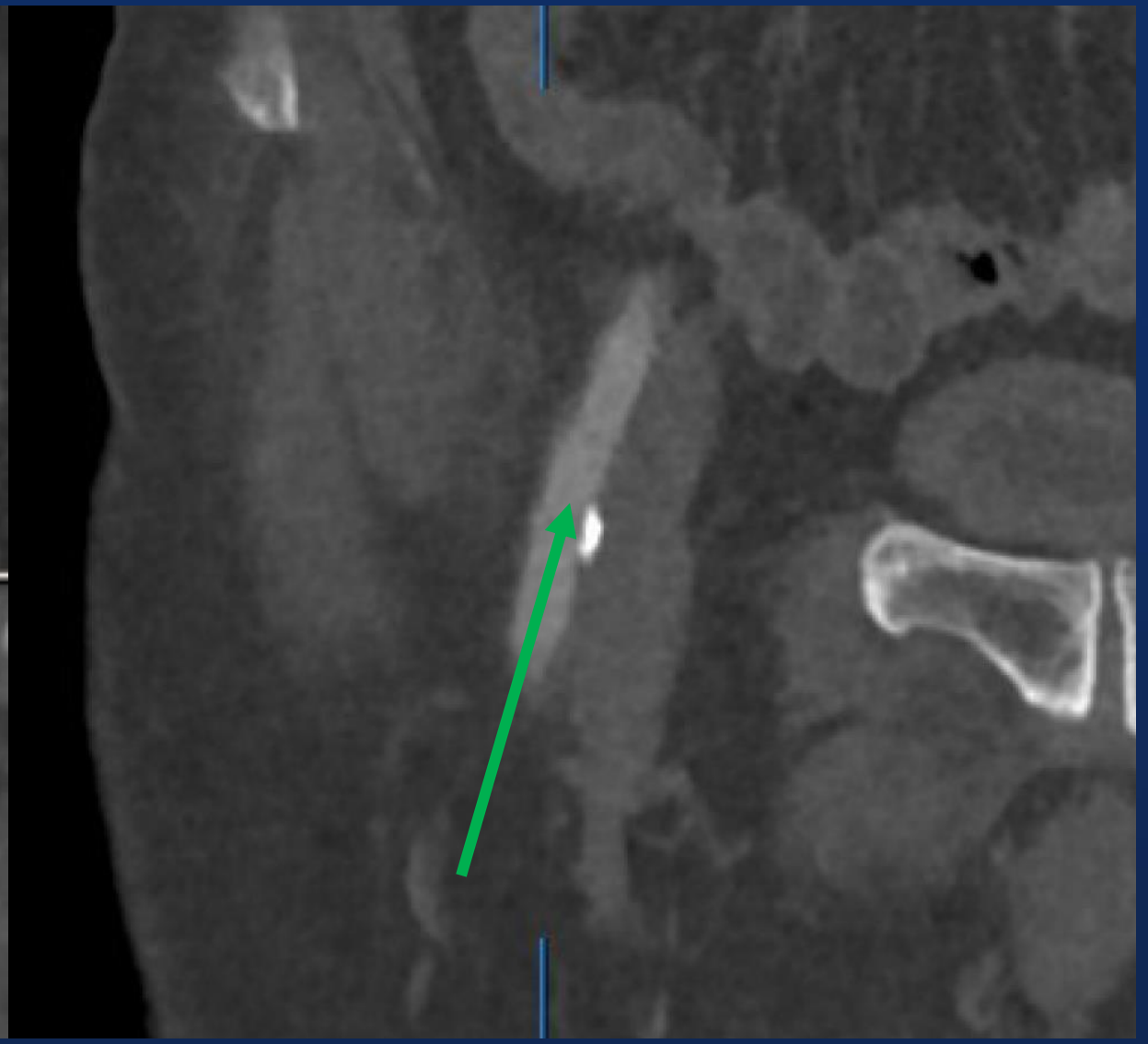




CT-Planning +Sono Guidance

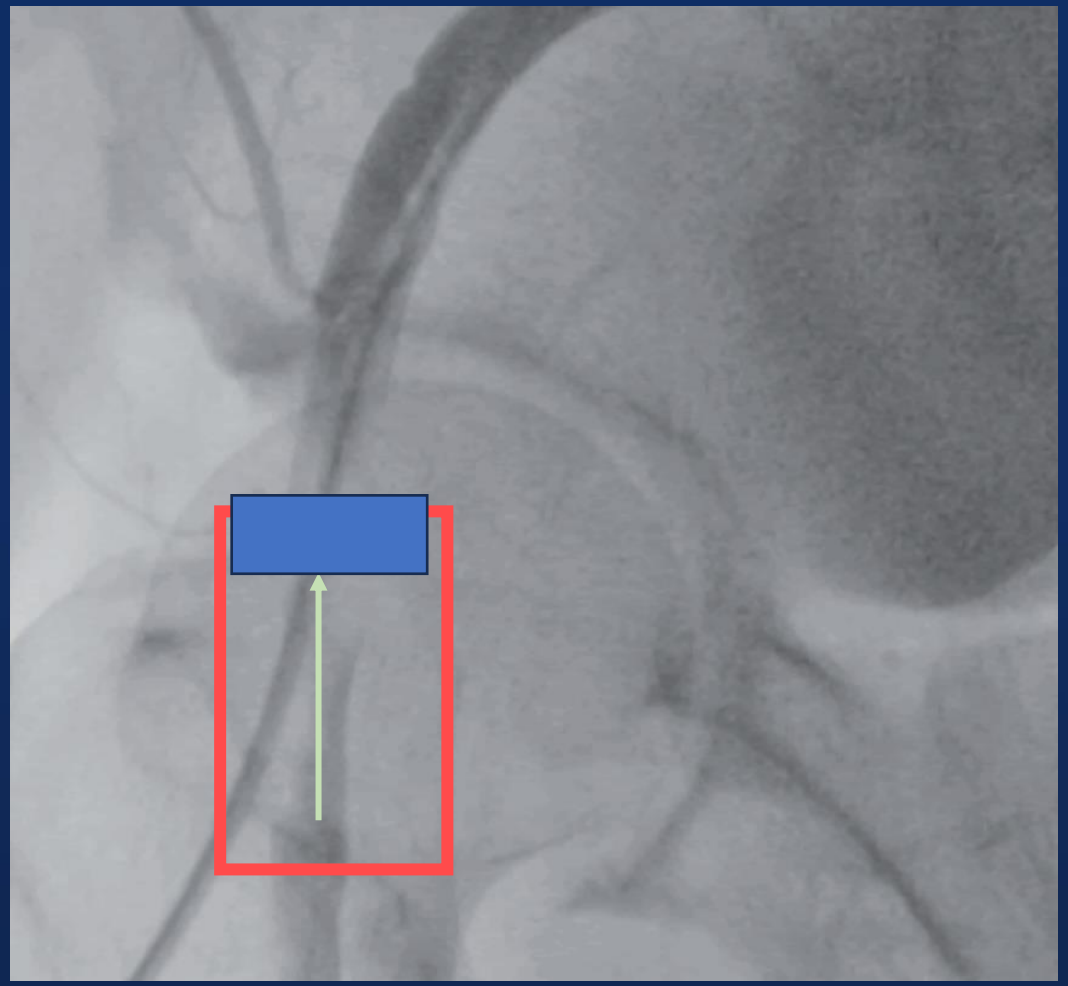
Direction of common FA by CT planning

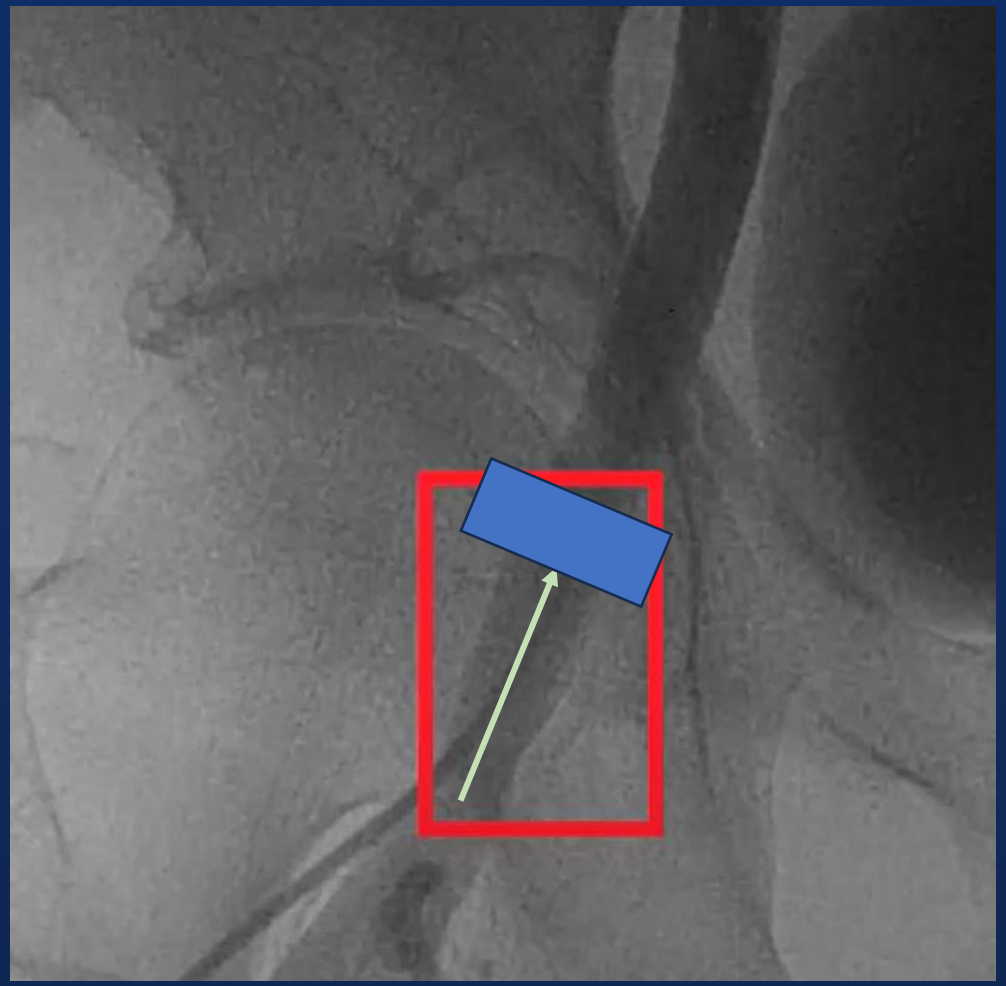




CT-Planning +Sono Guidance

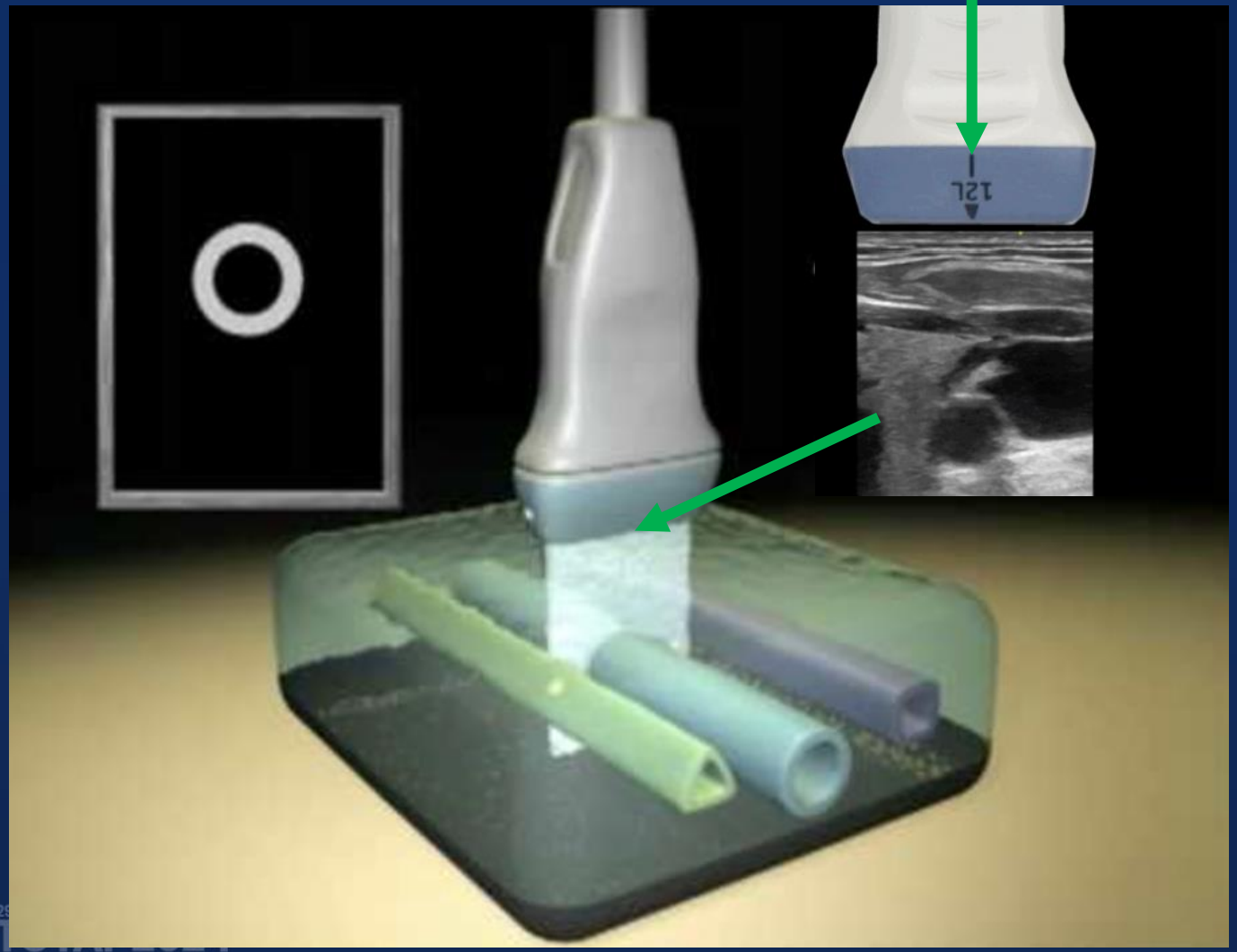
Iidentify the direction of common FA by Fluoro angio and <u>rotate the probe accordingly</u>

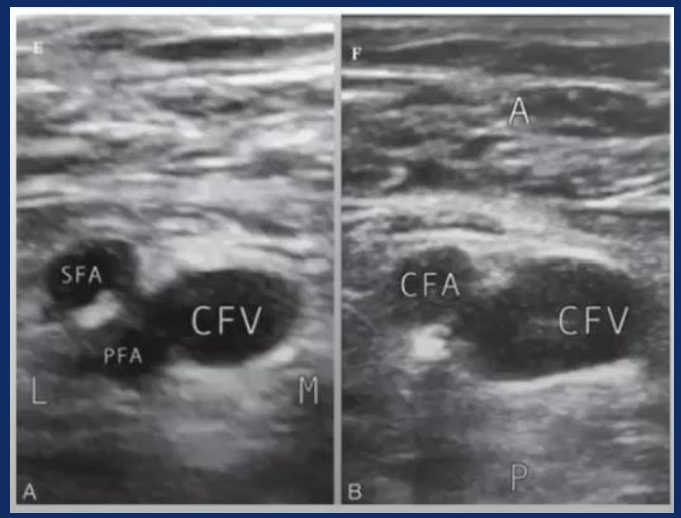




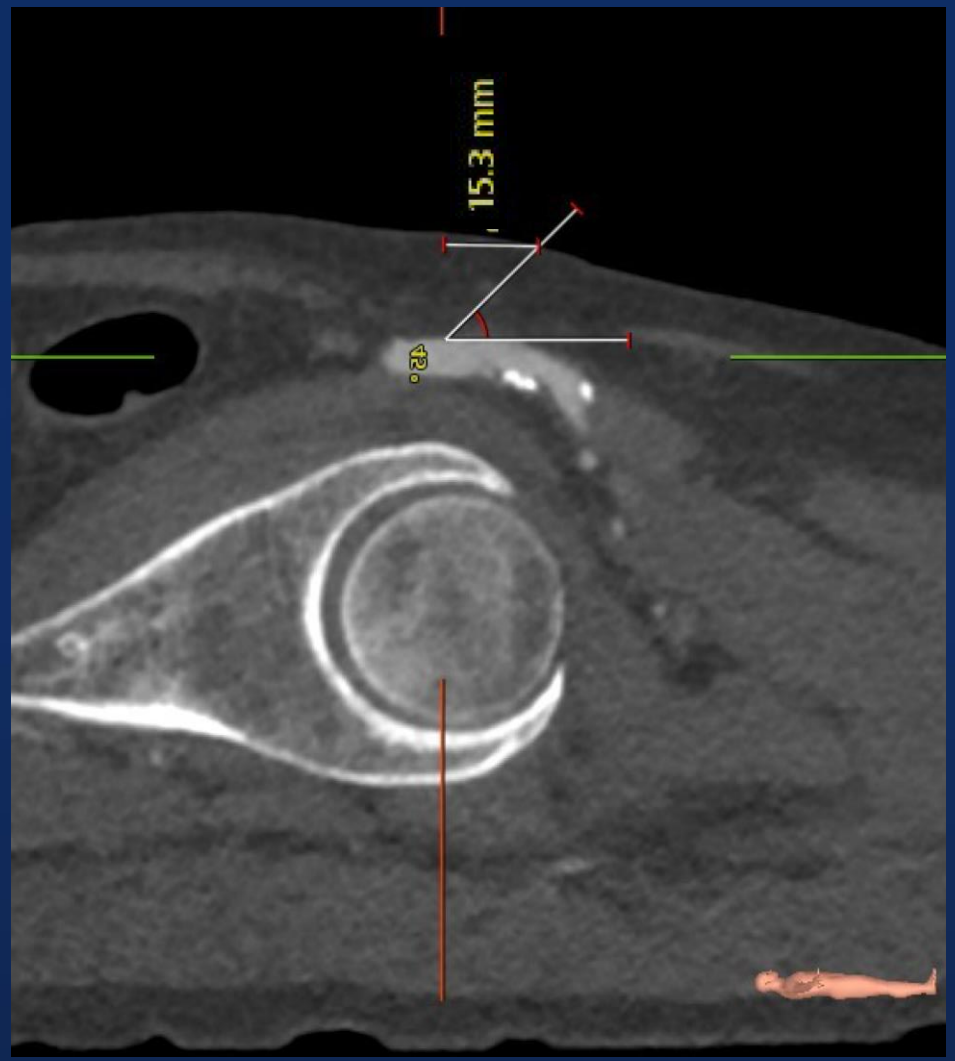
CT-Planning +Sono Guidance

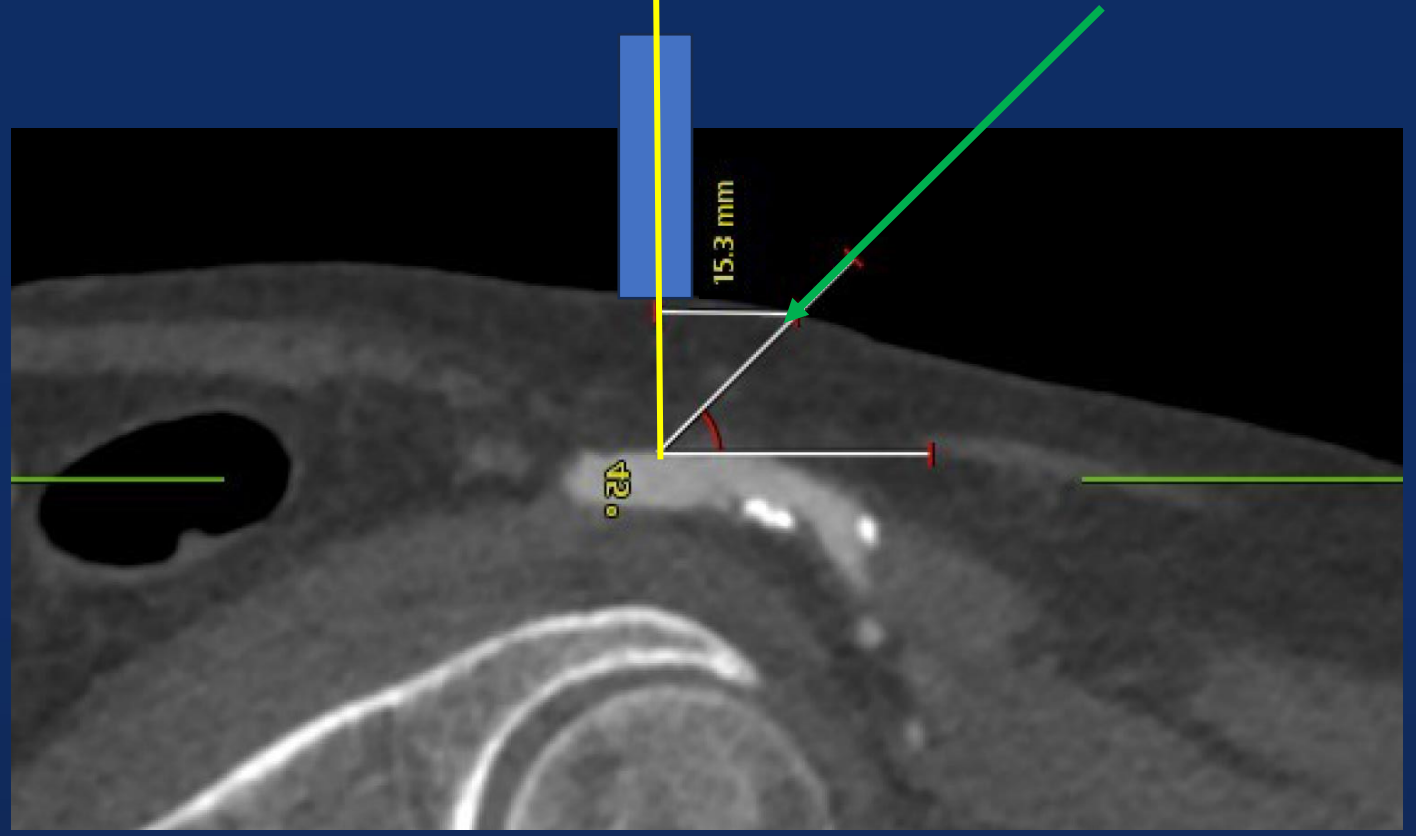
Keep the US probe vertical(perpendiculars to the vessel)





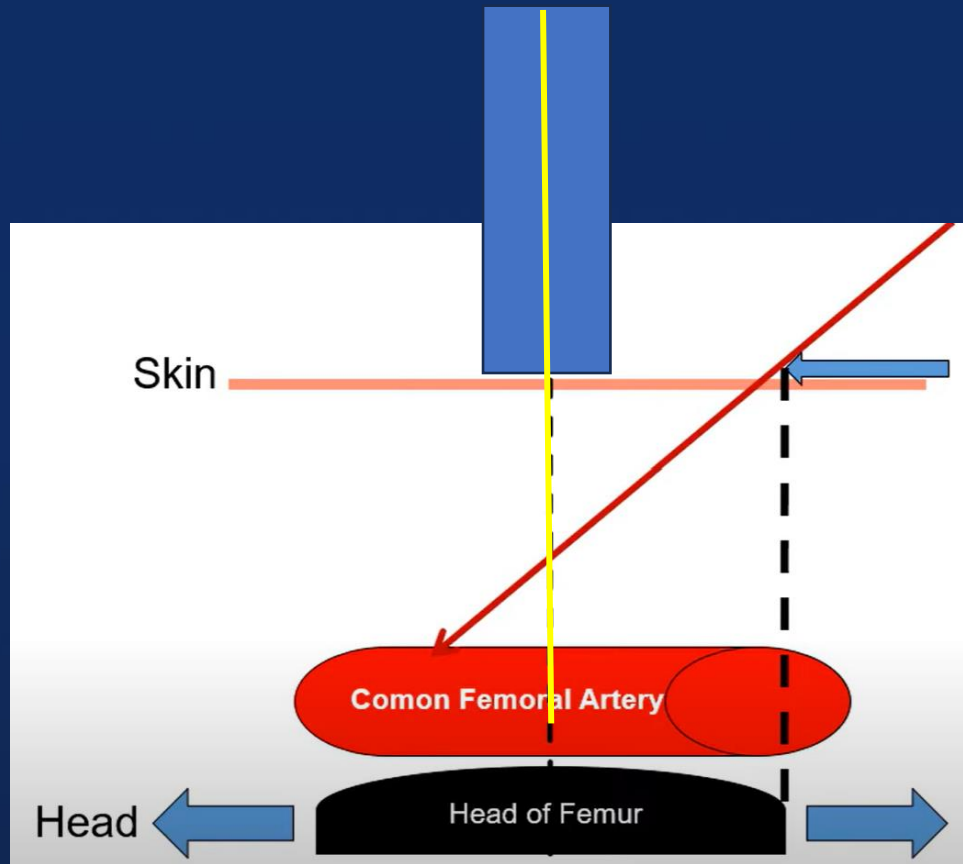
CT-Planning +Sono Guidance



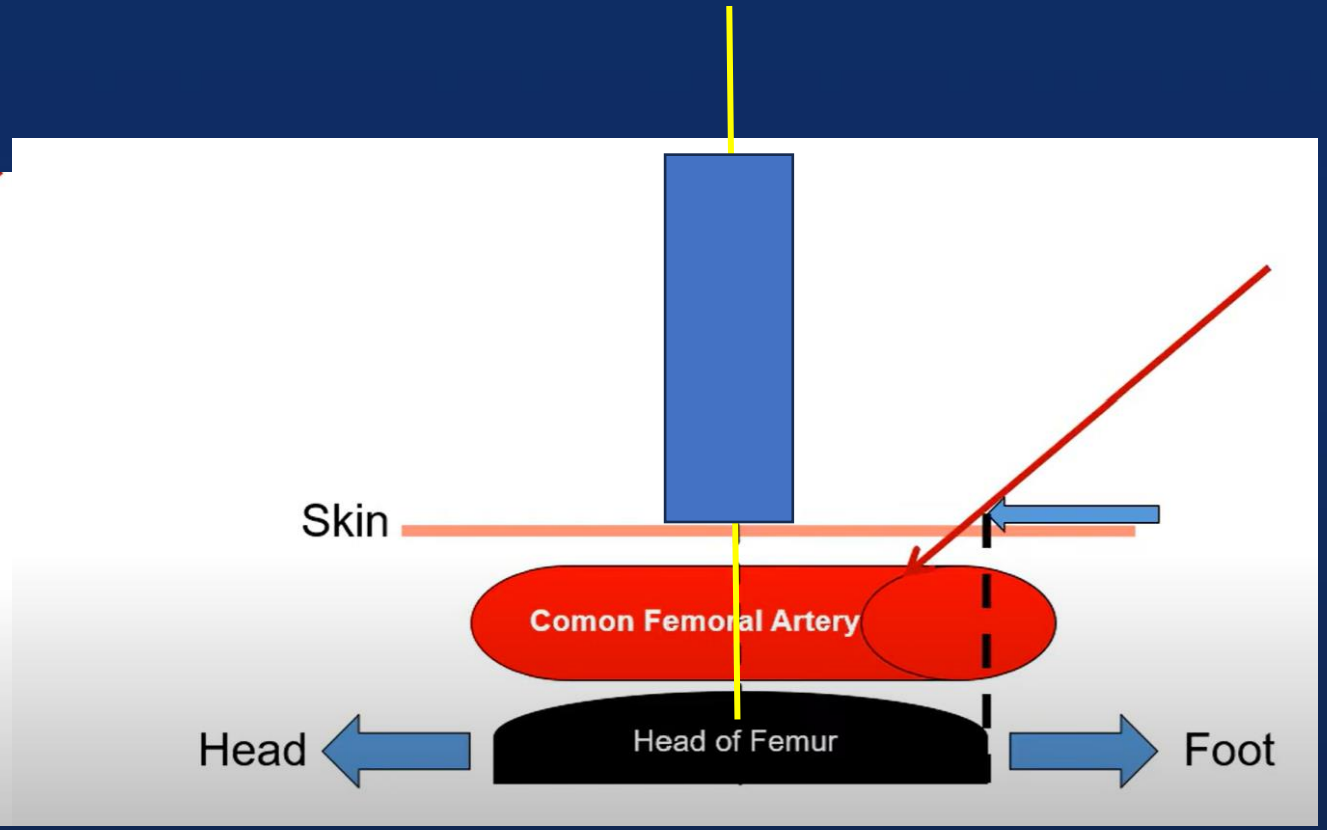


CT-Planning +Sono Guidance

Obese Patient



Thin Patient



CT-Planning +Sono Guidance

Obese Patient

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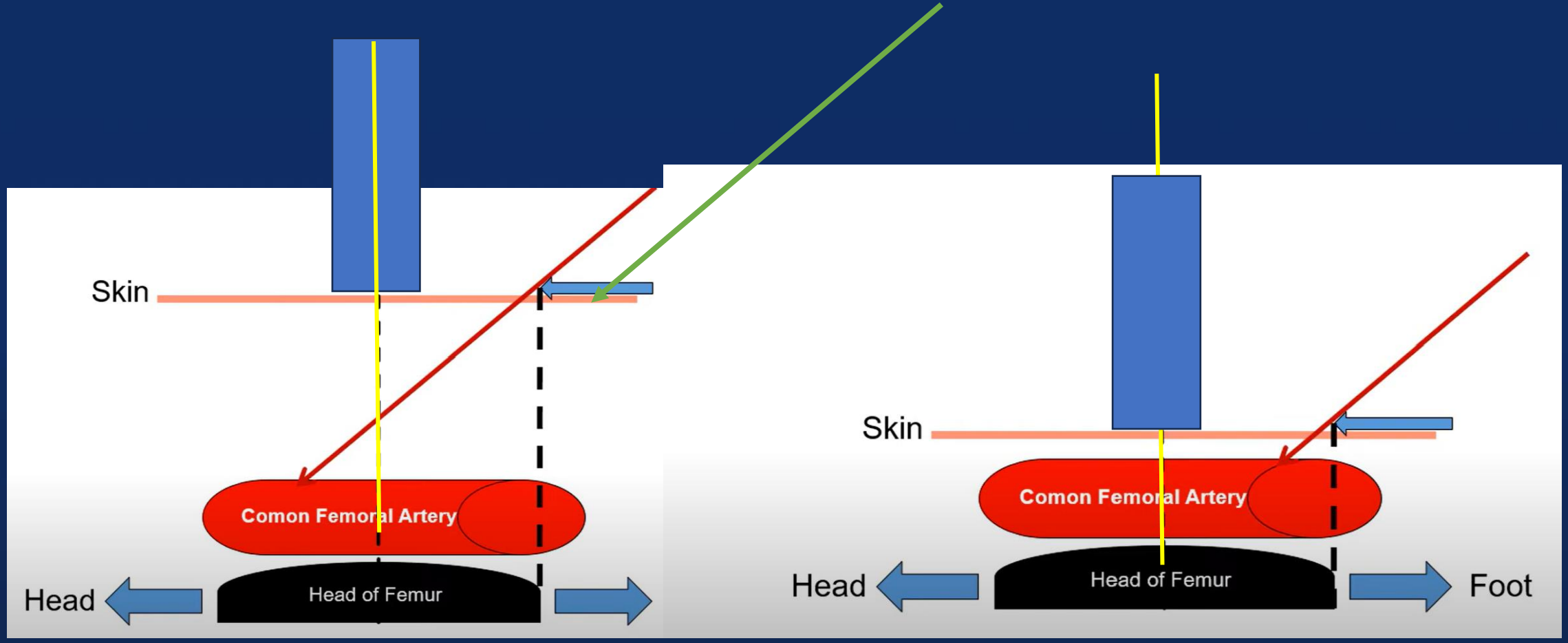

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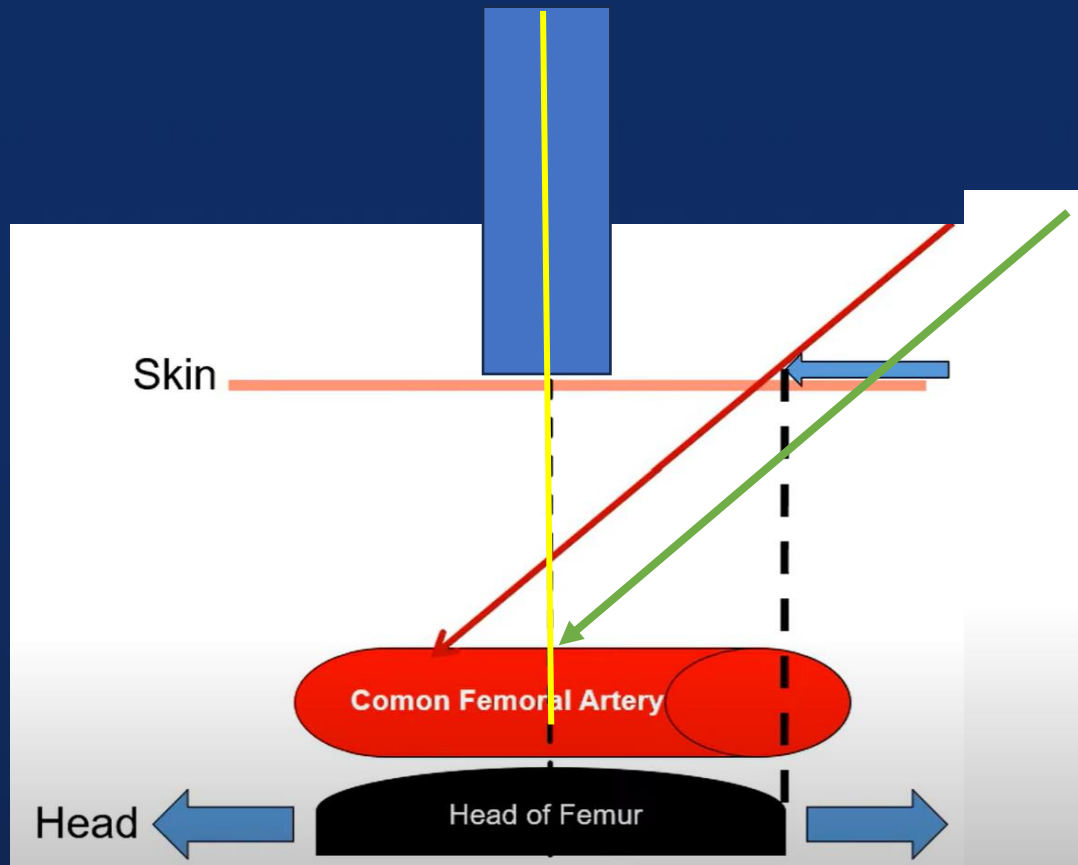
Obese Patient



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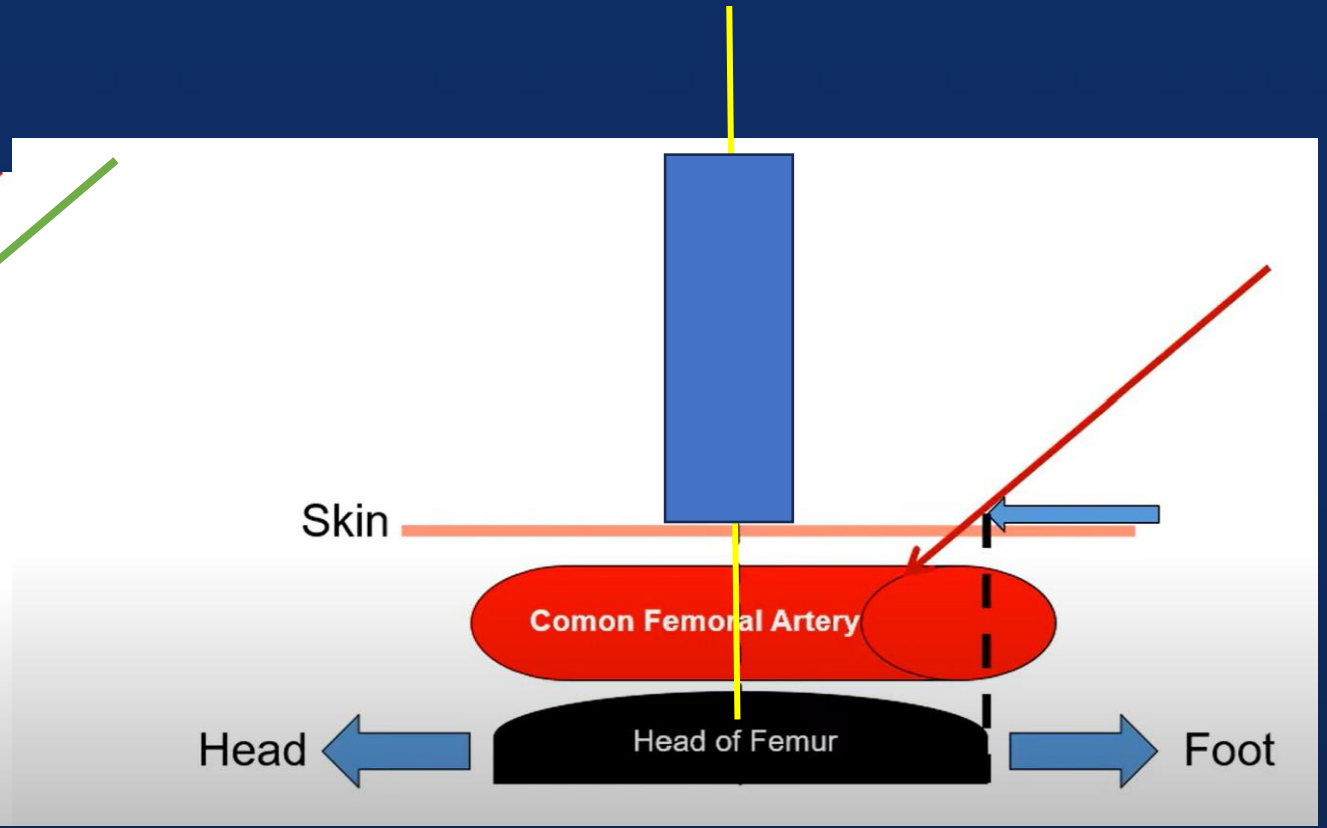

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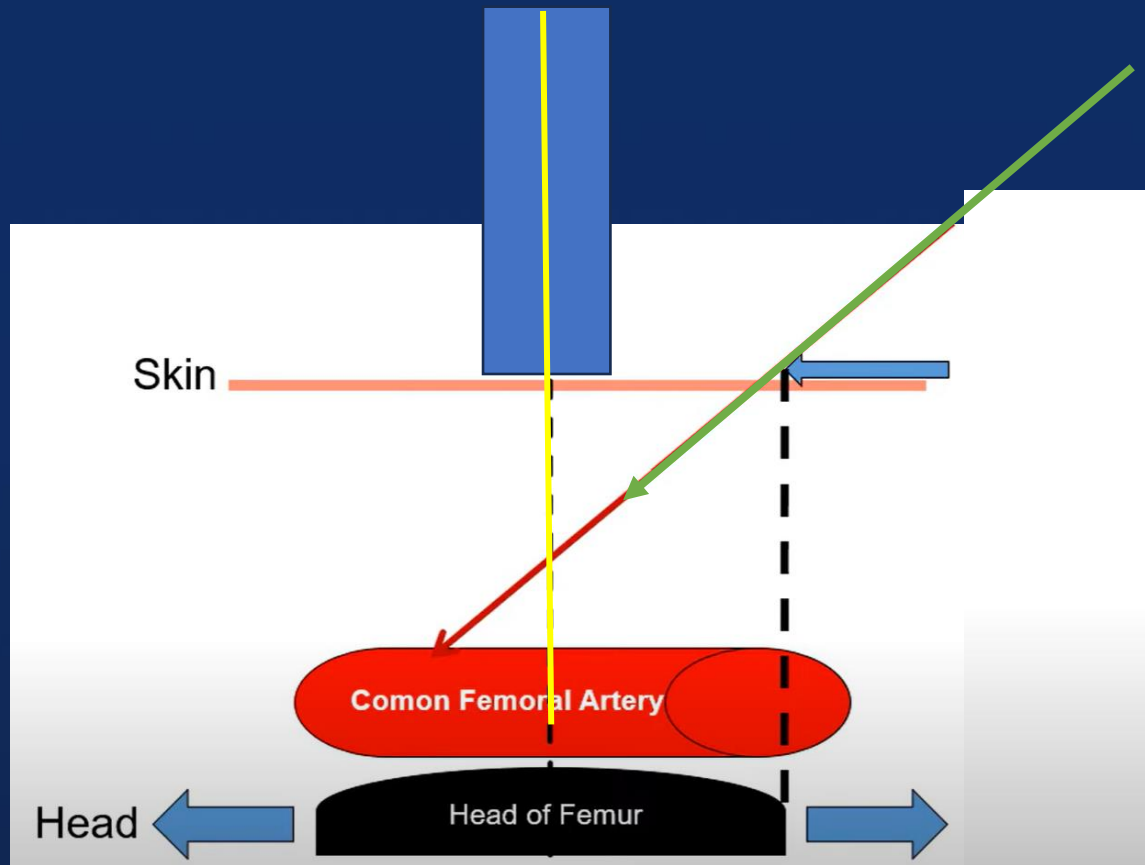

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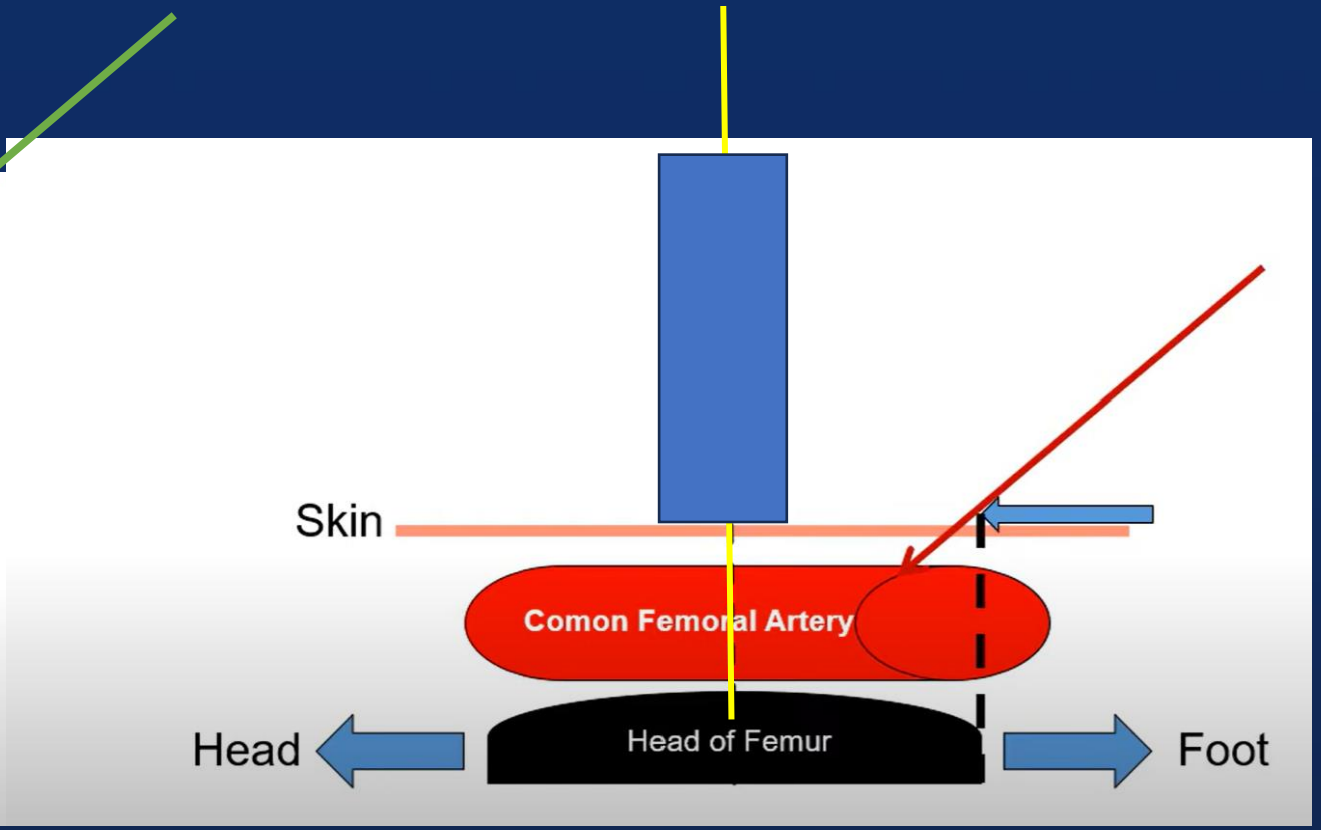

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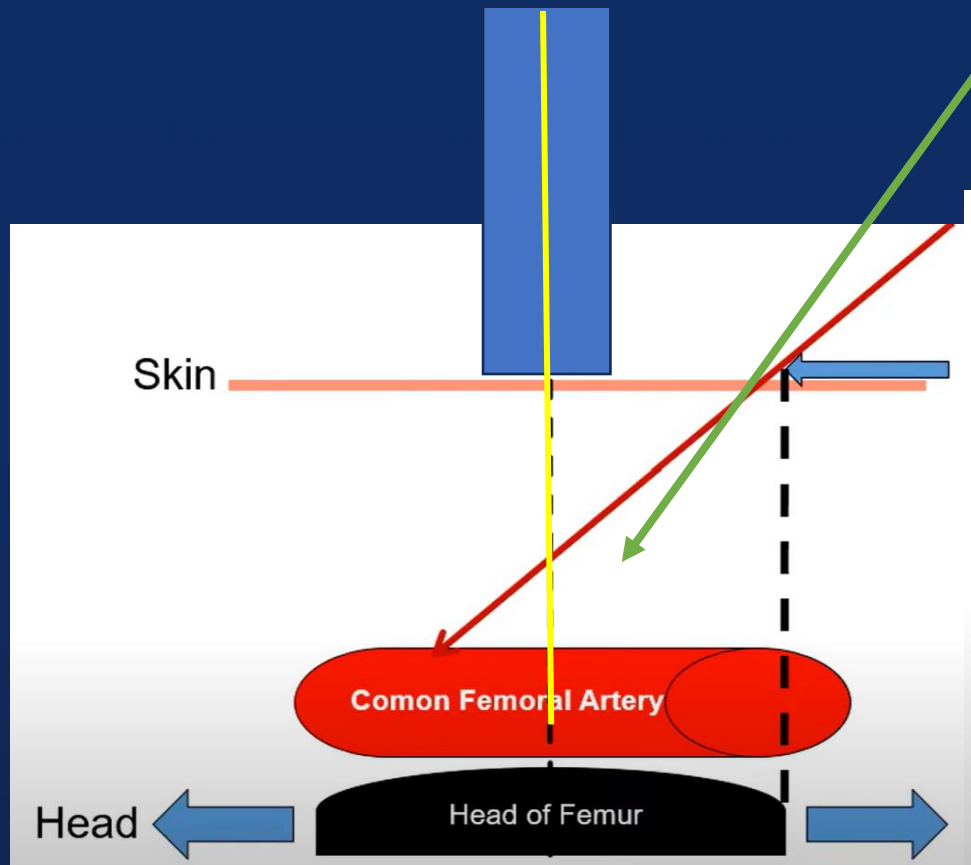

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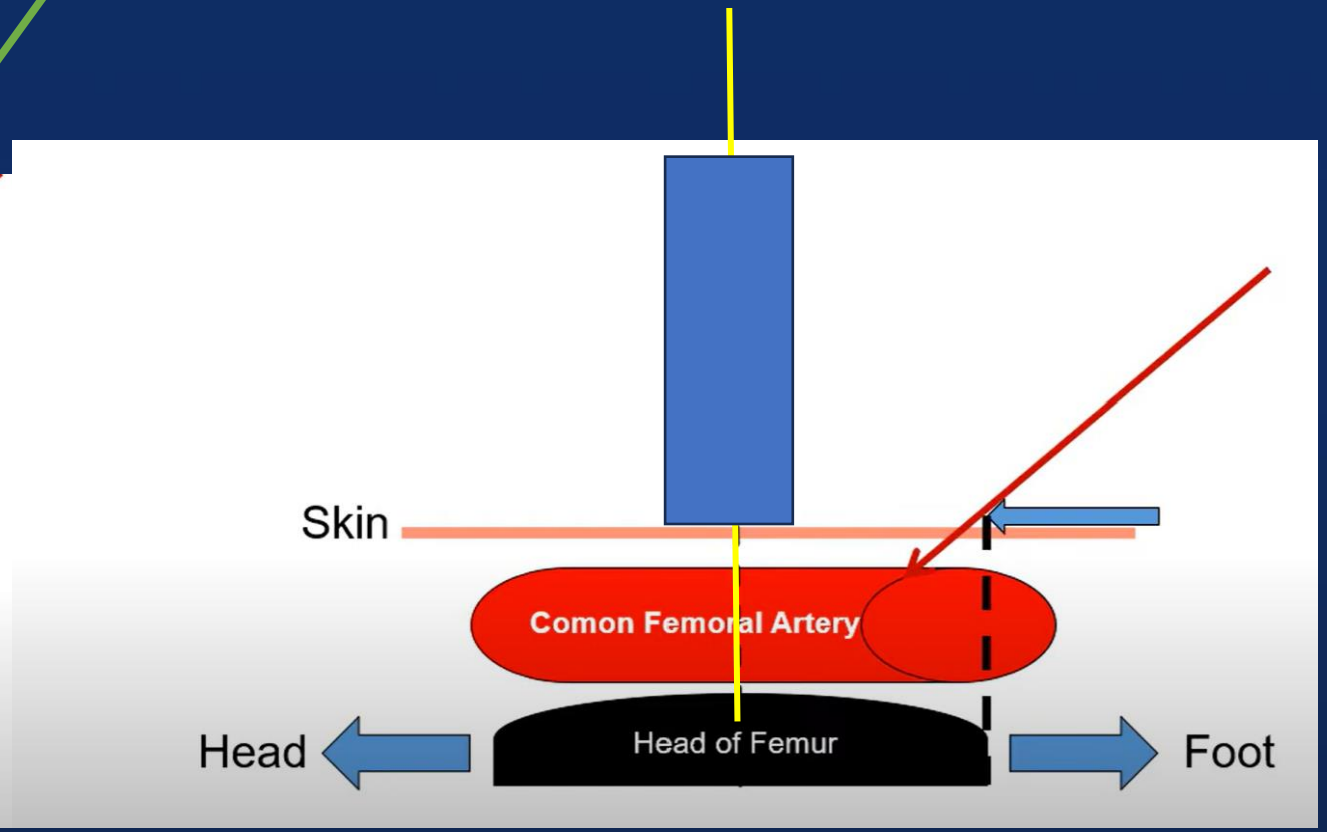

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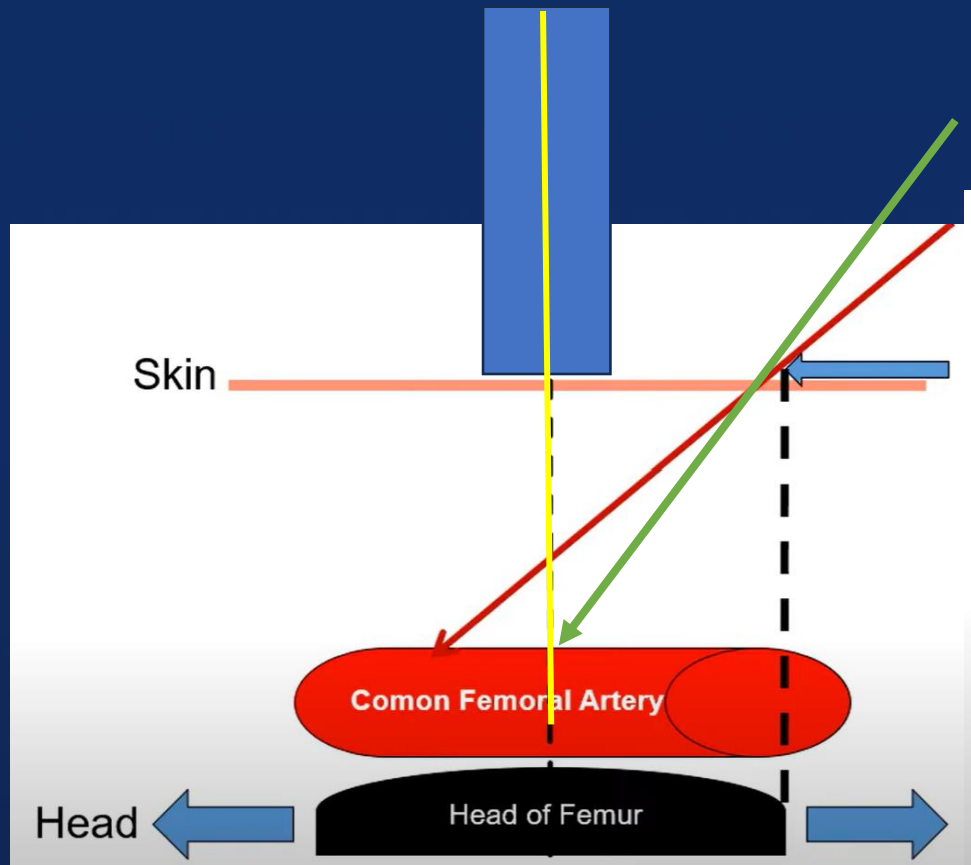

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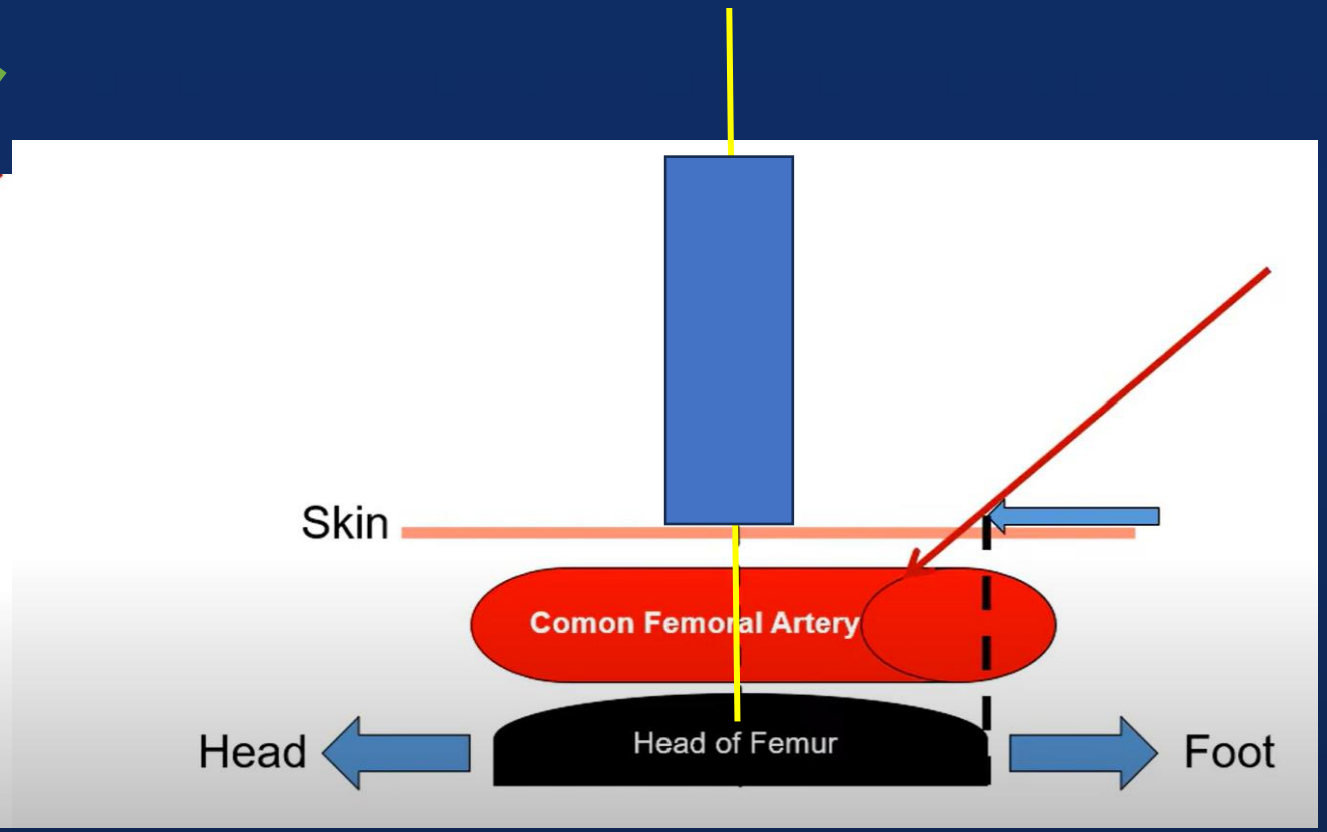

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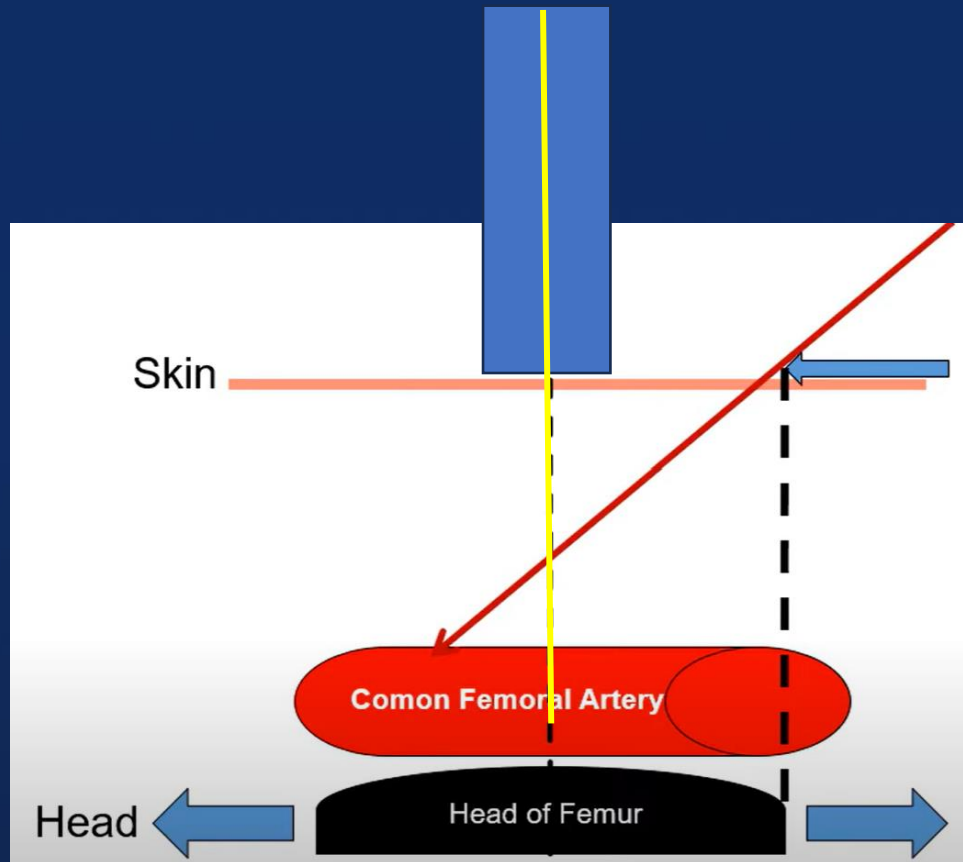

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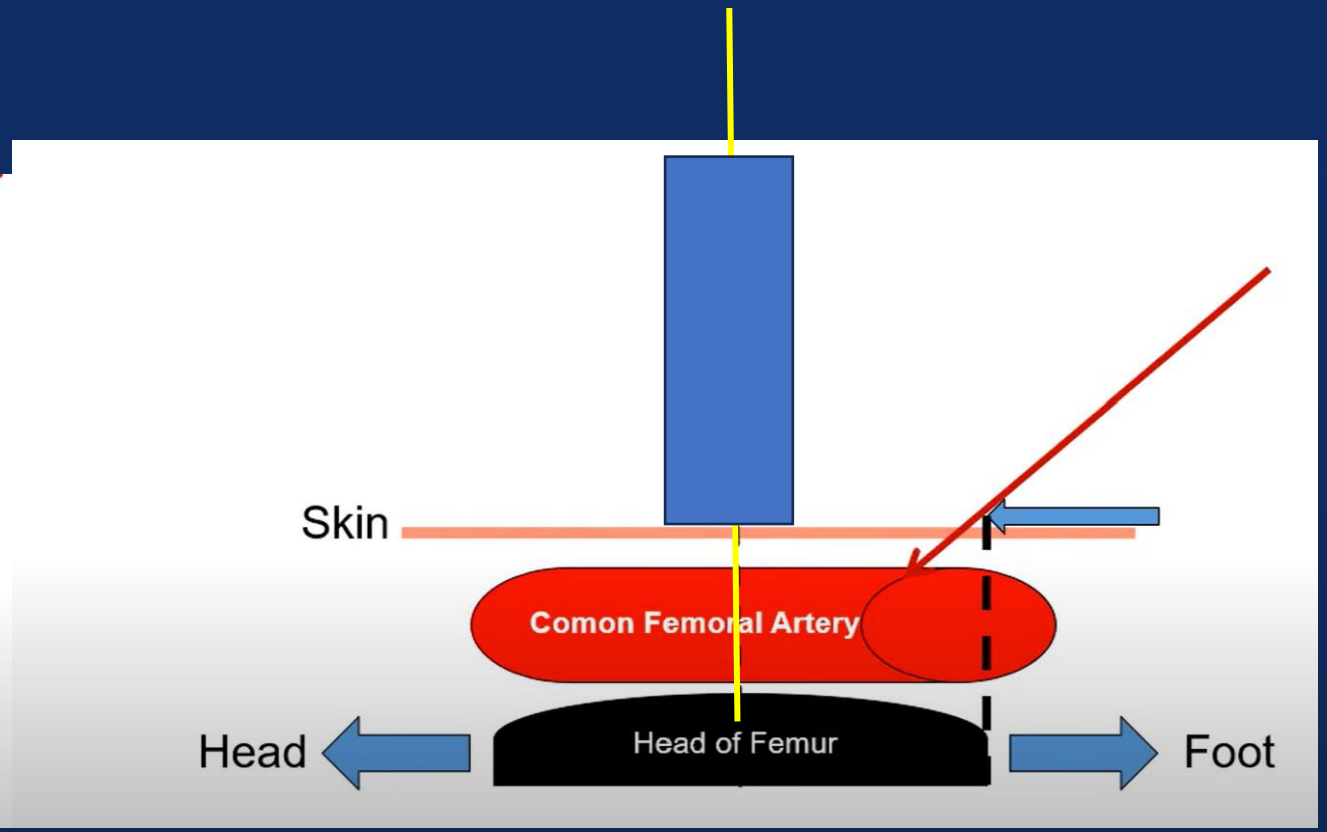

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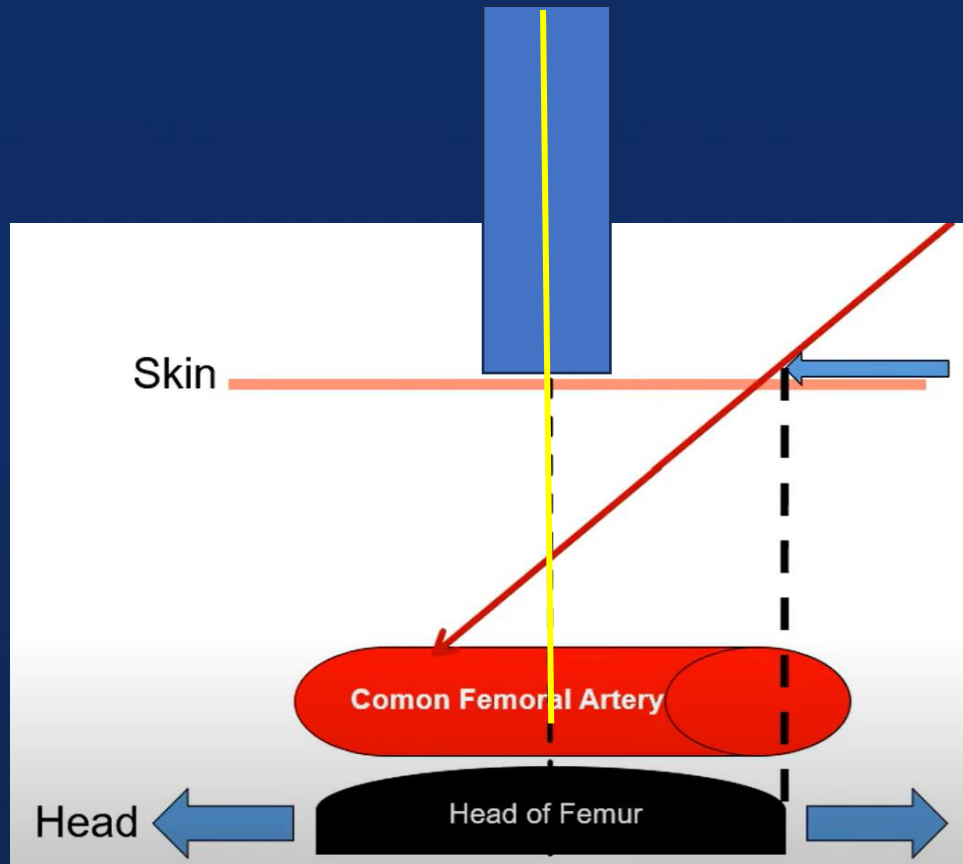

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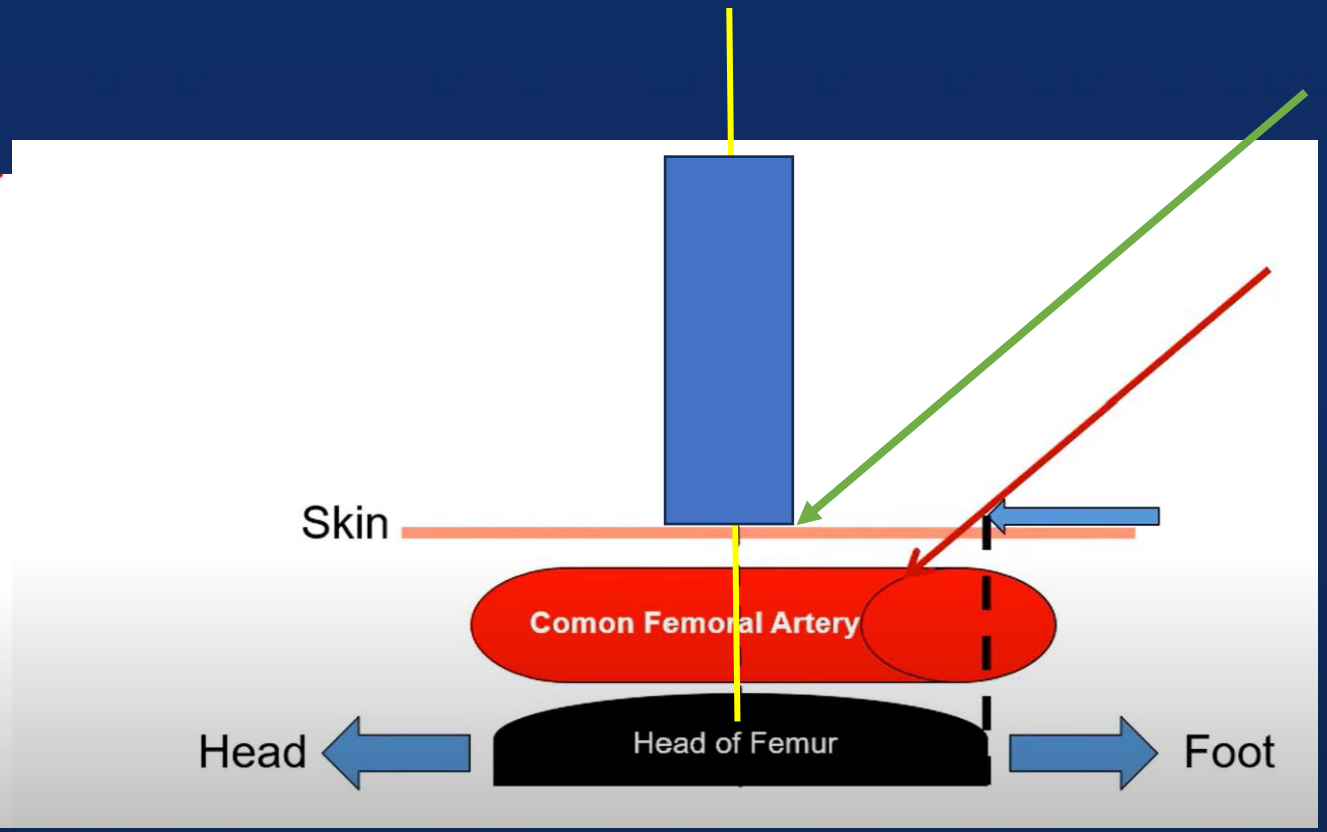

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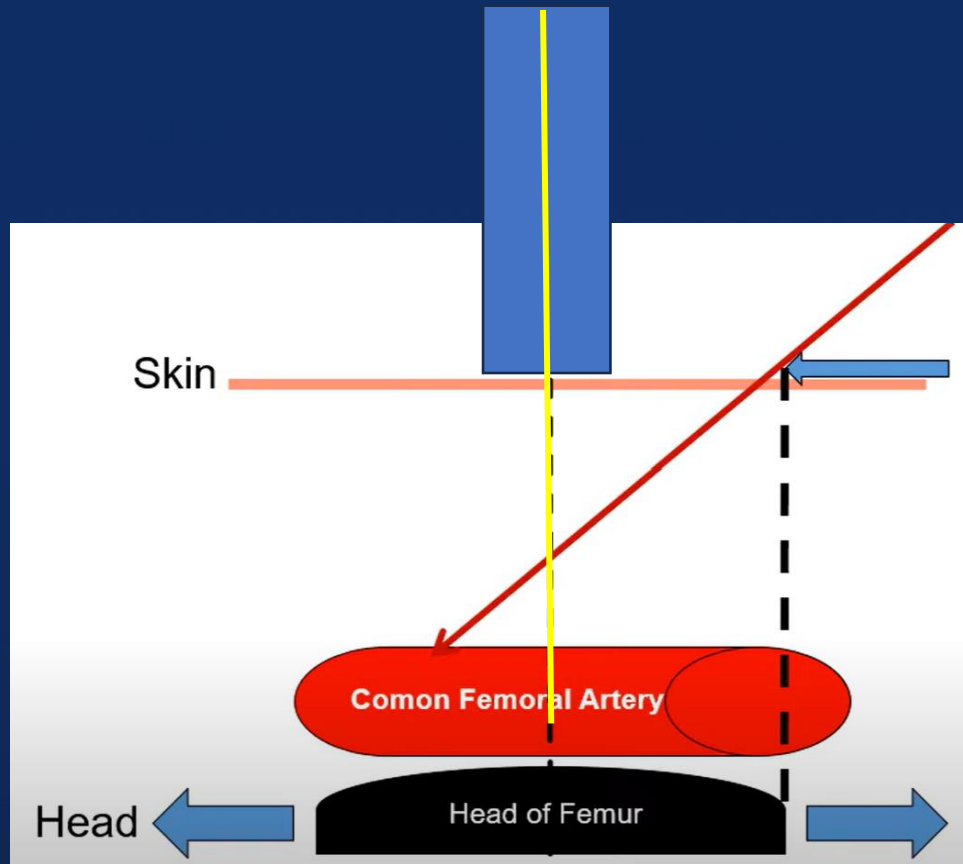

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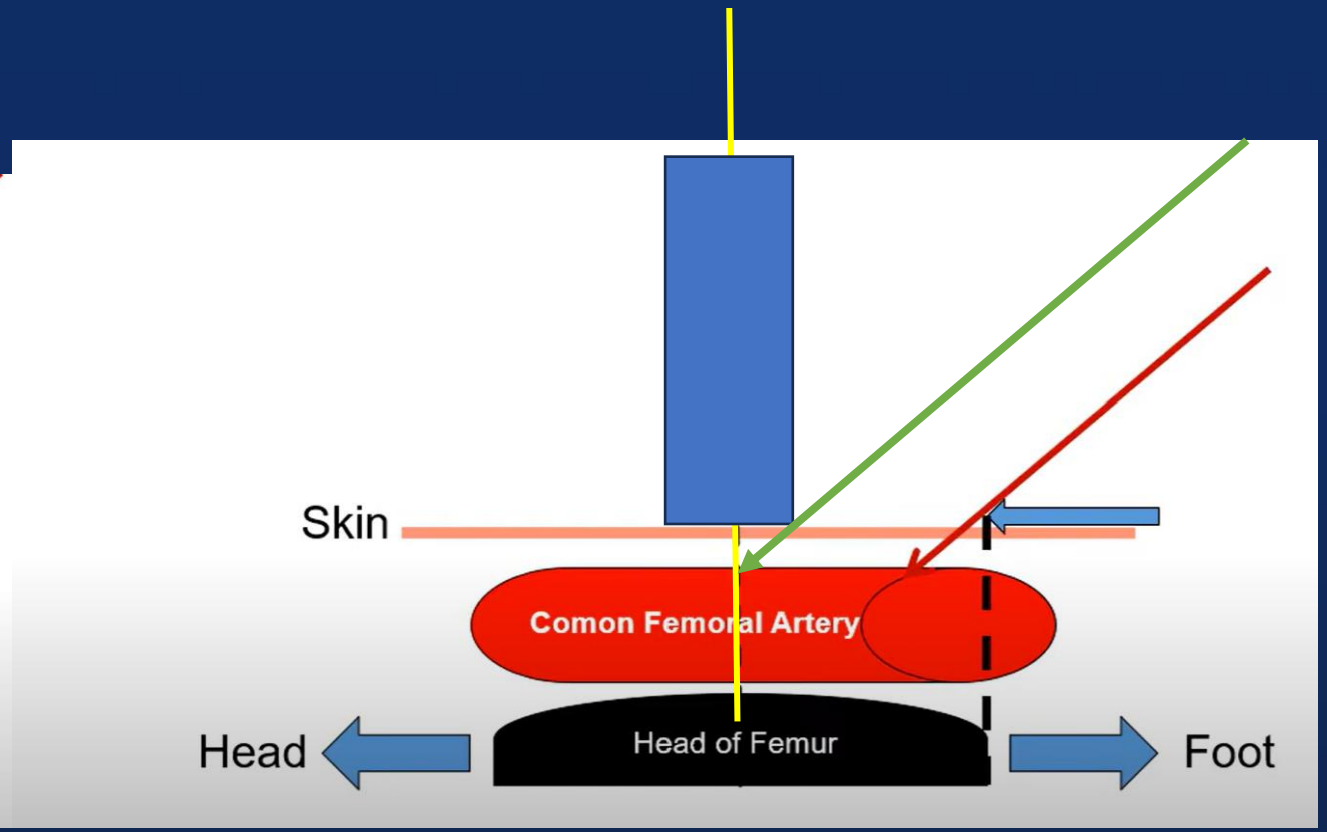

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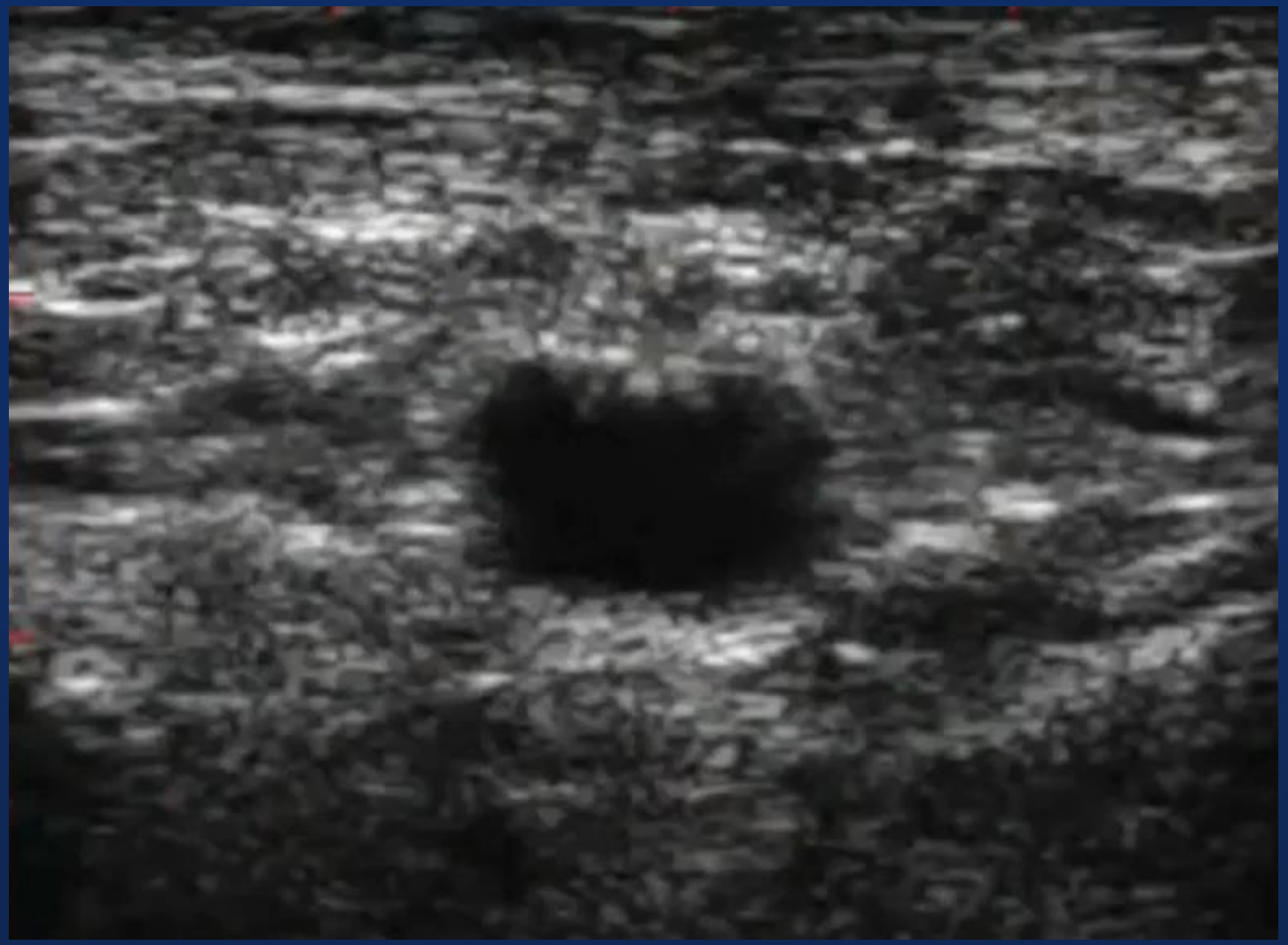
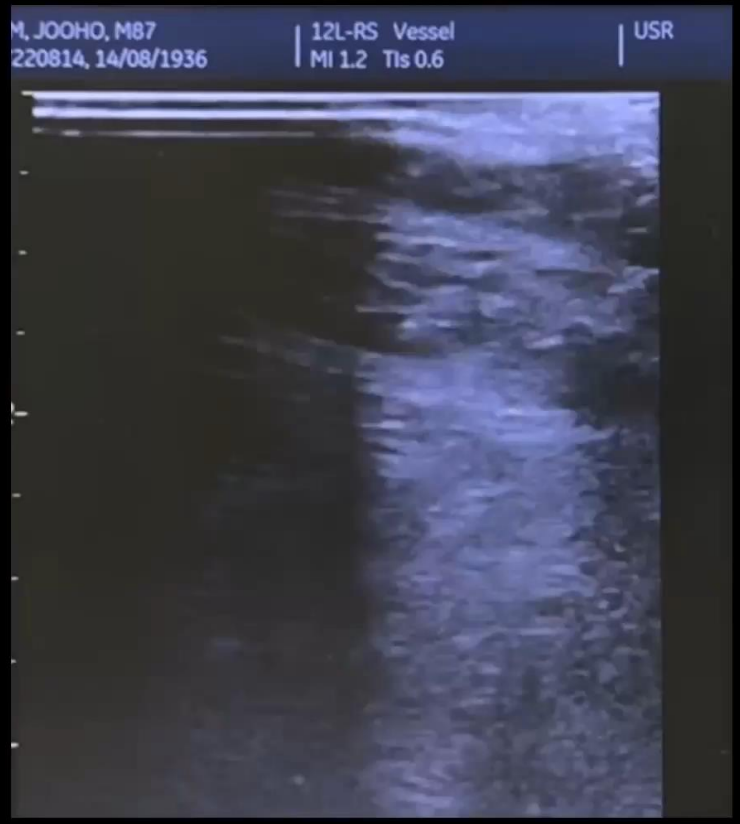
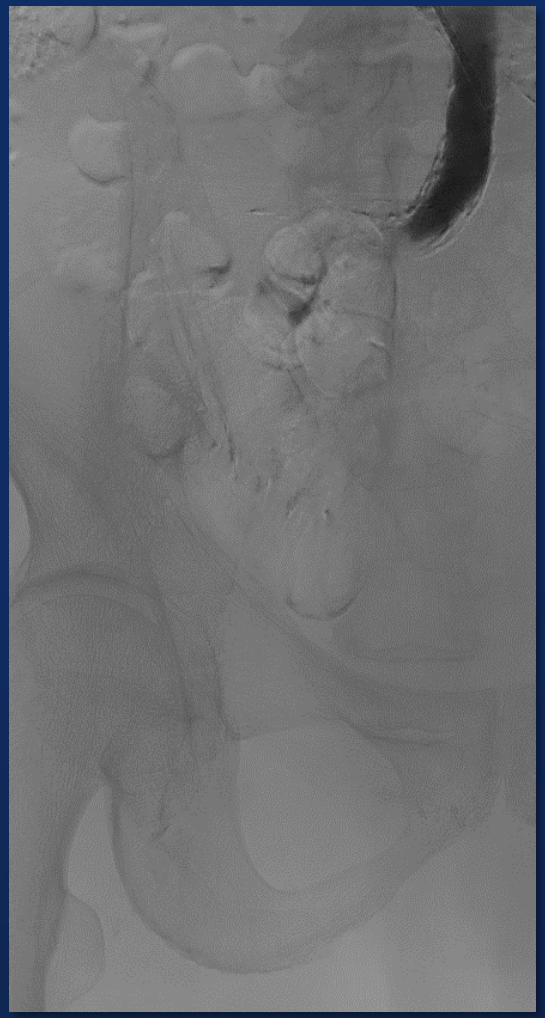


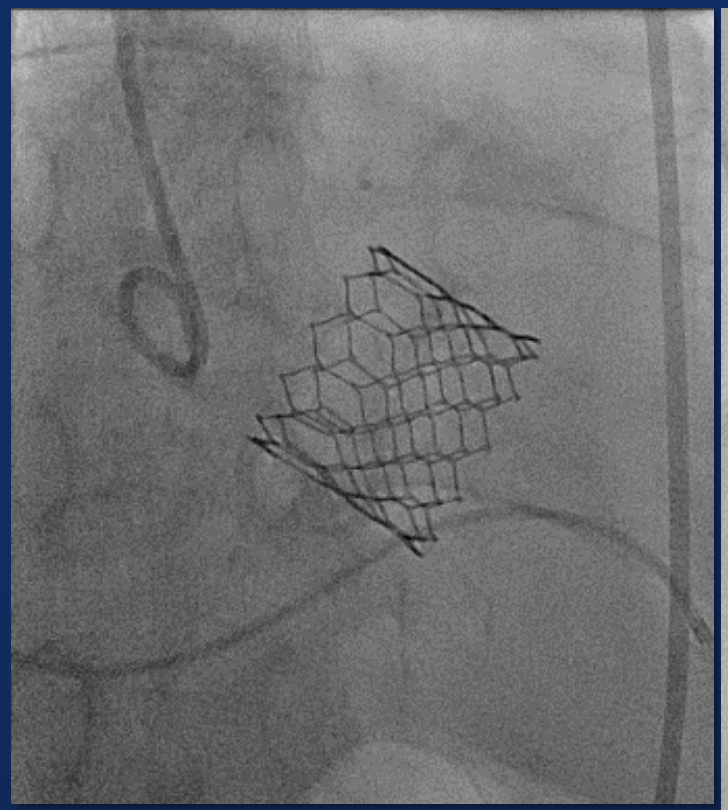
- In & out jerky movement (Bulge into lumen)

CT-Planning +Sono Guidance

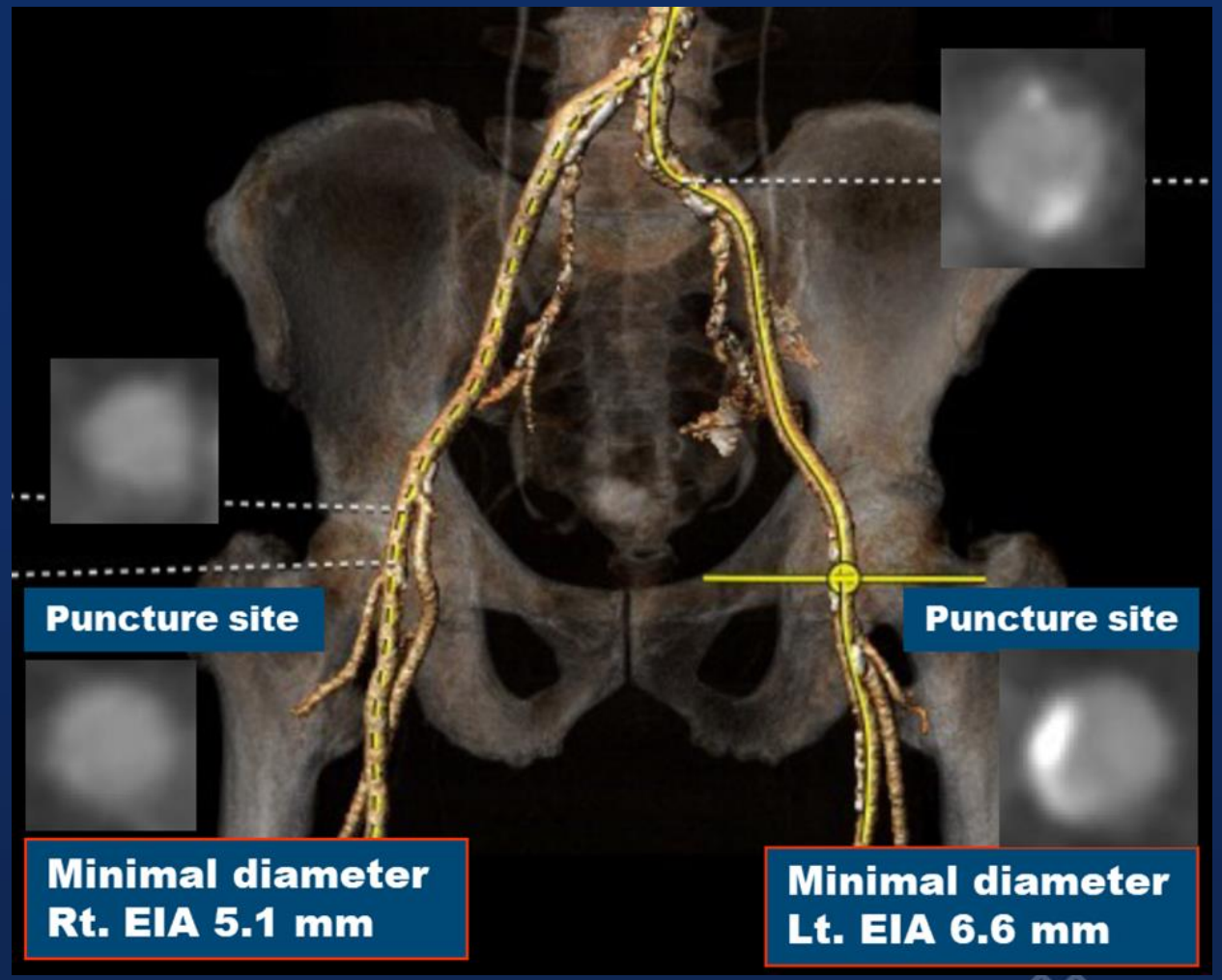


CFA Heavy Calcification US Guided Puncture





Vascular Complication : Access Site Dissection



Vascular Complication : Access Site Dissection

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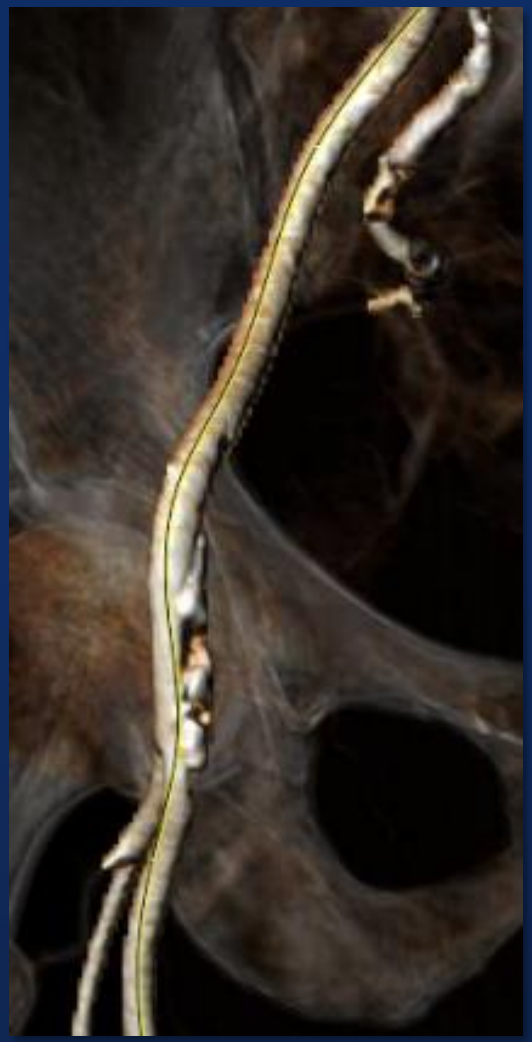
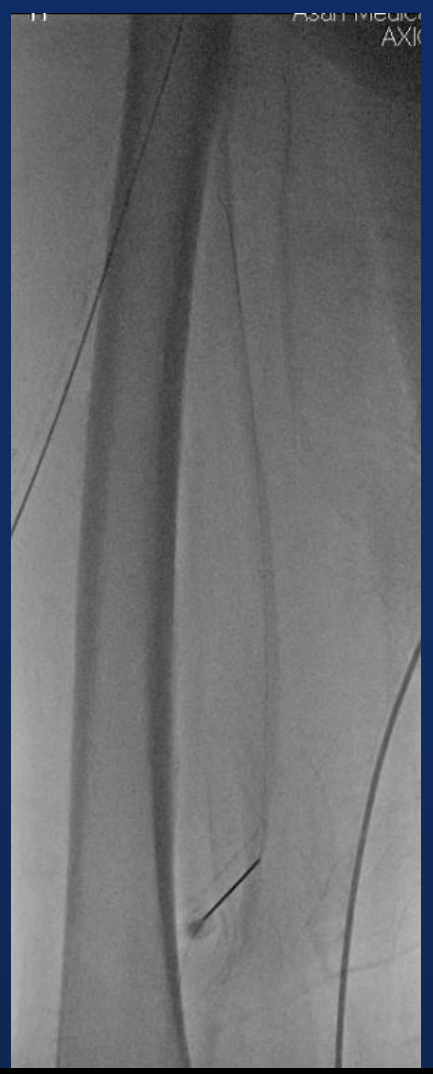
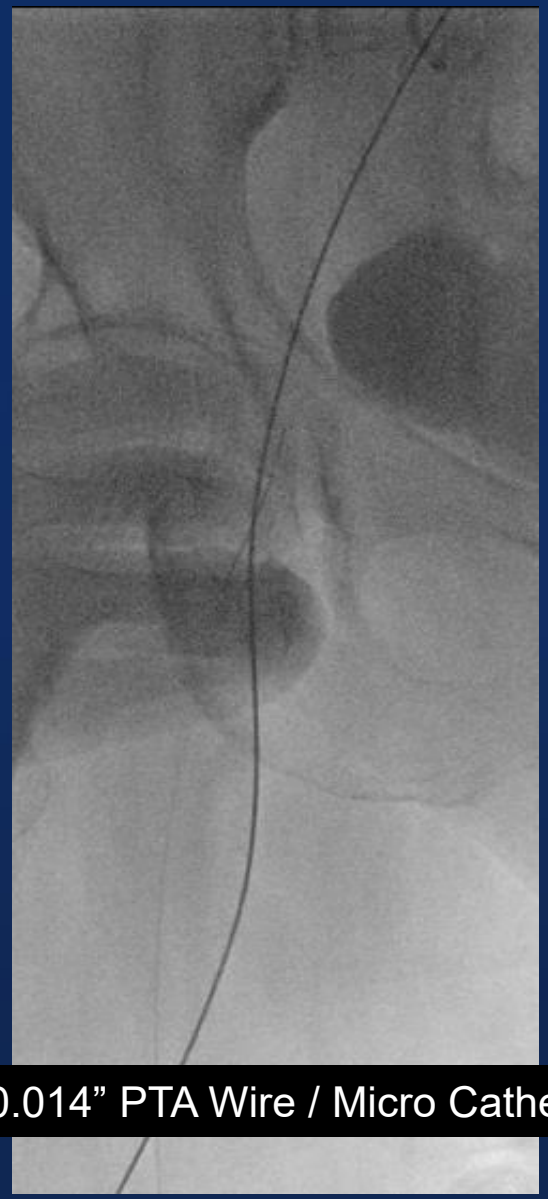


Access Site Severe Dissection

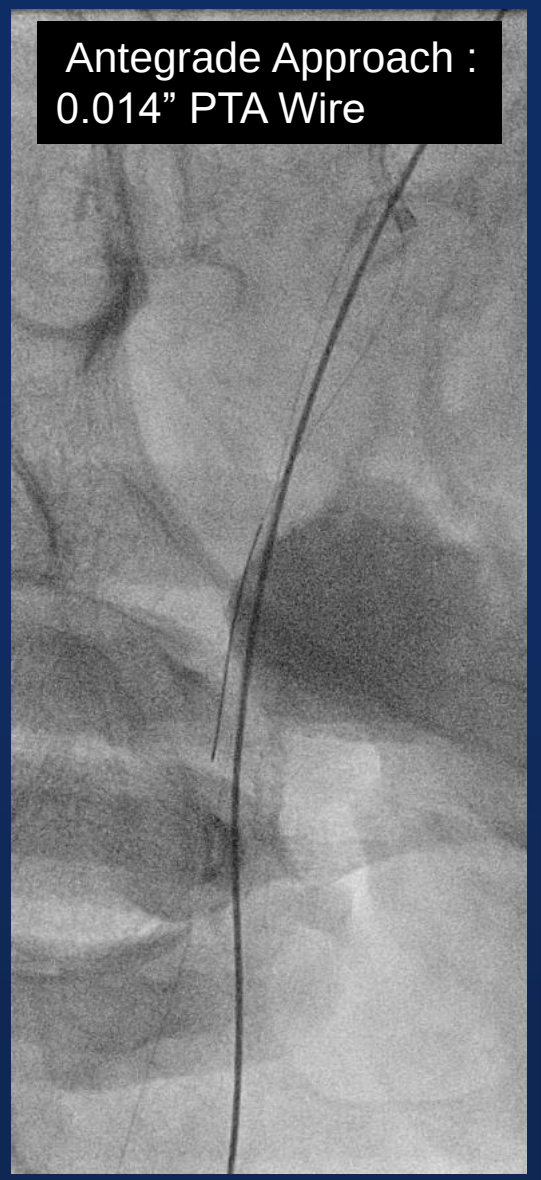
Vascular Complication : Access Site Dissection



Distal SFA Puncture - 0.014” PTA Wire / Micro Catheter



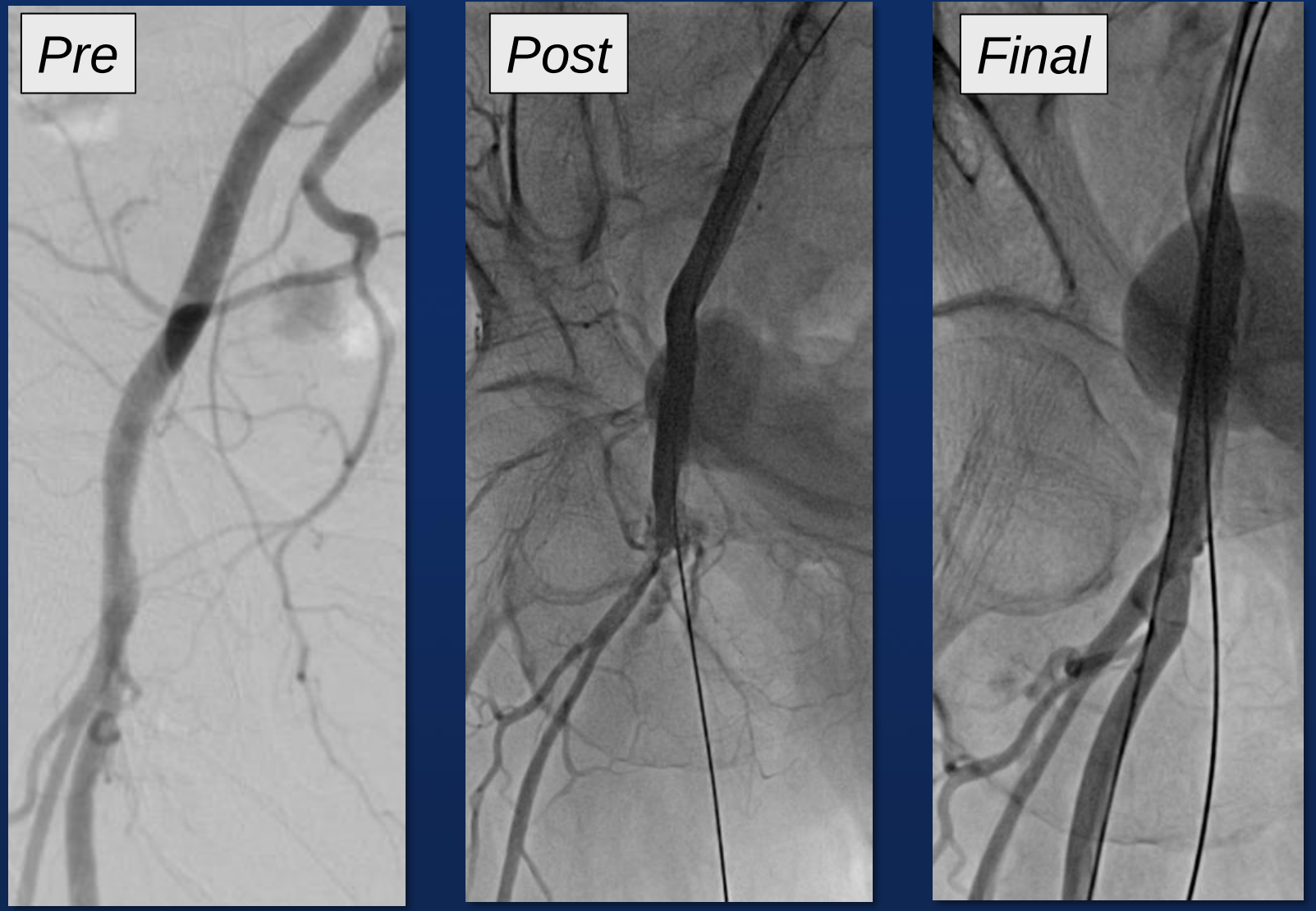
PTA Balloon 2.0 * 40



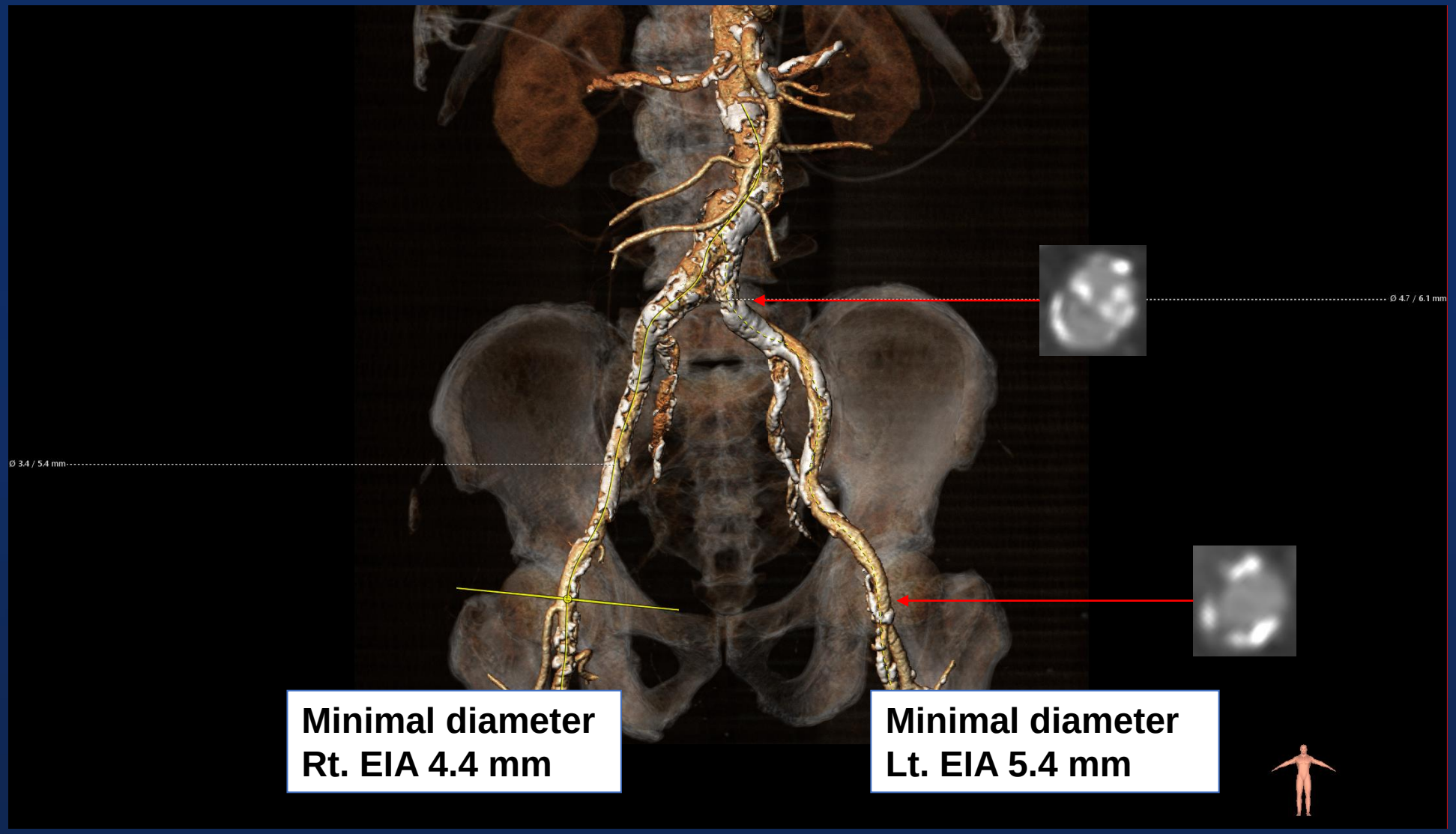
Antegrade Approach :
0.014” PTA Wire

6.0 * 40mm

Vascular Complication : Access Site Dissection

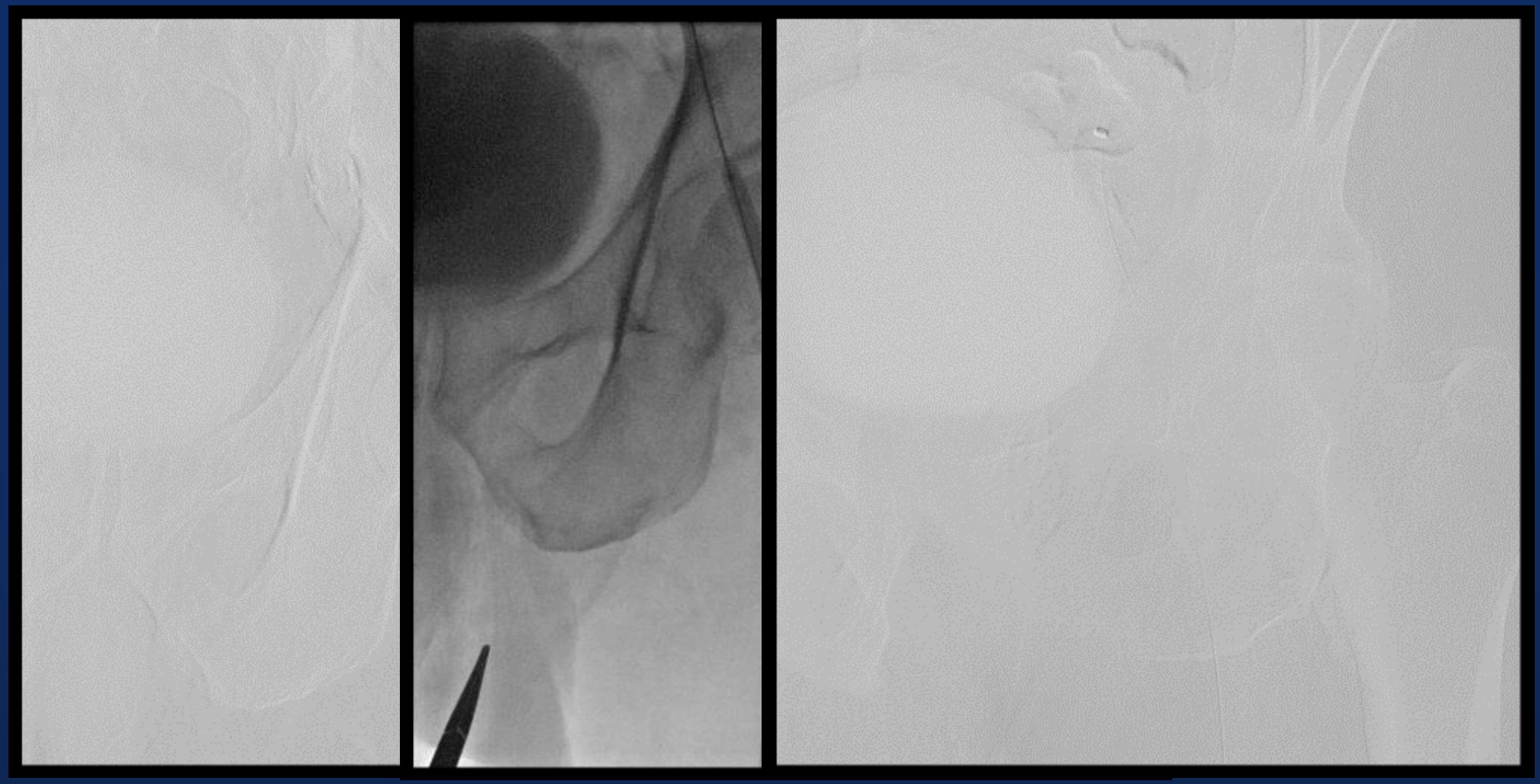


Vascular Complication

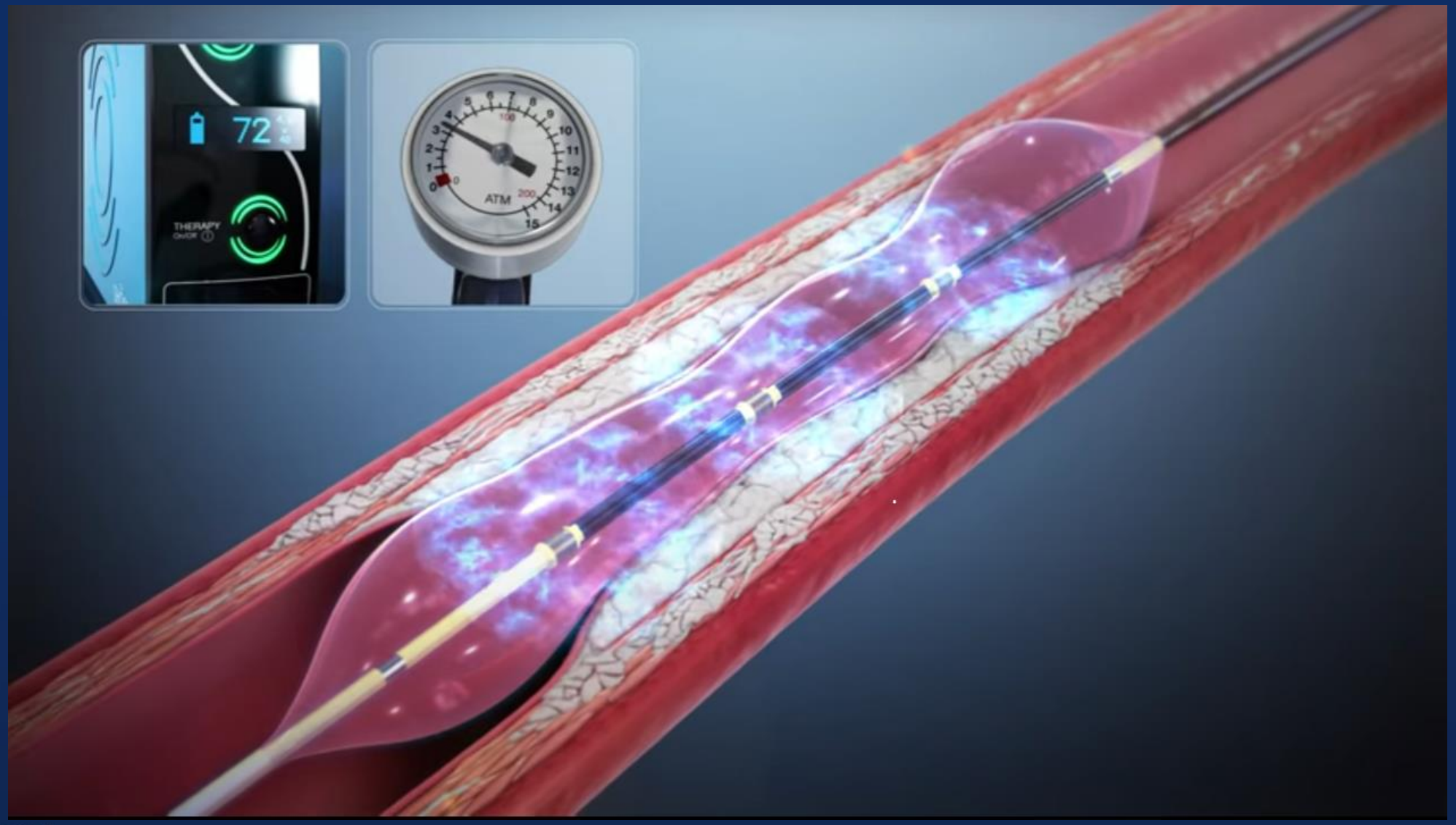


Vascular Complication

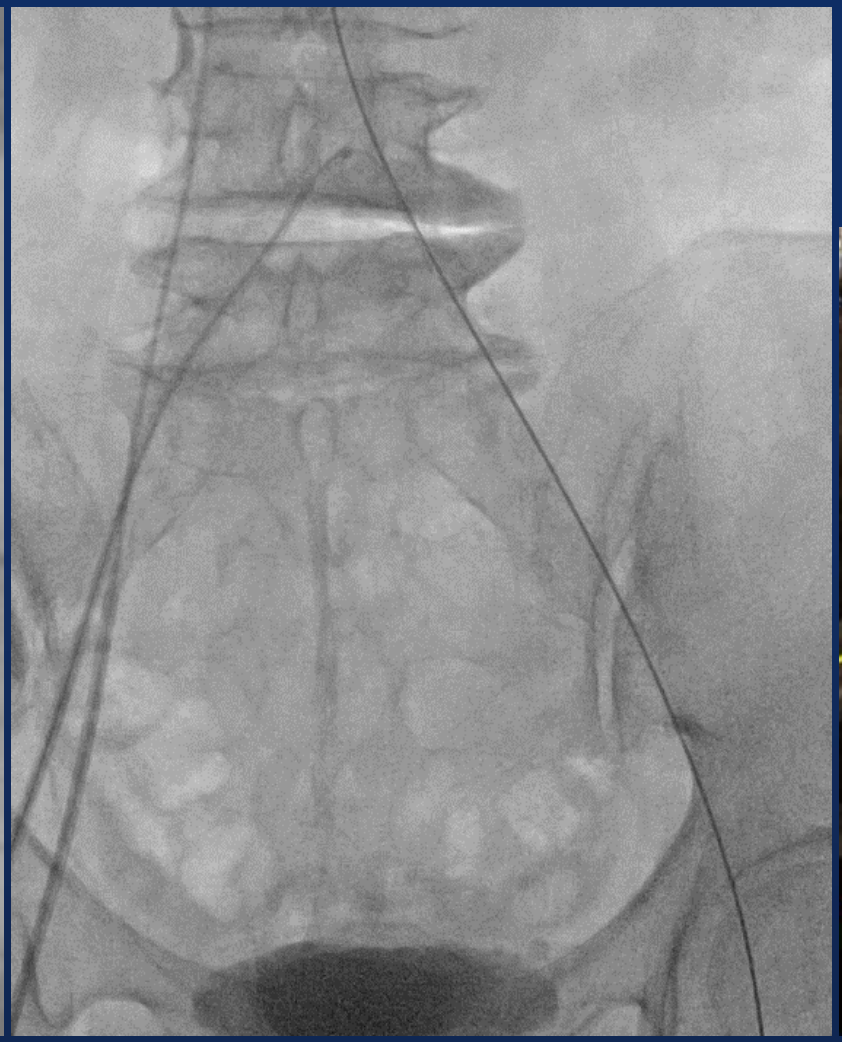
Vascular Complication



Intravascular Lithotripsy (IVL)



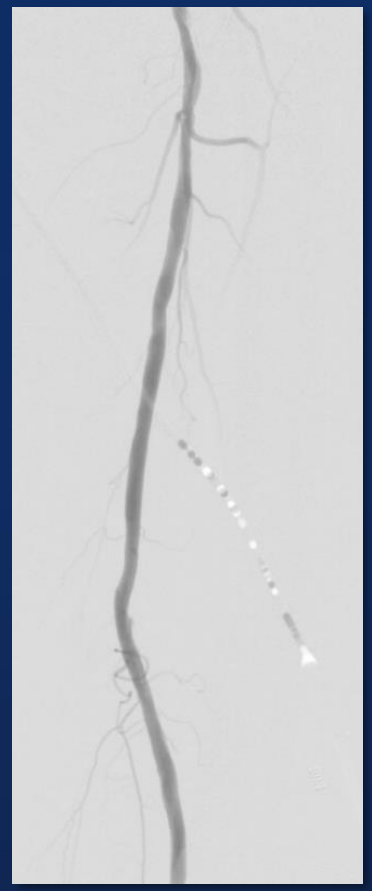
Vascular Complication : Access Site Lumen Loss

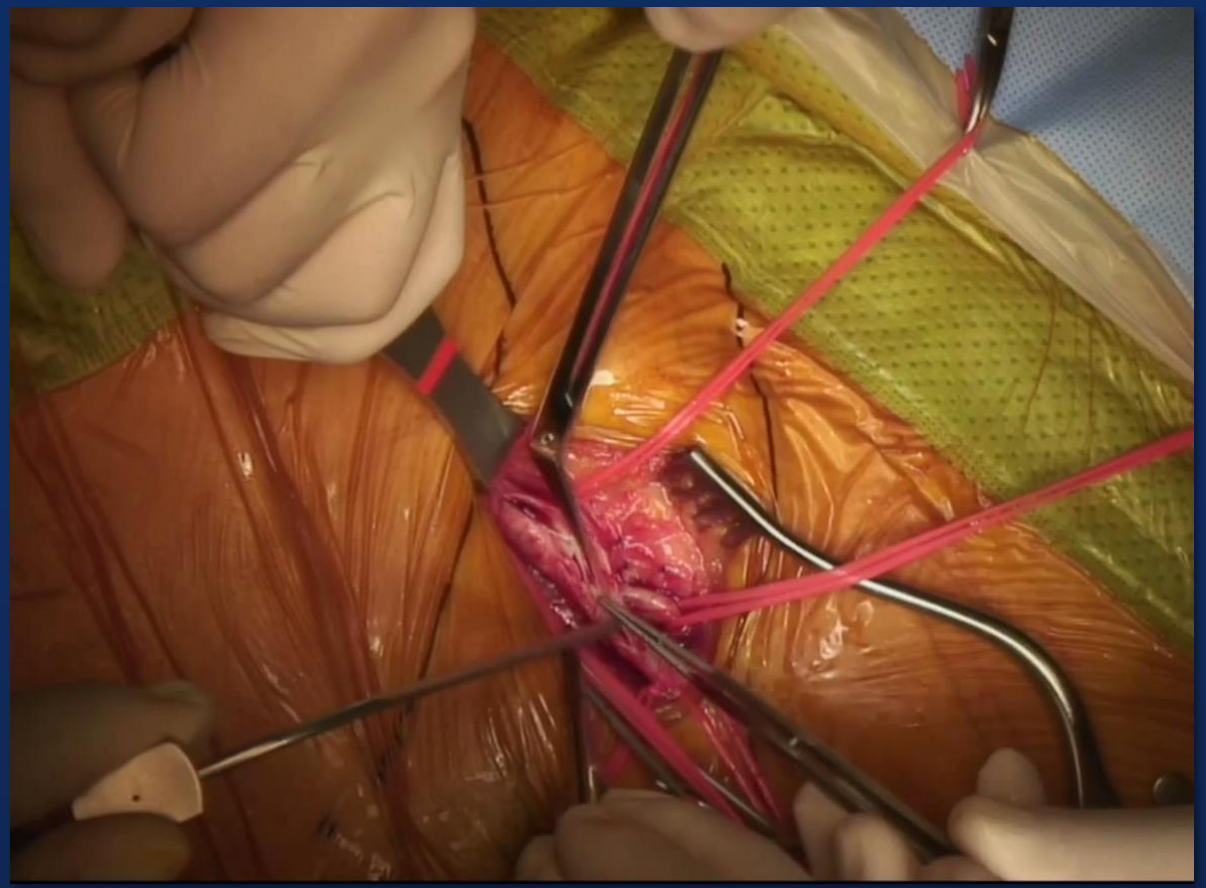


Vascular Con Site Lumen Loss

Vascular Complication

Common Femoral Artery Endarterectomy





Access Site Severe Dissection

Conclusion

- Sonography-guided puncture is very important to reduce complication
- Patient selection, increased operator experience and improved device technology are key to prevent complications
- Comprehensive understanding of CT before TAVR is mandatory
- Adjunctive technique (PCI, PTA) help to control and manage catastrophic situation
- Heart Team with knowledgeable and complementary members

Thank you for your attention.