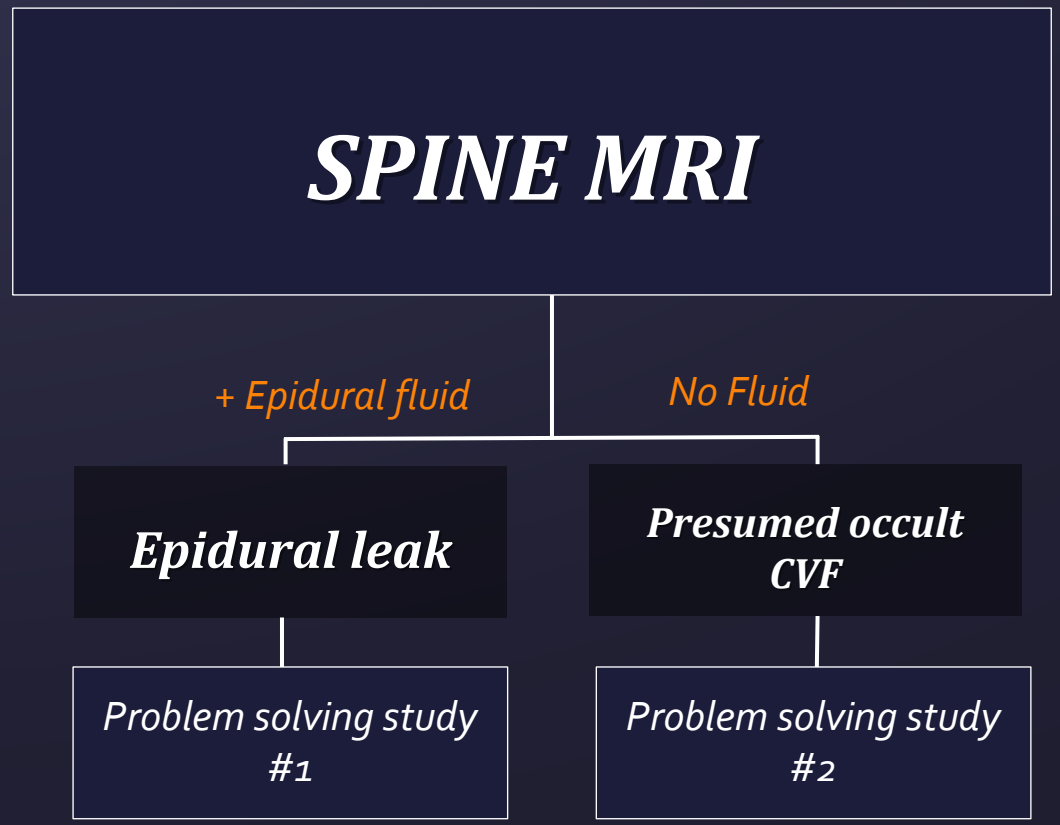
SPINAL IMAGING ALGORTIHM II: *CT-BASED*

Peter G. Kranz, M.D.

Associate Professor of Radiology
Chief, Division of Neuroradiology
Duke University Medical Center
peter.kranz@duke.edu

Duke Radiology

FIRST LINE VS PROBLEM-SOLVING



Problem solving study #1:
High temporal resolution

- ***Ultrafast CTM***
- ***DSM***
- ***Dynamic myelography***

Problem solving study #2:
Can detect CVF

- ***DSM***
- ***Dynamic Myelo (under fluoro)***

- ***Decubitus CTM***
- ***Dynamic CTM (ultrafast)***

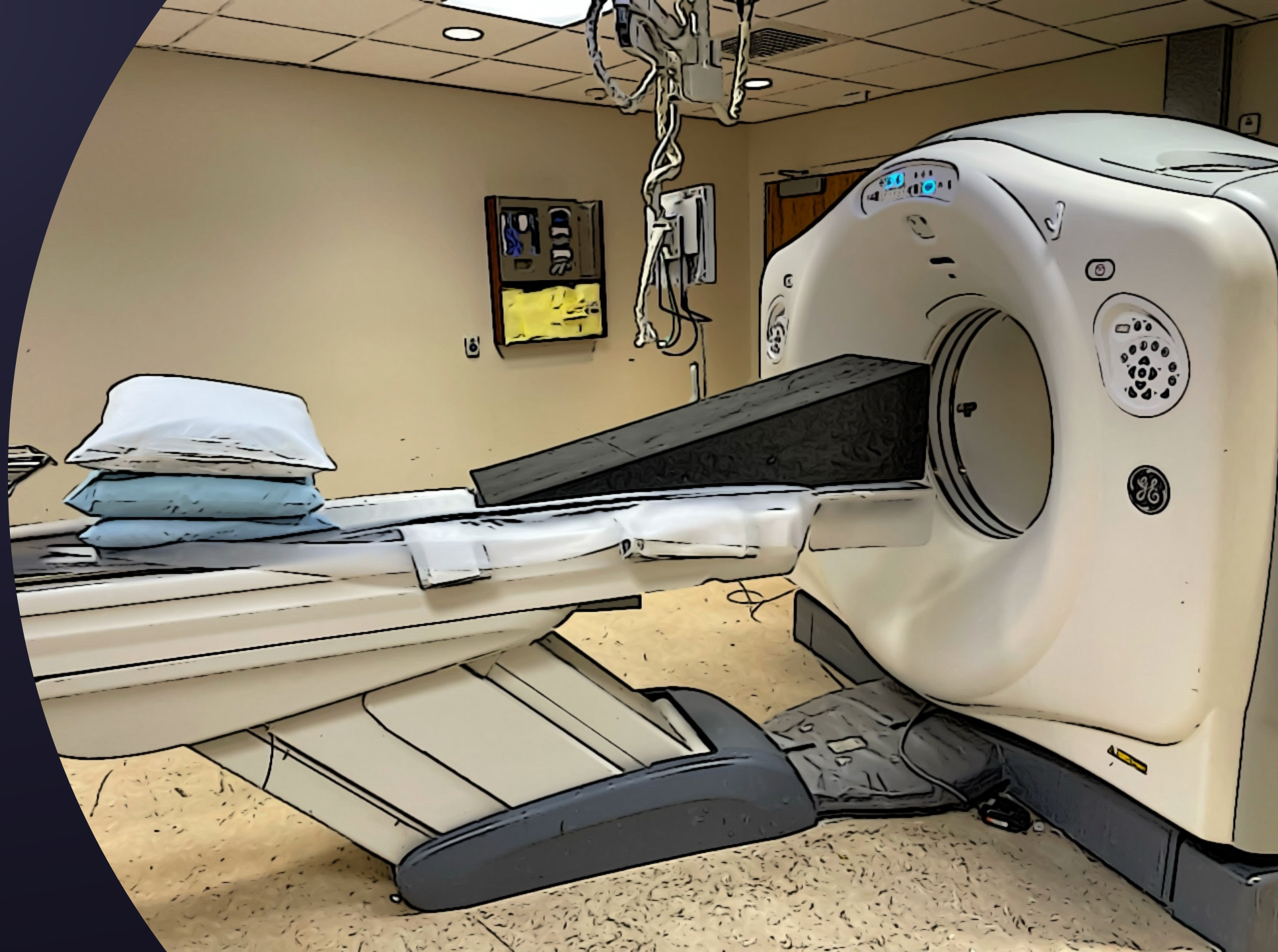
CT FOR EPIDURAL LEAKS

WHAT IS ULTRAFAST CTM?

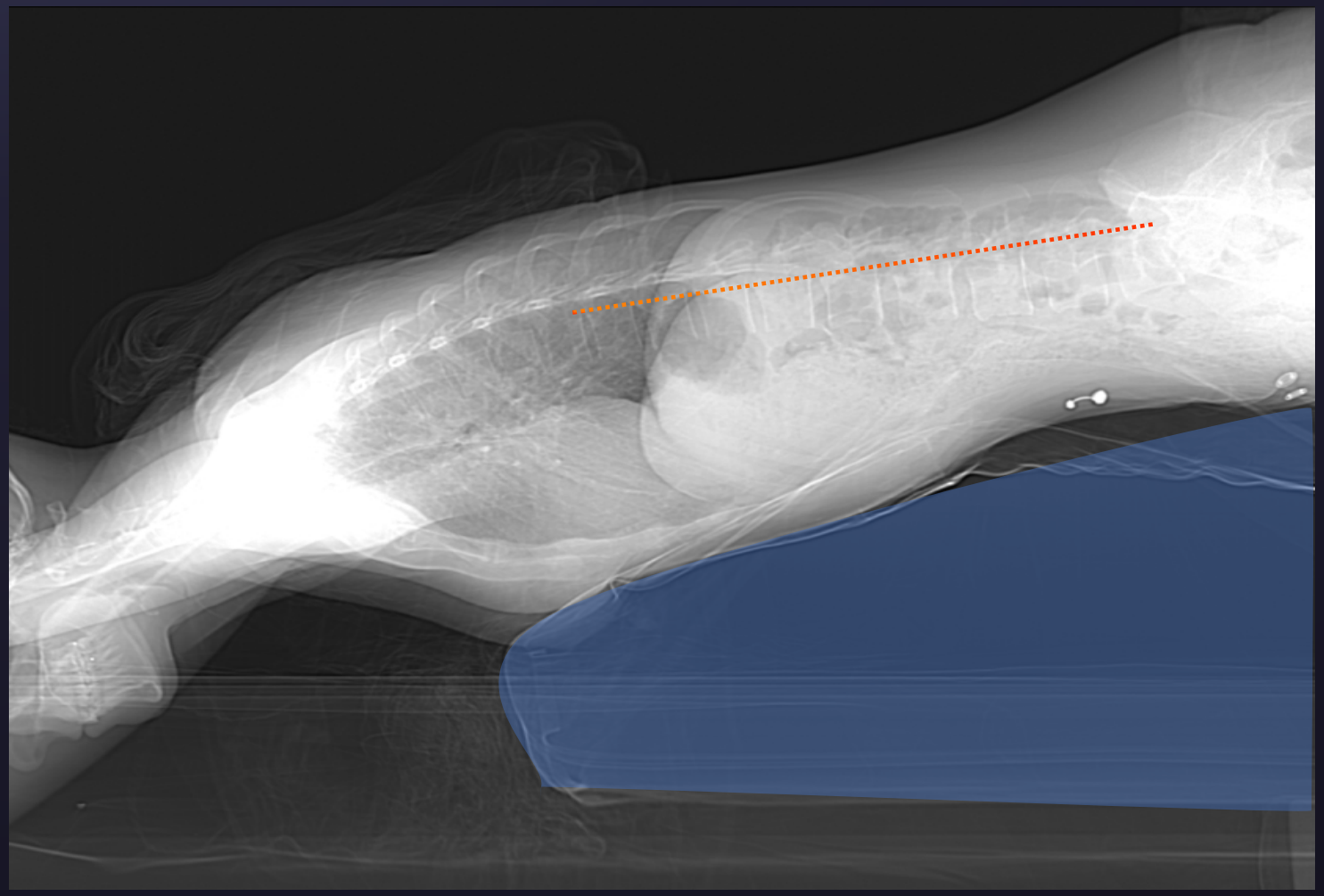
WHAT IS ULTRAFAST CTM?

- *Scan as contrast is injected*
- *Multiple phases (3-4 typical)*
- *Goal: catch first moment of leak*
- *Sometimes called "dynamic CTM"*

Equipment

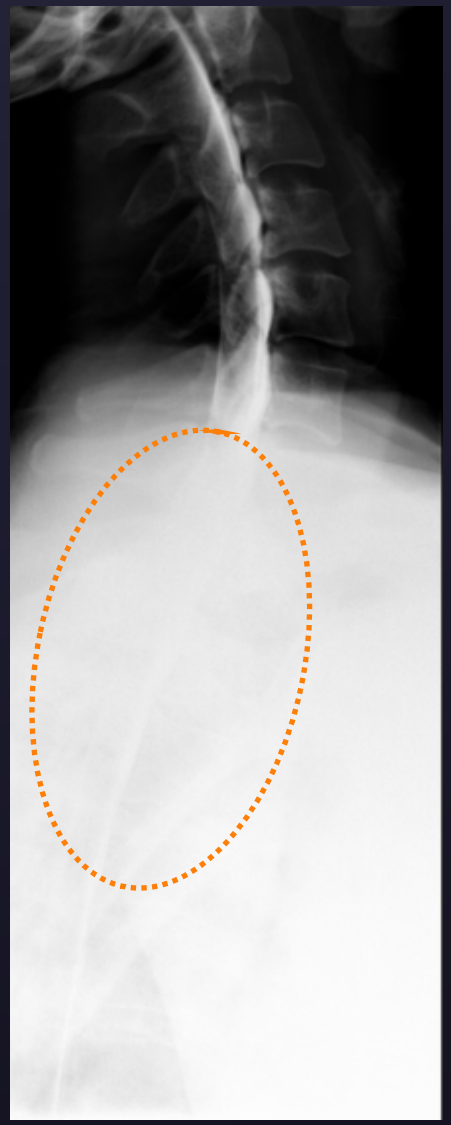


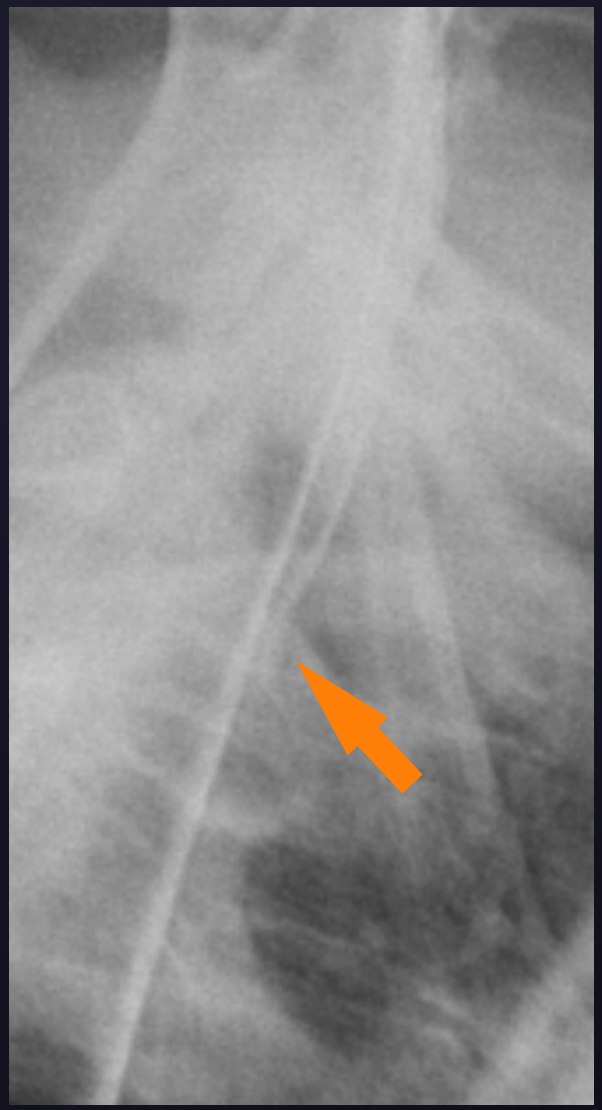
ULTRAFAST CTM FOR VENTRAL LEAKS



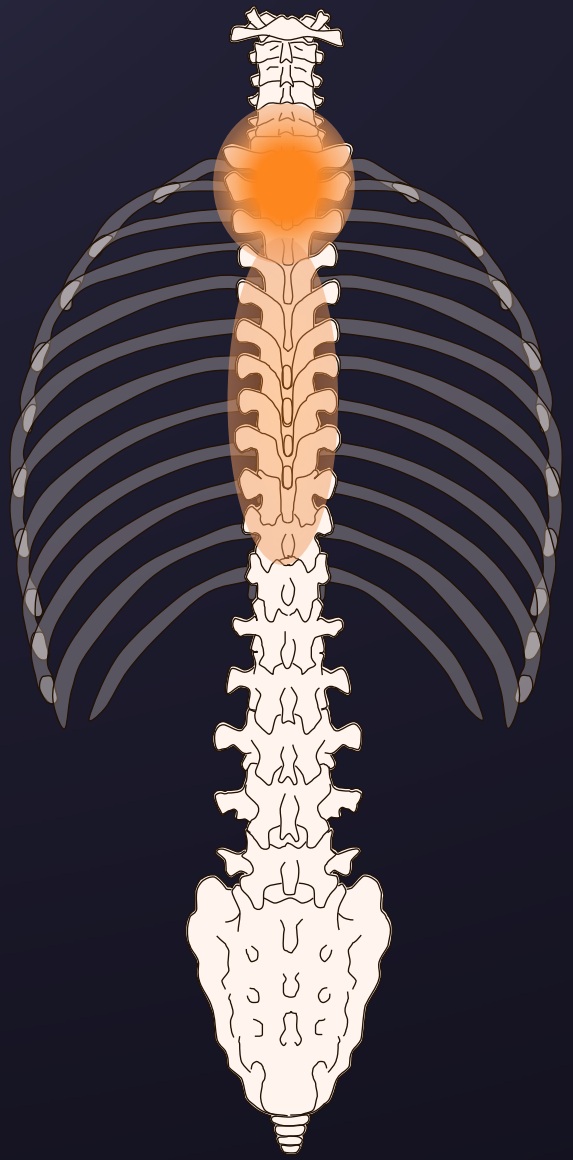
WHY ULTRAFAST CTM?

Avoids "the shoulder problem"

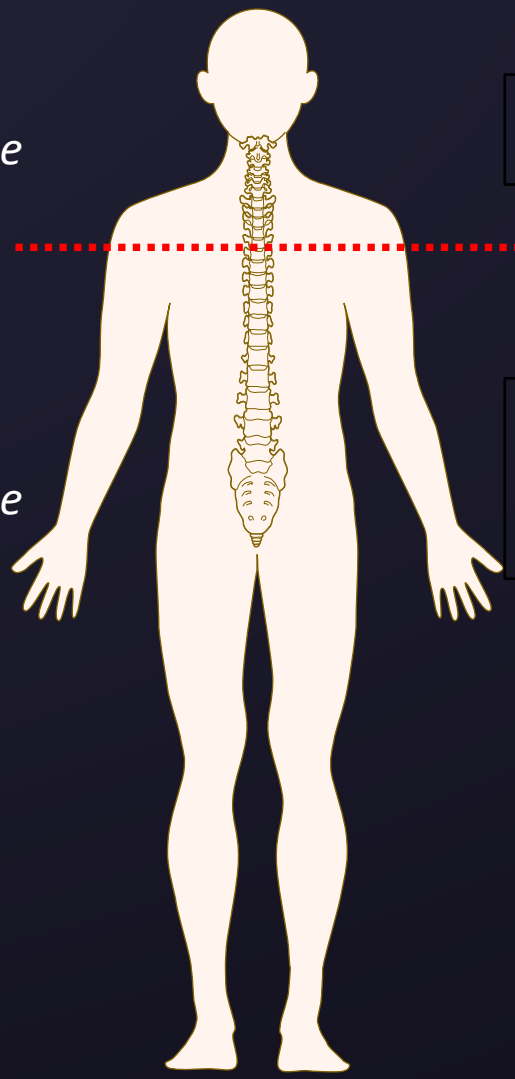




WHY ULTRAFAST CTM?



CT FOR EPIDURAL LEAKS

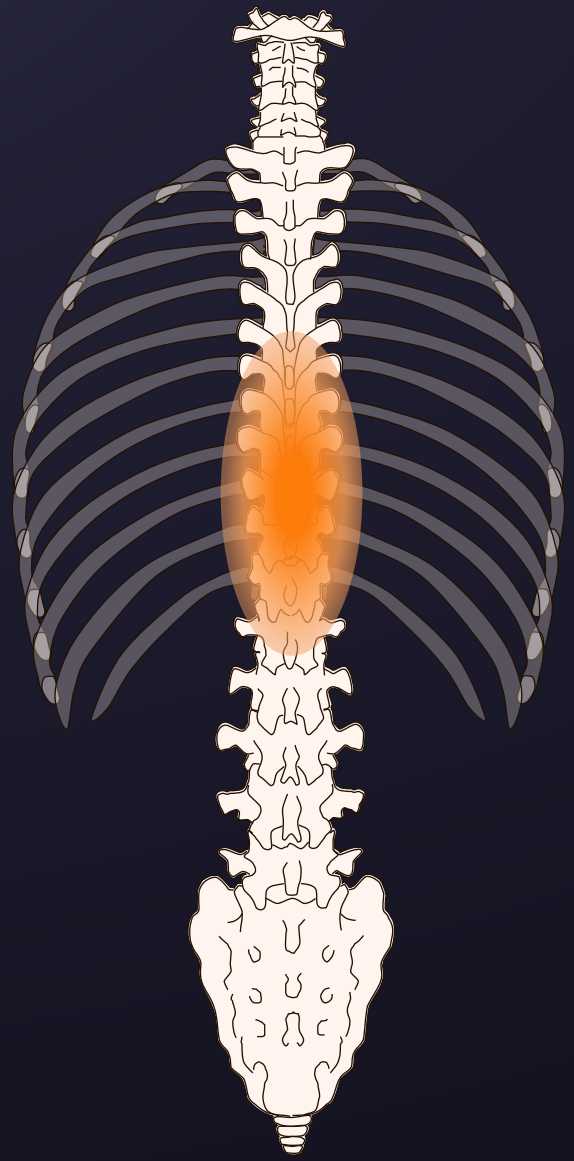


Ultrafast CT

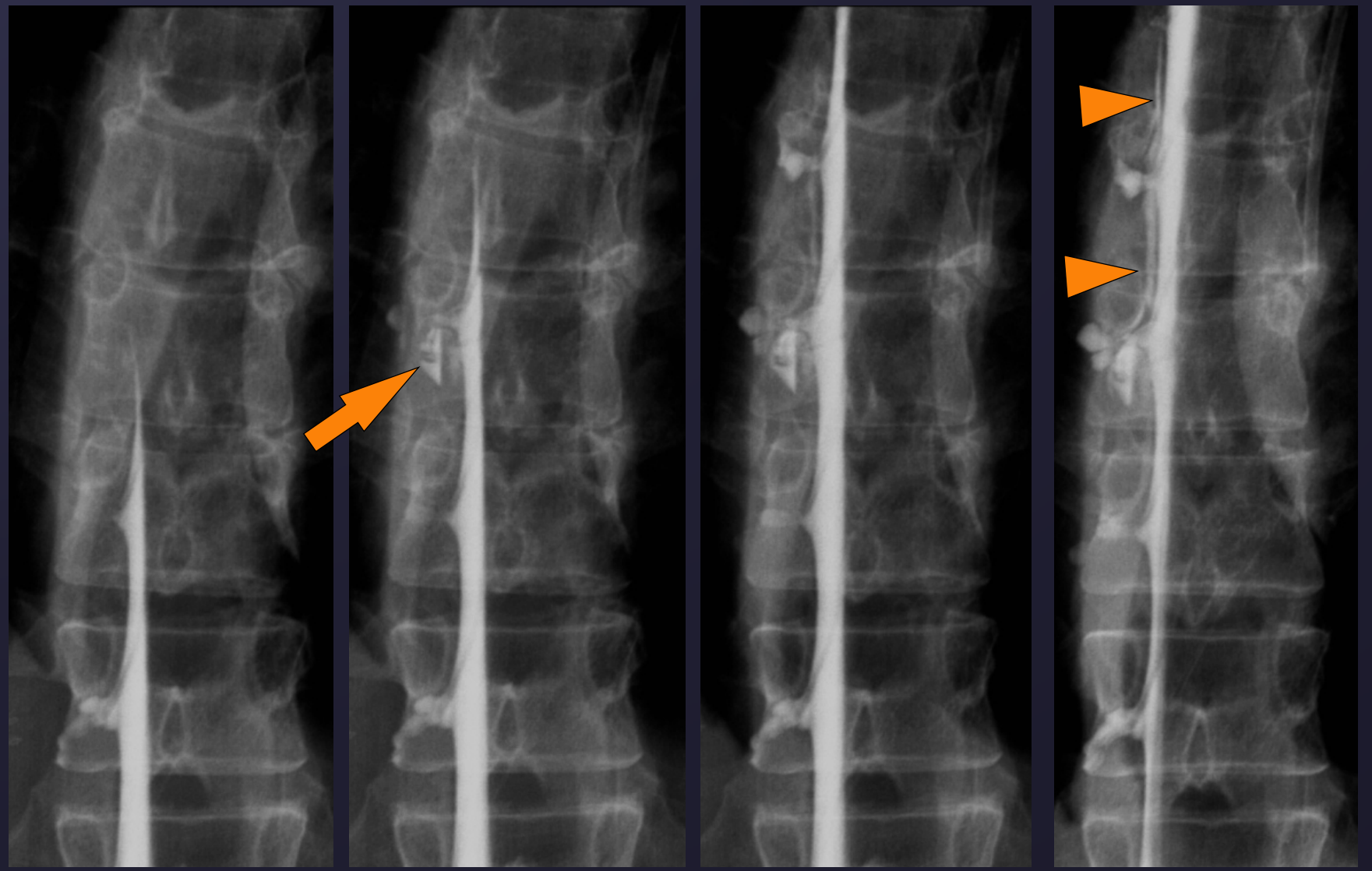
Fluoro or Ultrafast CT

Ventral leaks

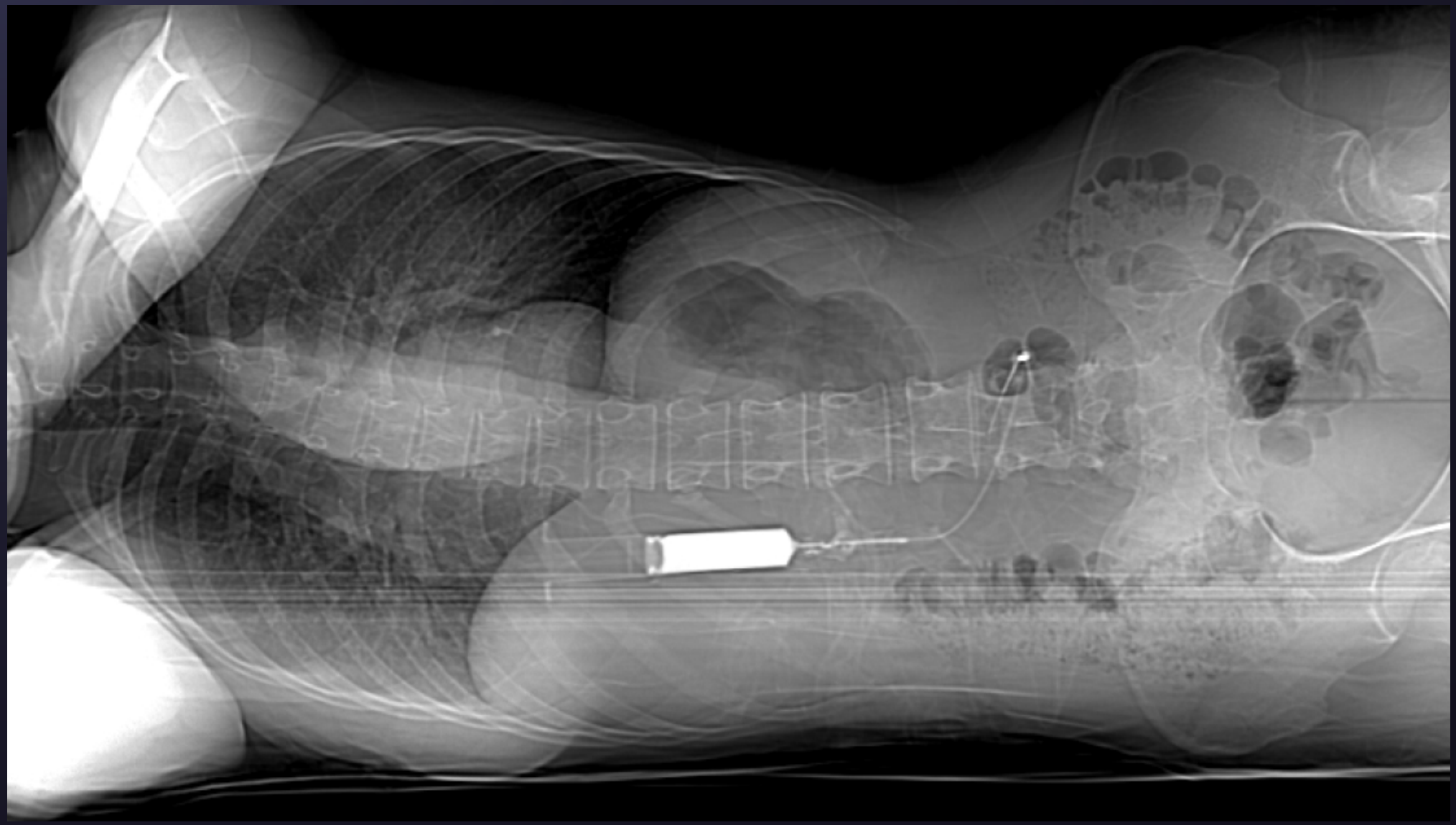
ULTRAFAST CTM FOR LATERAL LEAKS



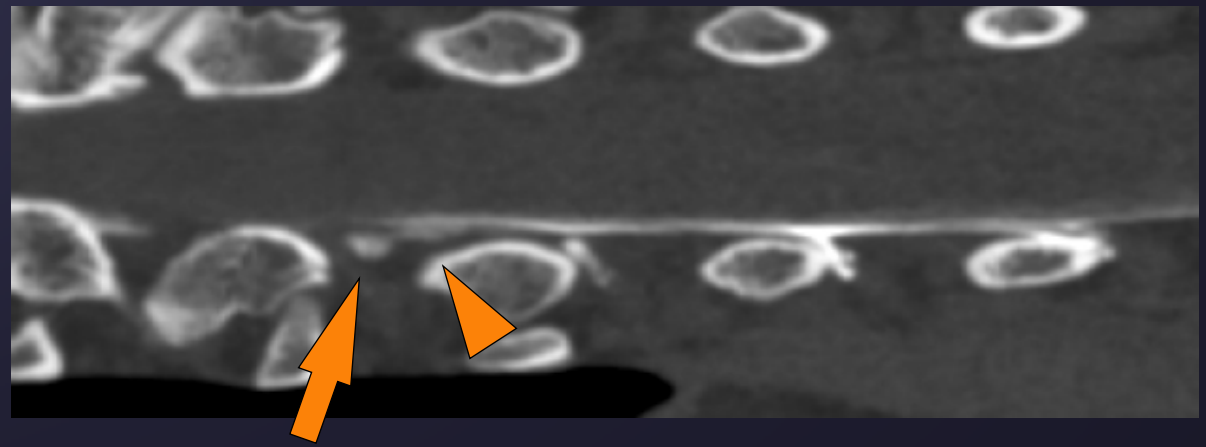
DYNAMIC MYELOGRAM

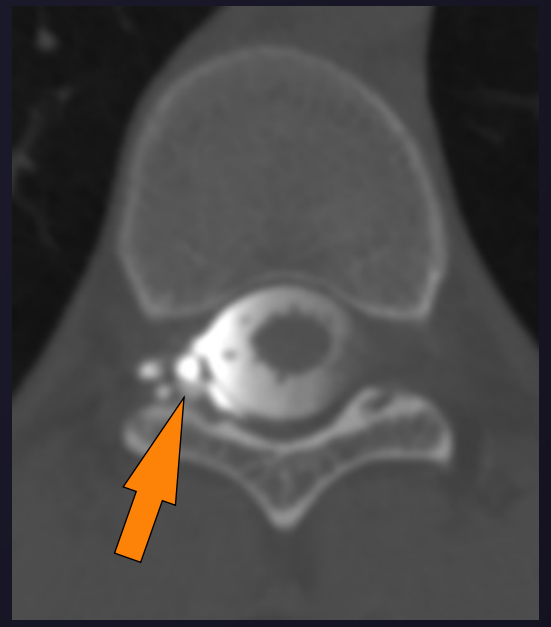


ULTRAFAST CTM FOR LATERAL LEAKS



Phase 1





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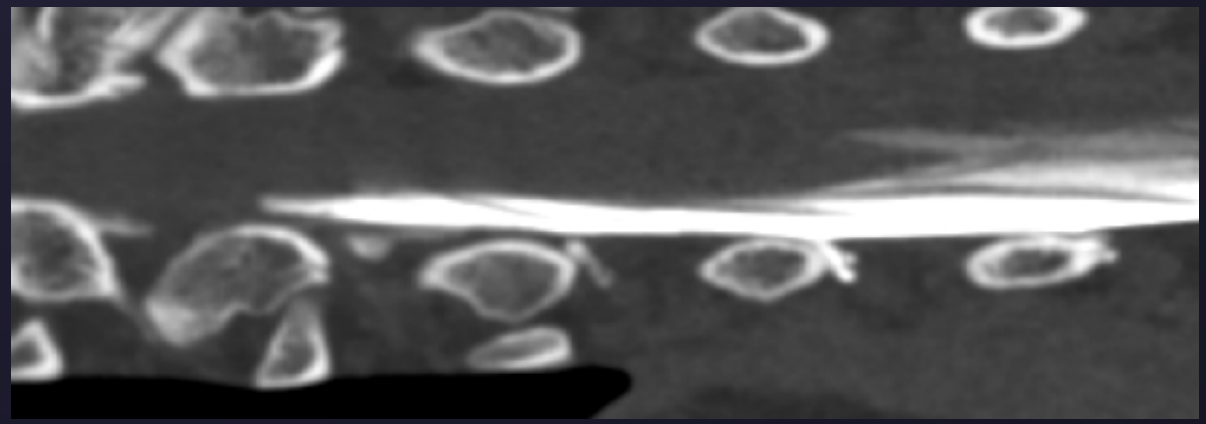
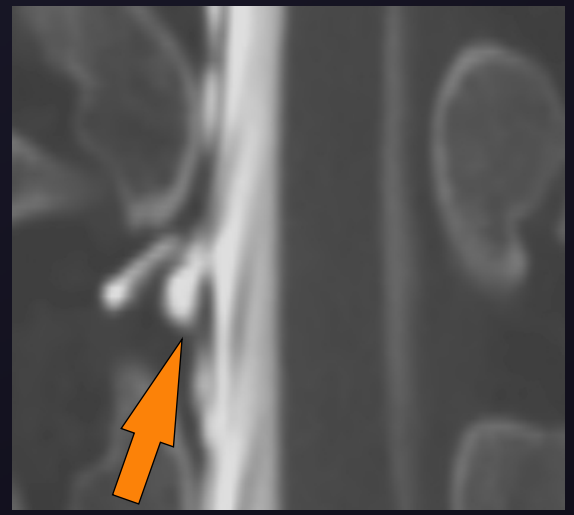
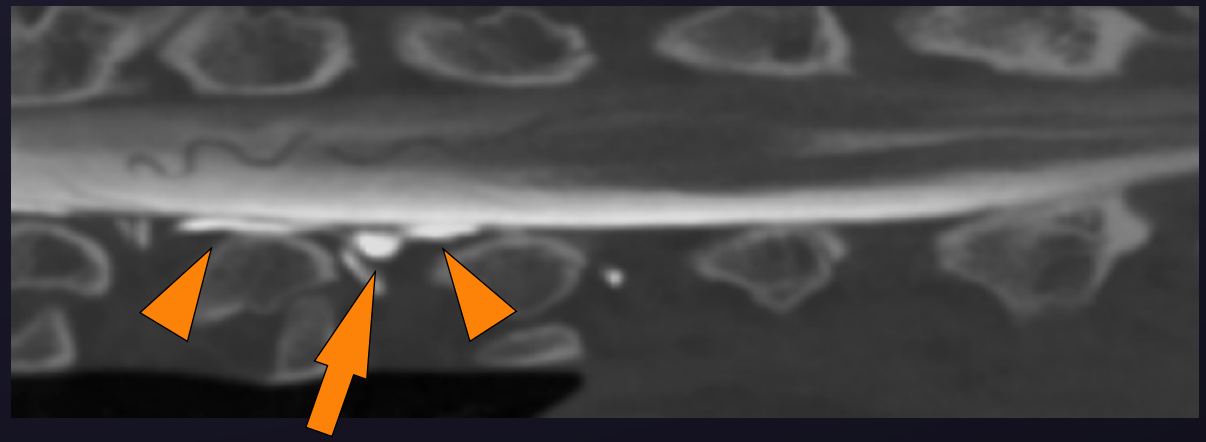


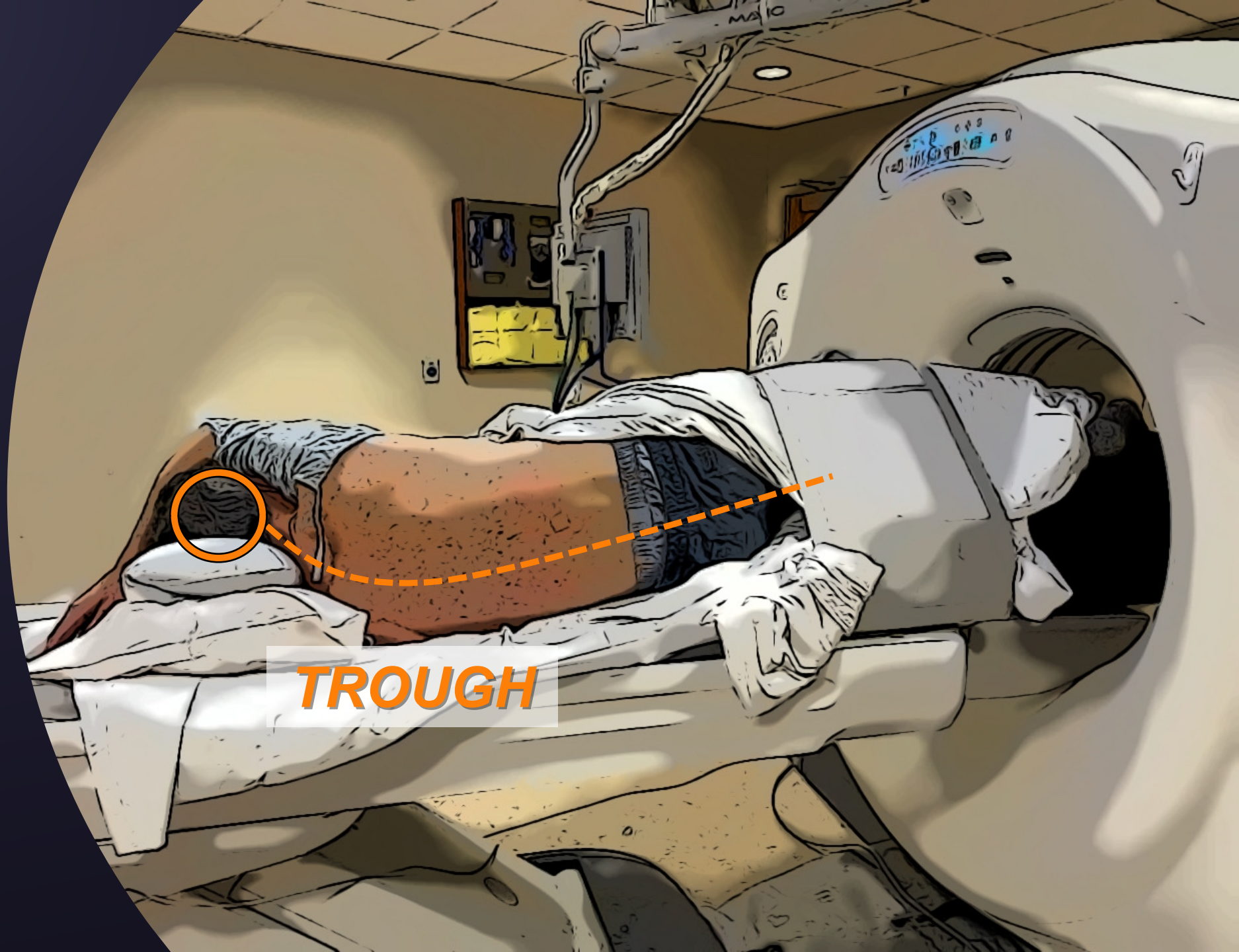


Phase 4

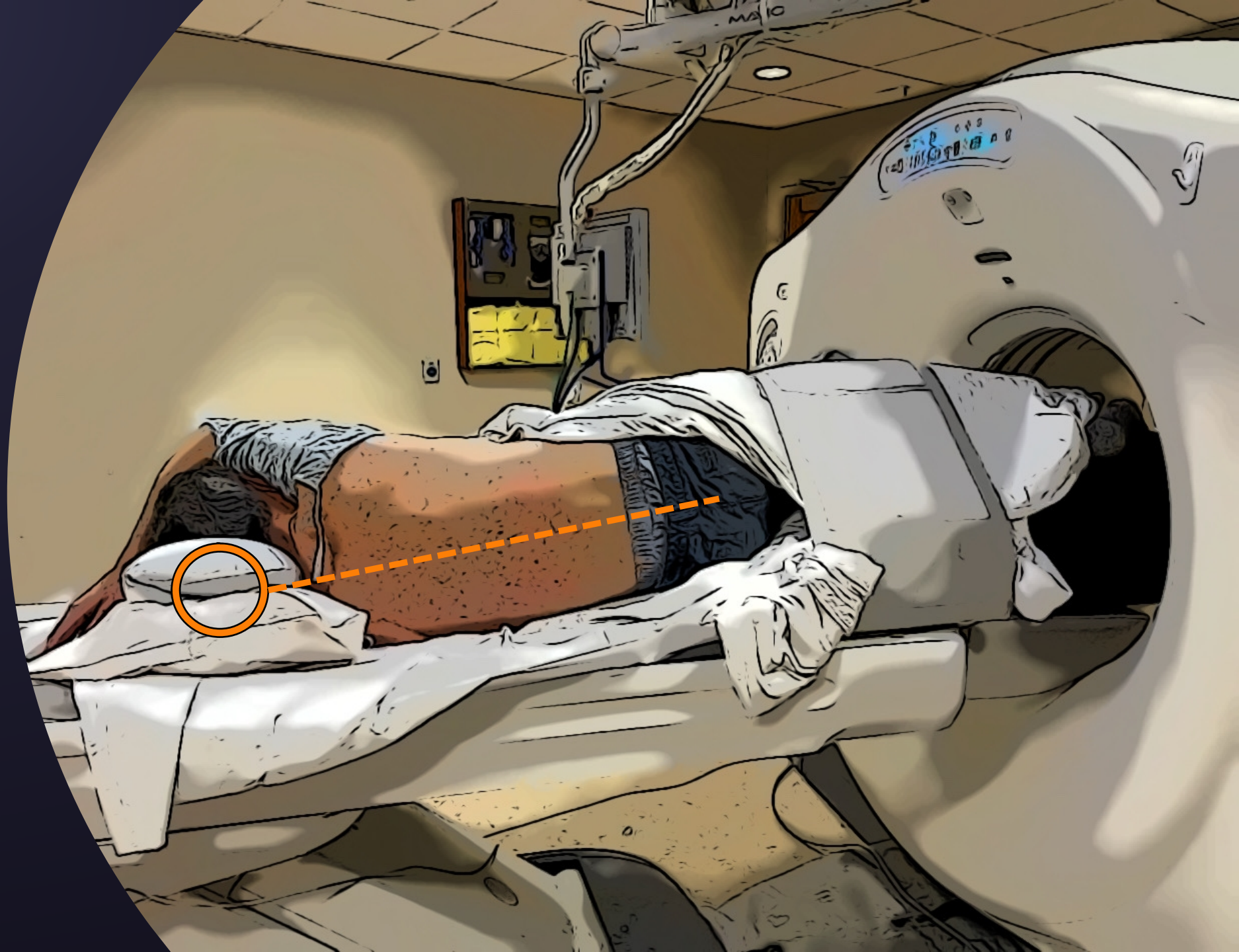


CT FOR CVFs

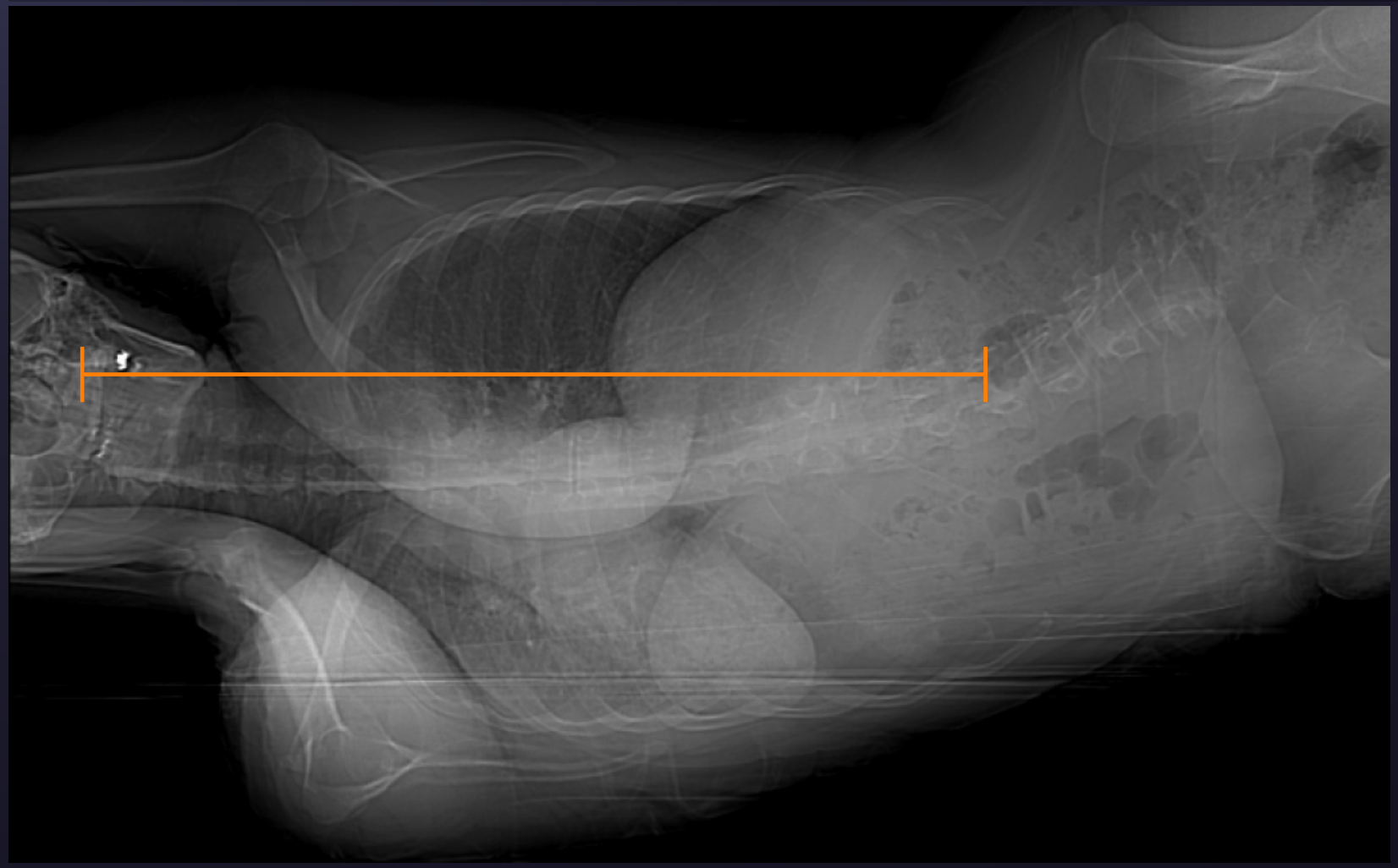
Position



Position if Dynamic CTM (Ultrafast)

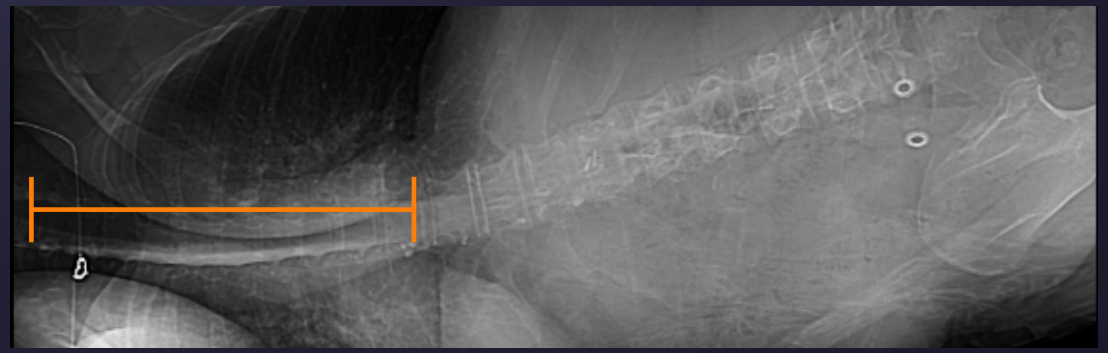


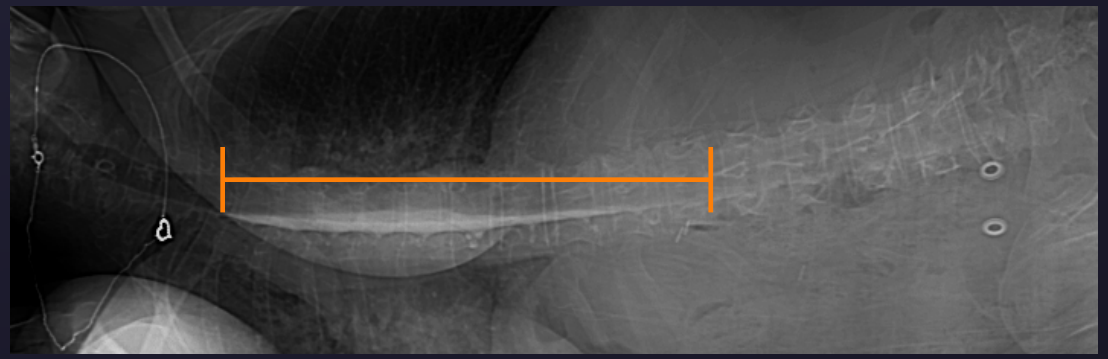
LATERAL DECUBITUS CTM

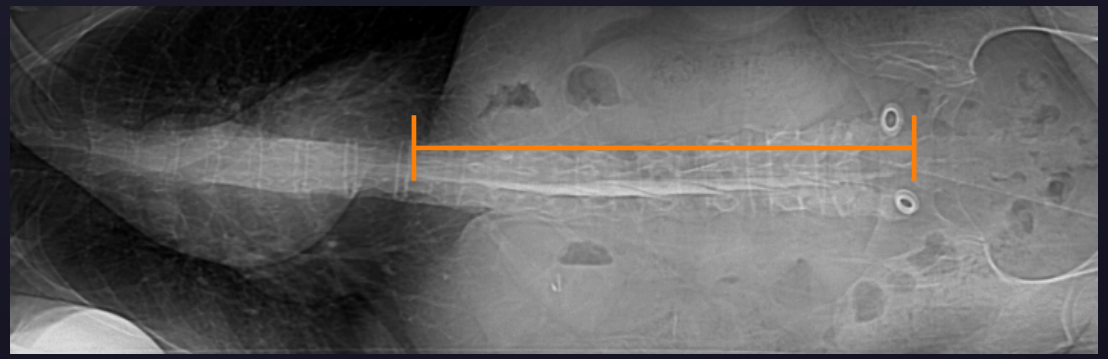


Goal: ***high-density contrast***

LATERAL DECUBITUS CTM







KEEP THE CONTRAST OUT OF THE HEAD! (3 PILLOWS)

EARLY SCANNING IS IMPORTANT ...BUT

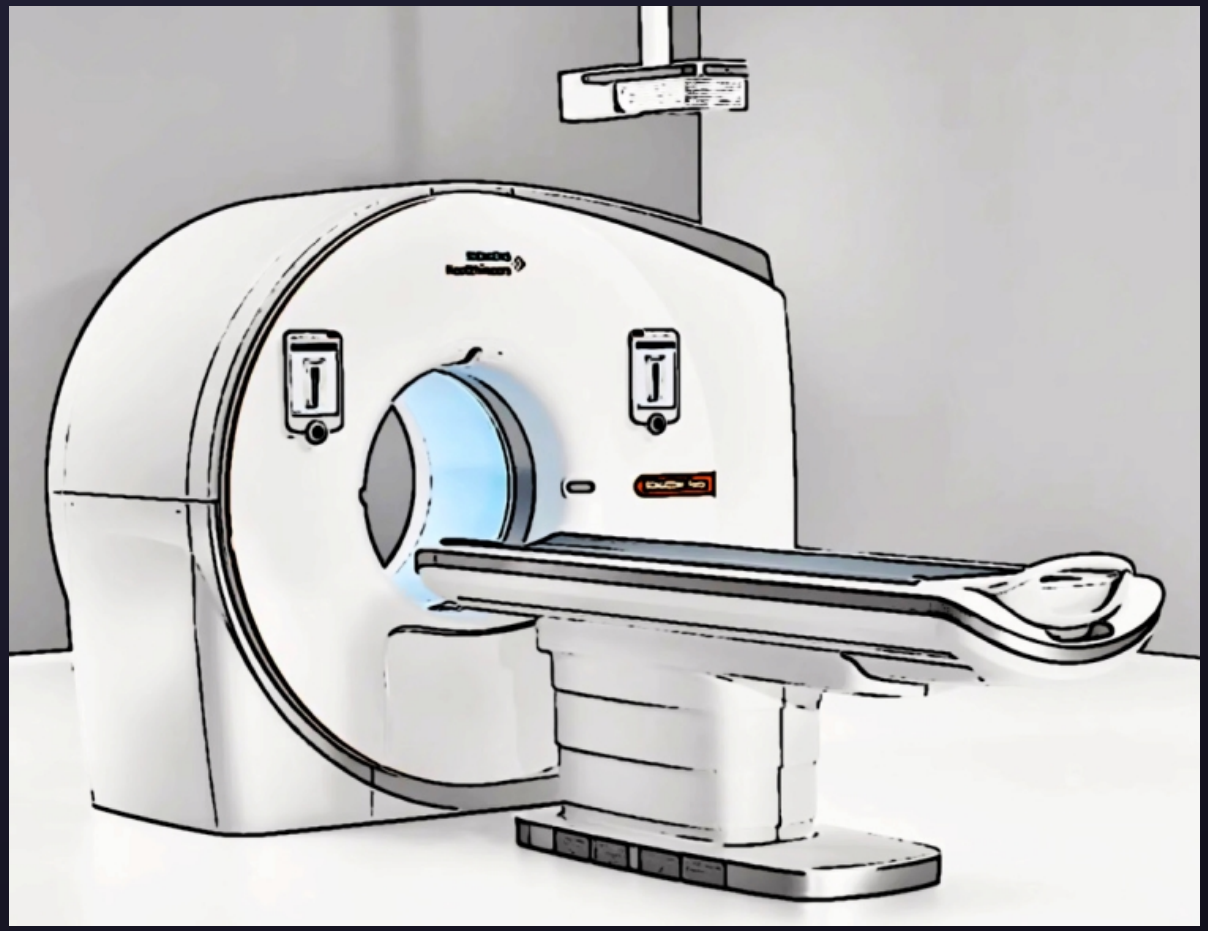
CONTRAST DENSITY IS MORE IMPORTANT* (my opinion)

MULTIPLE PHASES OF SCANNING? I'M NOT YET SURE

WHY CTM FOR CVF?

WHY CTM FOR CVF?

***Access* to equipment**



WHY CTM FOR CVF?

Both sides in one procedure

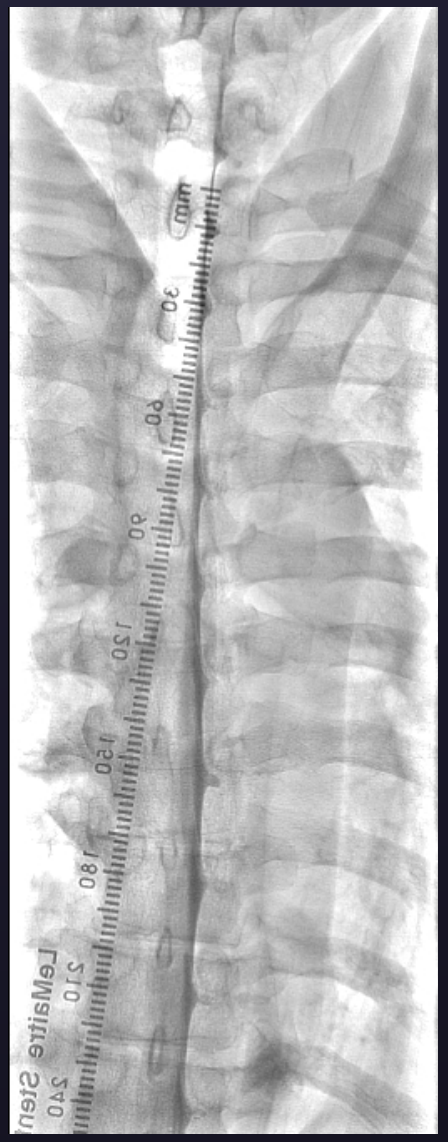
1 DAY
1 NEEDLE
NO SEDATION

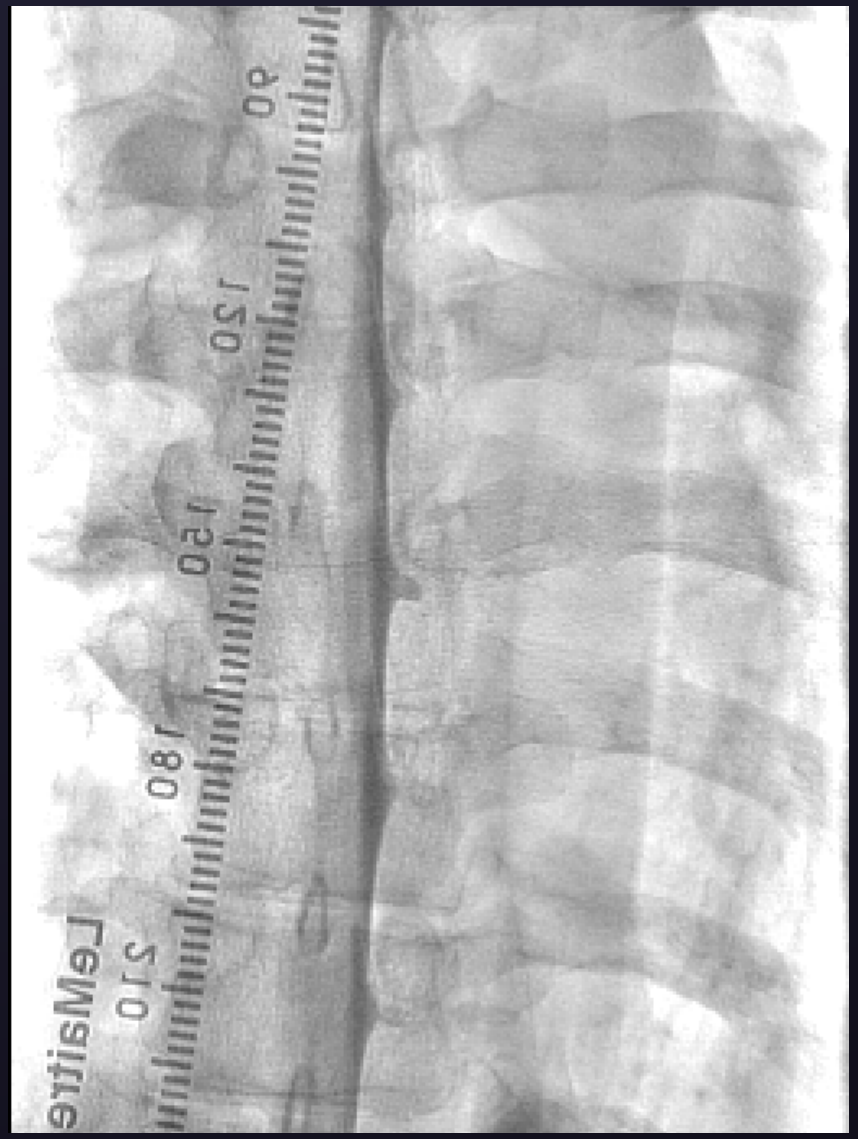
Left Side

Right Side

WHY CTM FOR CVF?

High confidence for small fistulas





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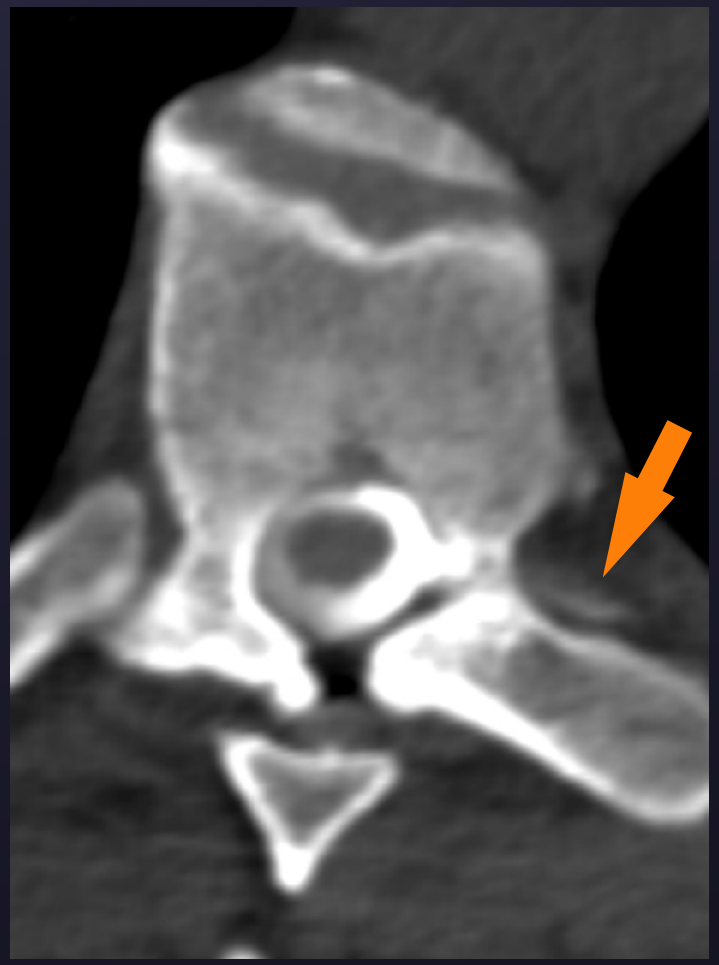

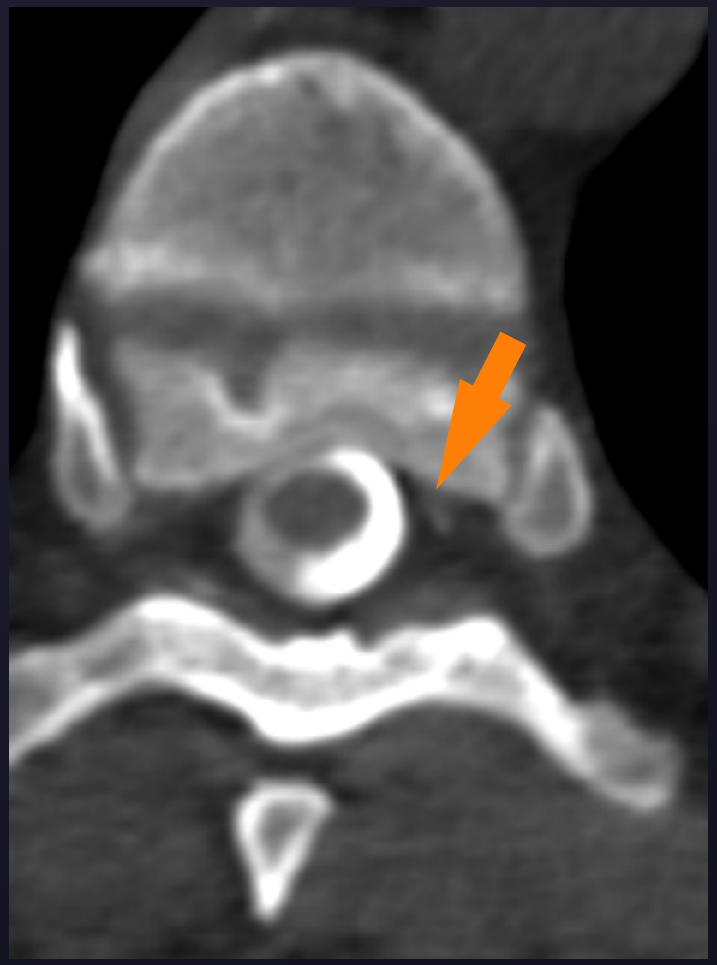

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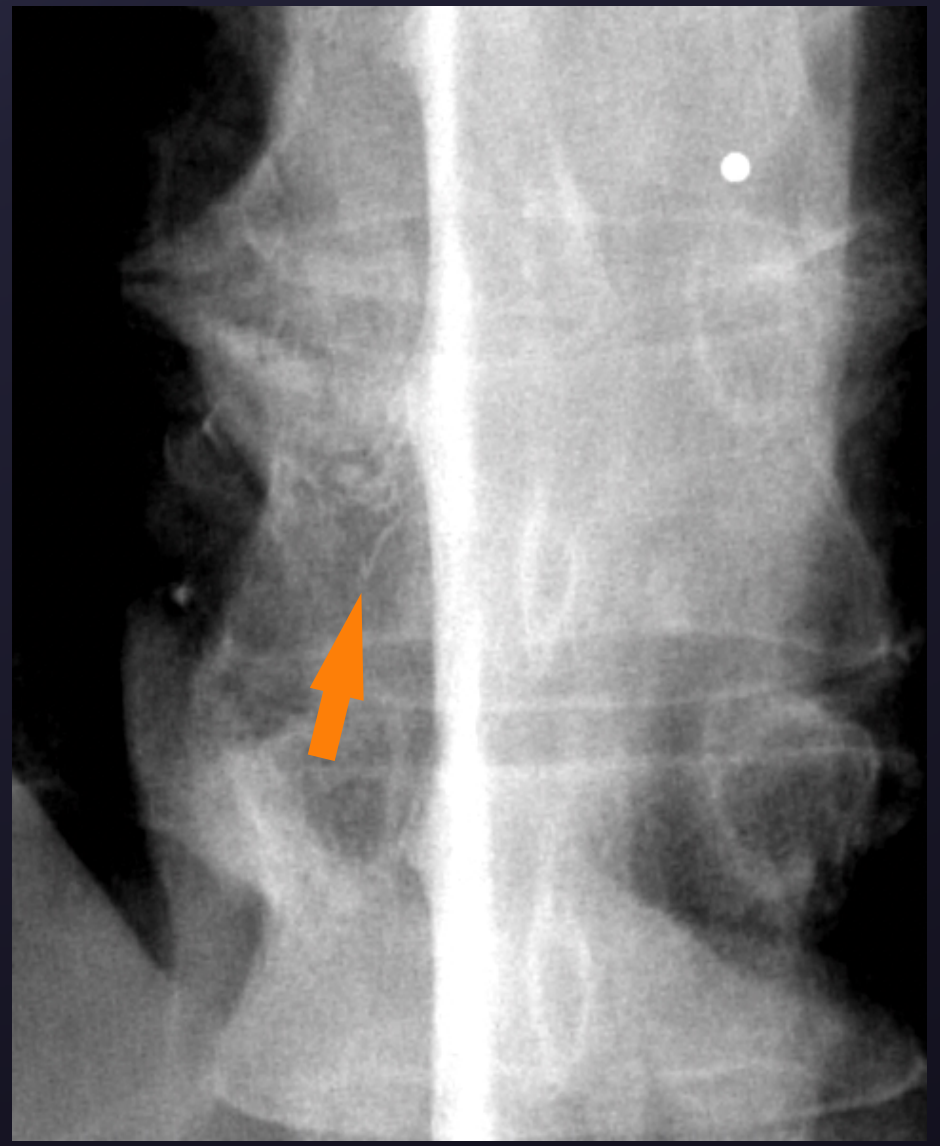

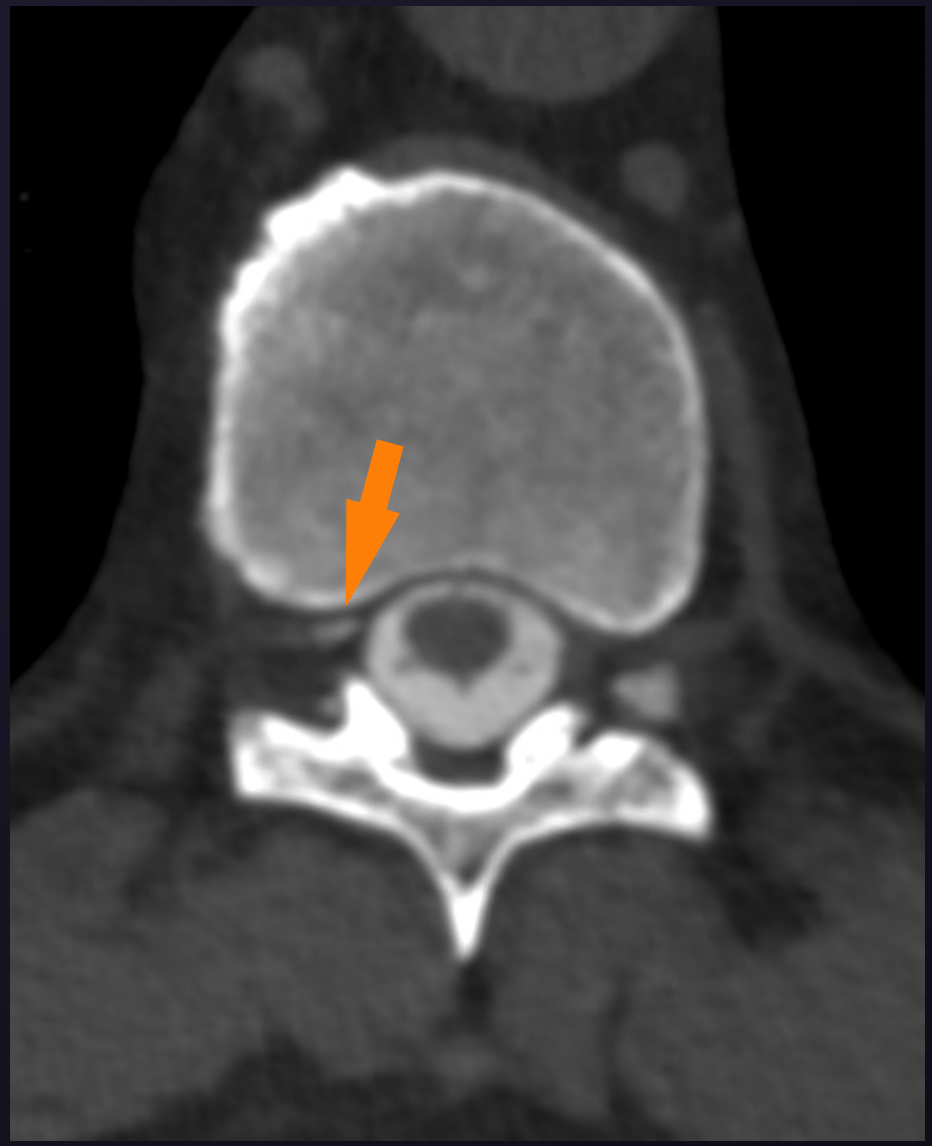

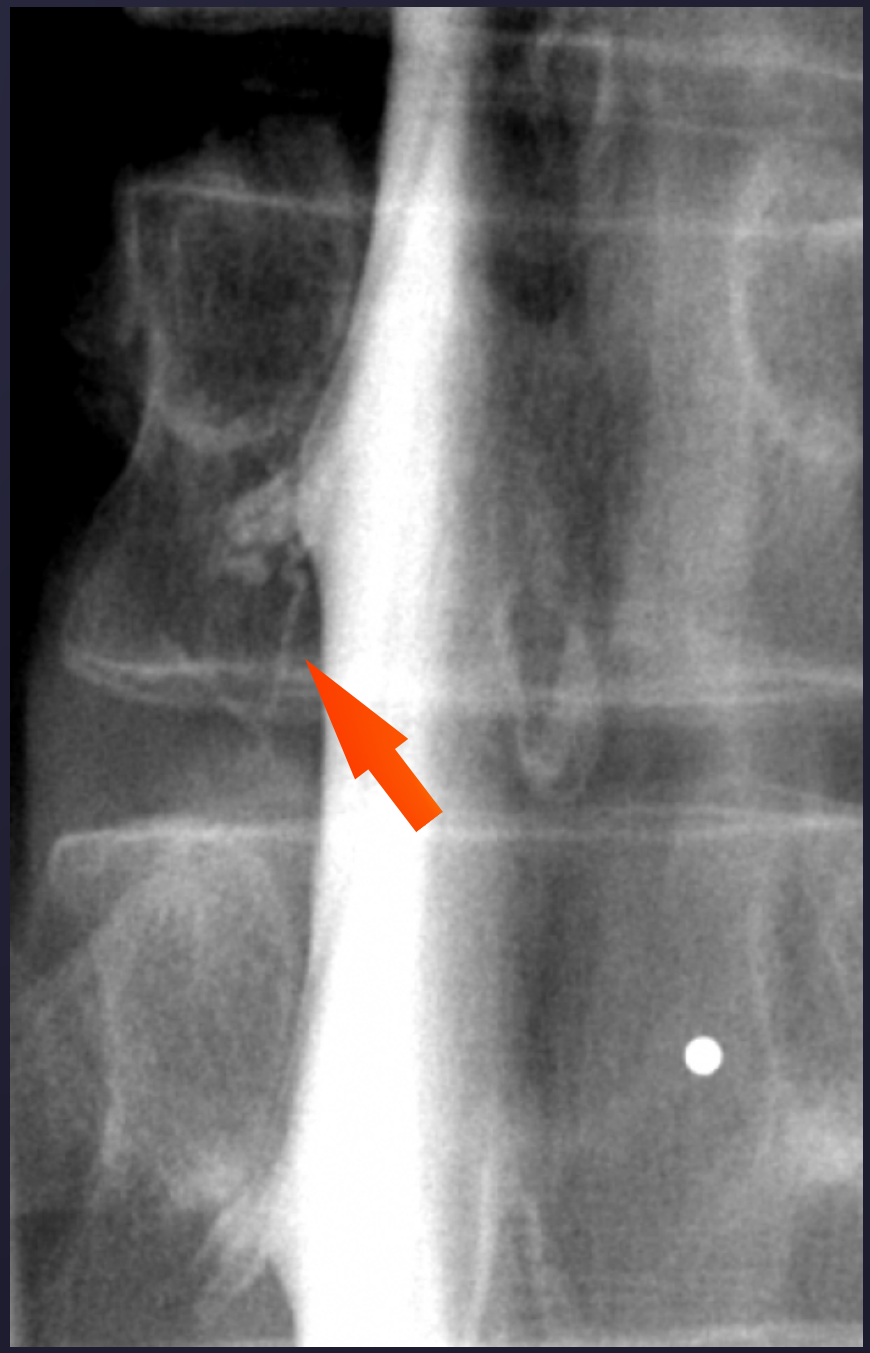

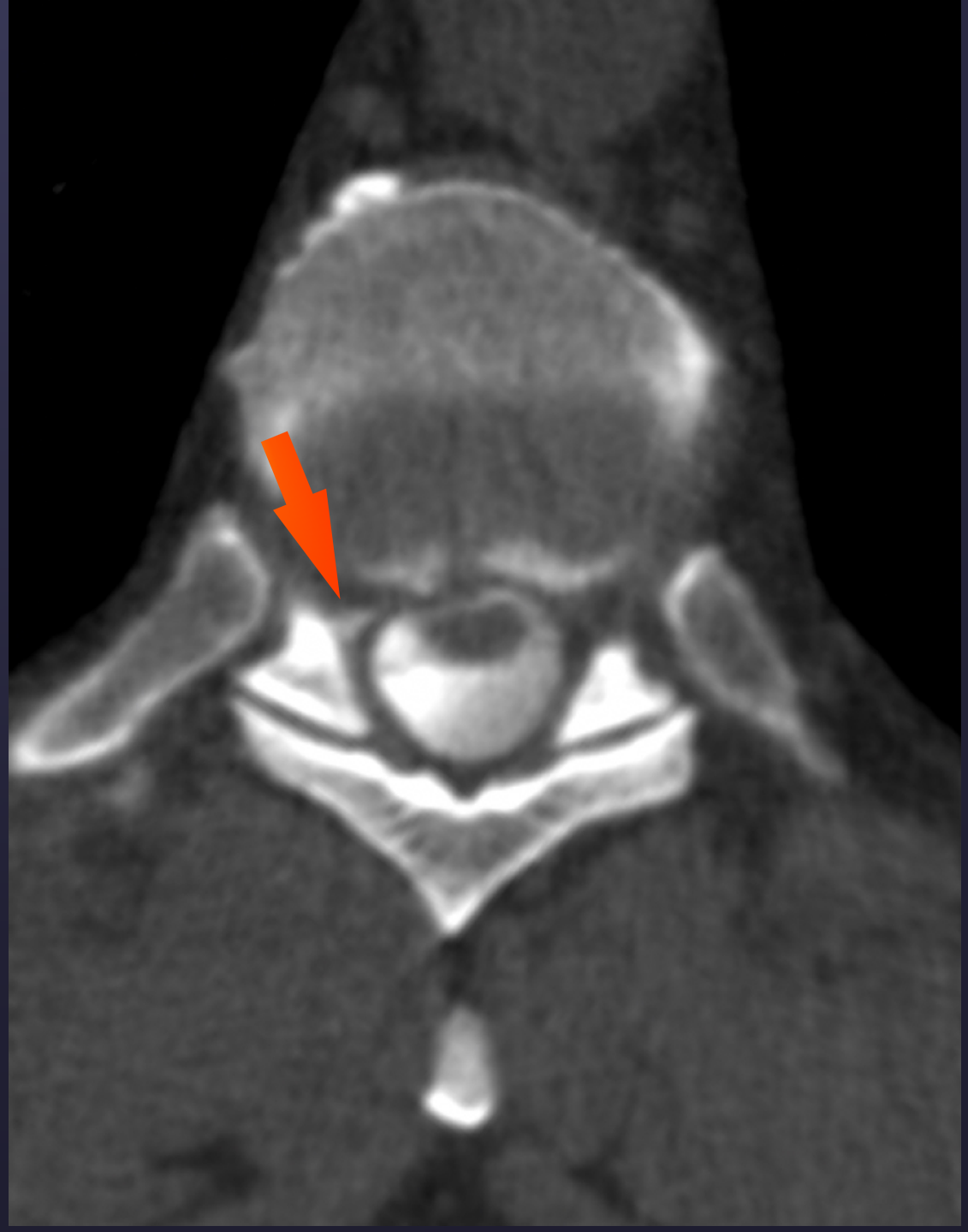

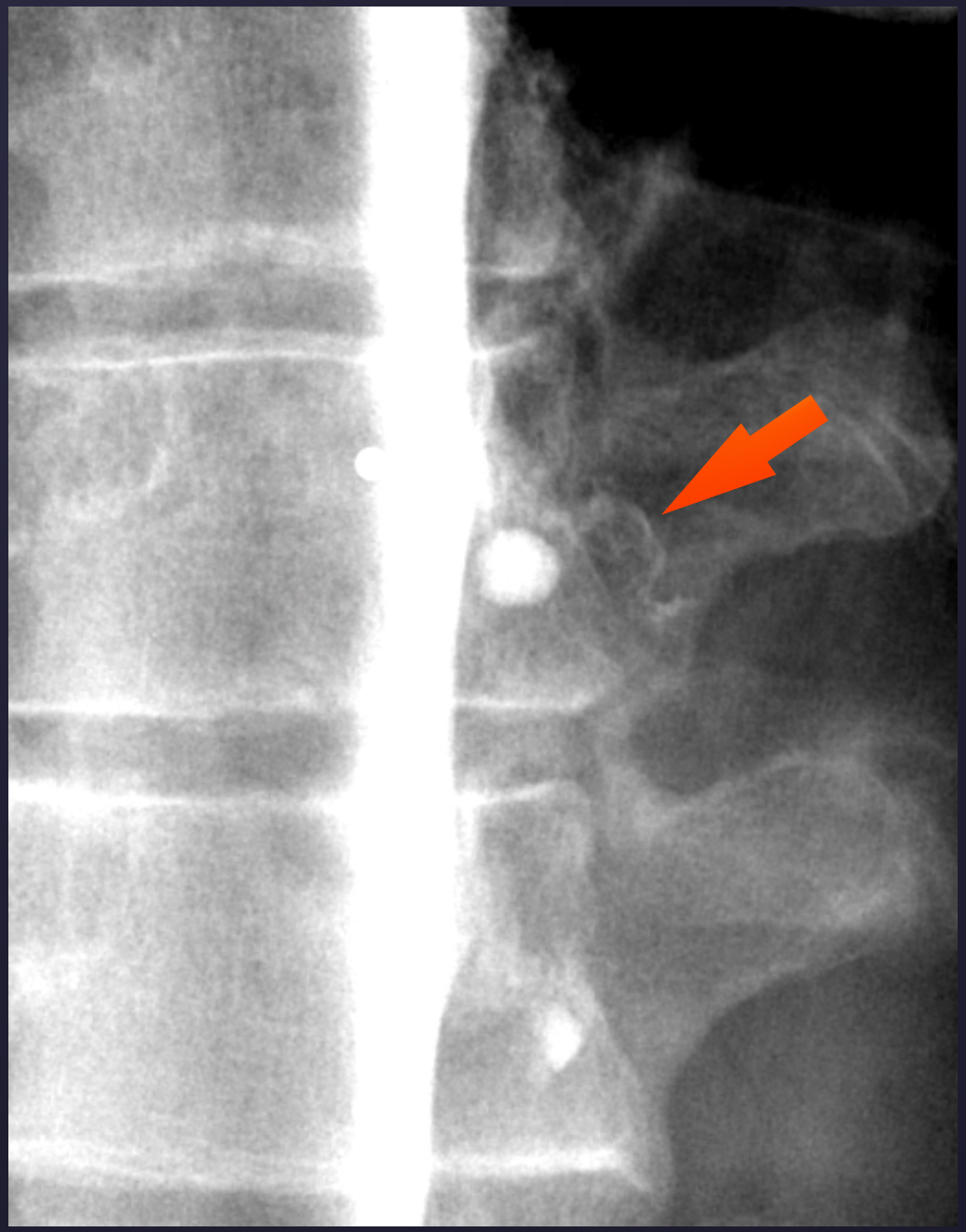

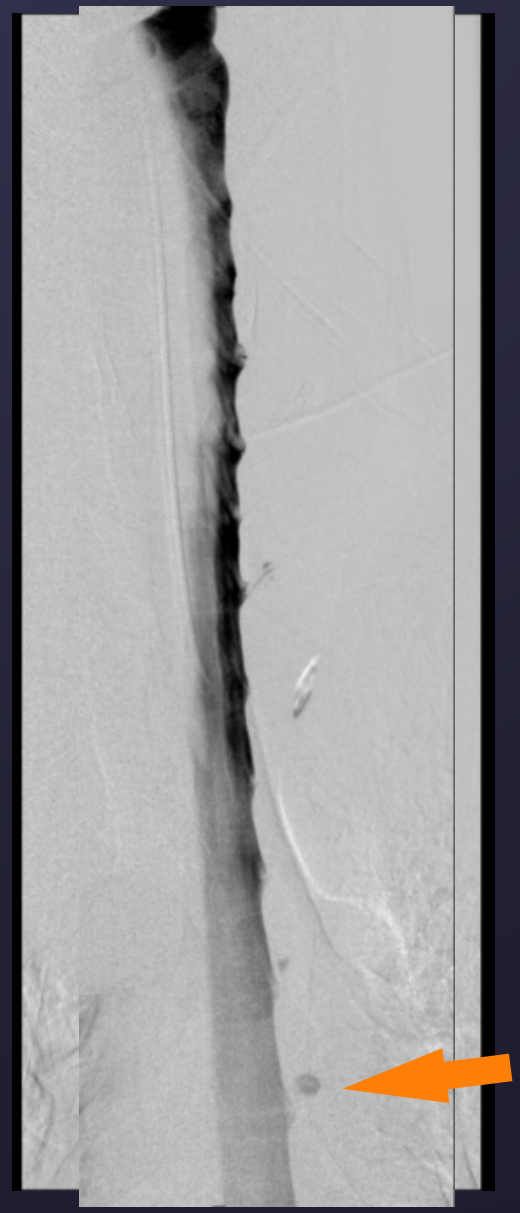

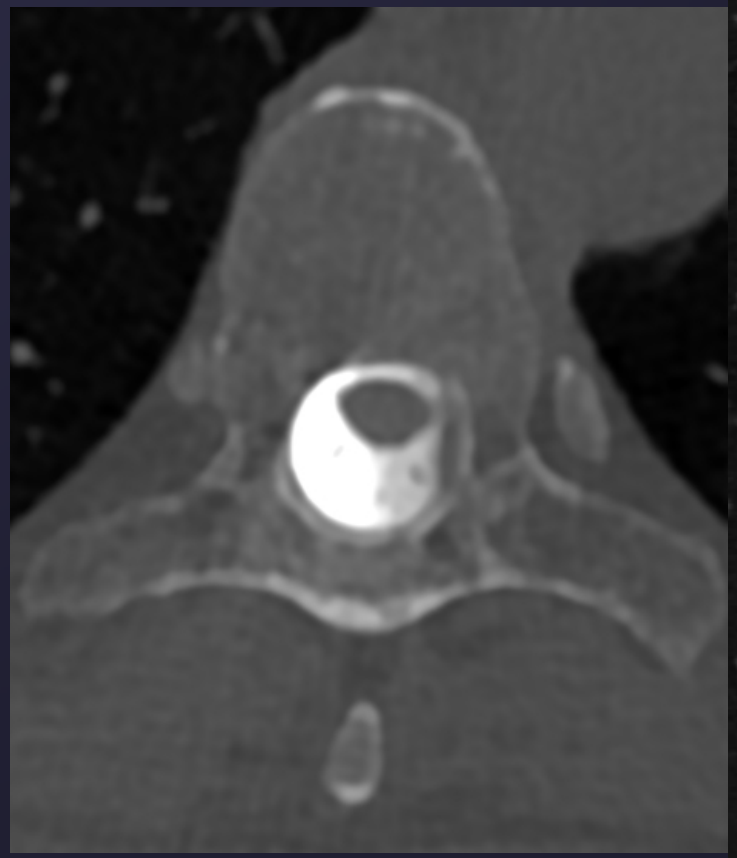

WHY CTM FOR CVF?

Original Article

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Incremental diagnostic yield and clinical outcomes of lateral decubitus CT myelogram immediately following negative lateral decubitus digital subtraction myelogram

Darya P Shlapak[1], Ian T Mark[1], Dong Kun Kim[1], John C Benson[1], Felix E Diehn[1], Narayan R Kissoon[2,3], Greta B Liebo[1], Ajay A Madhavan[1], Jonathan M Morris[1], Pearse P Morris[1], Michael P Oien[1], Jared T Verdoorn[1] and Carrie M Carr[1]

Abstract

Introduction: Spontaneous intracranial hypotension (SIH) caused by a spinal cerebrospinal fluid (CSF) leak classically presents with orthostatic headache. Digital subtraction myelography (DSM) has a well-established diagnostic yield in the absence of extradural spinal collection. At our institution, DSM is followed by lateral decubitus CT myelogram (LDCTM) in the same decubitus position to increase diagnostic yield of the combined study. We evaluated the incremental diagnostic yield of LDCTM following negative DSM and reviewed patient outcomes.

Methods: Retrospective review of consecutive DSMs with subsequent LDCTM from April 2019 to March 2021 was performed. Combined reports were reviewed, and studies with positive DSMs were excluded. Of the exams with negative DSM, only studies with LDCTM reports identifying potential leak site were included. Interventions and follow-up clinical notes were reviewed to assess symptoms improvement following treatment.

Results: Of the 83 patients with negative DSMs, 11 (13.2%) had positive leak findings on LDCTMs, and 21 (25.3%) were equivocal. Of 11 positive LDCTMs, 6 leaks were nerve sheath tears (NSTs) and 5 were CSF-venous fistulas (CVFs). 10/11 (90.9%) had intervention and follow-up, with 9/10 (90%) having positive clinical outcome. Of the 21 equivocal LDCTM patients (19 CVFs and 2 NSTs), 15 (71.4%) had interventions and follow-up, with 3/15 (20.0%) with positive clinical outcomes.

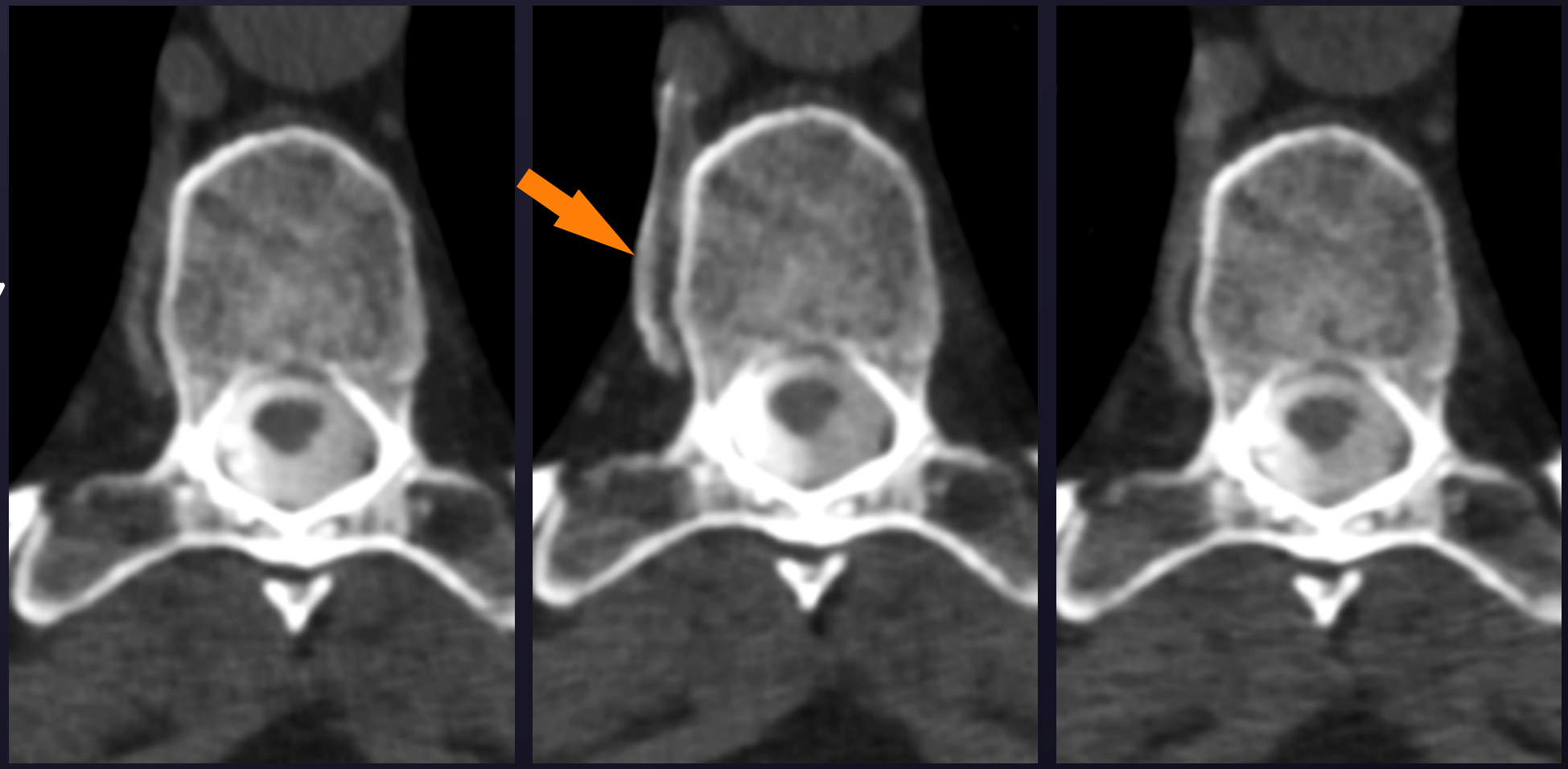
Conclusion: LDCTM following negative DSM has an incremental diagnostic yield up to 38.6%, with up to 14.5% of positive patient outcomes following treatment. LDCTM should be considered after DSM to maximize diagnostic yield of the combined exam.

CONSIDER POST-DSM CT IF NEGATIVE

39% ADDITIONAL INCREMENTAL DIAGNOSTIC YIELD

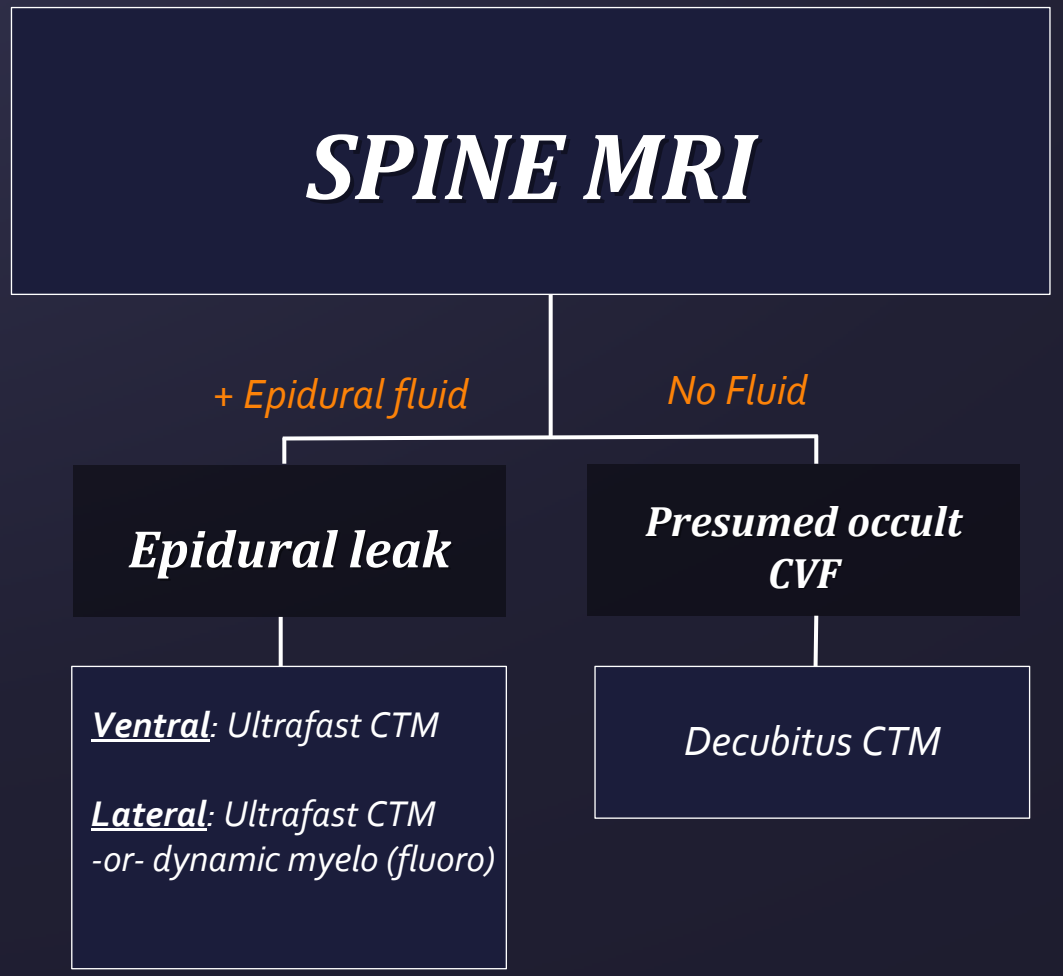
WHY CTM FOR CVF?

Respiratory phases



Max Inspir ***Resist Inspir*** ***Valsalva***

MY ALGORITHM (CT-BASED PRACTICE)



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