

Drug Eluting Beads Chemoembolization: My top 5 Technical Pearls

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Chief of Interventional Radiology
Vice Chair for faculty Affairs



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Disclosures

Consultant: Abbott Vascular, Baxter Healthcare Corporation, Bard Peripheral Vascular, Boston Scientific, W.L. Gore, Sirtex Medical, Guerbet, Eisai Medical, Trisalus, Astra Zeneca.

Grants: Bard Peripheral Vascular, Boston Scientific, Sirtex Medical.



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Objectives

- Optimizing DEB-TACE Technique
- Top 5 technical pearls

Trans-Arterial Chemoembolization

[\[May hepatic artery embolization replace surgical desarterialization in 6195. hepatic tumors?\]](#)

Regensberg C, Richard JP, Doyon D, Frileux C.

Nouv Presse Med. 1973 Jun 23;2(25):1717-8. French. No abstract available.

PMID: 4718543 [PubMed - indexed for MEDLINE]

**Modifications and advancement of this treatment
has evolved over the years**



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Technical Considerations

- Top 5 technical pearls to improve the outcomes:
 - Use of segmental or sub-segmental approach
 - Use of small and shaped microcatheters
 - Use of Cone Beam CT (CBCT)
 - Addressing extrahepatic supply to the tumor
 - Use of small drug-eluting beads size

Lencioni R, et al. Cardiovasc Intervent Radiol 2012; 35:980-985

De Baere T, et al. Cardiovasc Intervent Radiol 2016; 39:334-1210

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Gaba et al, Quality improvement guidelines for TACE in hepatic malignancy. JVIR 2018

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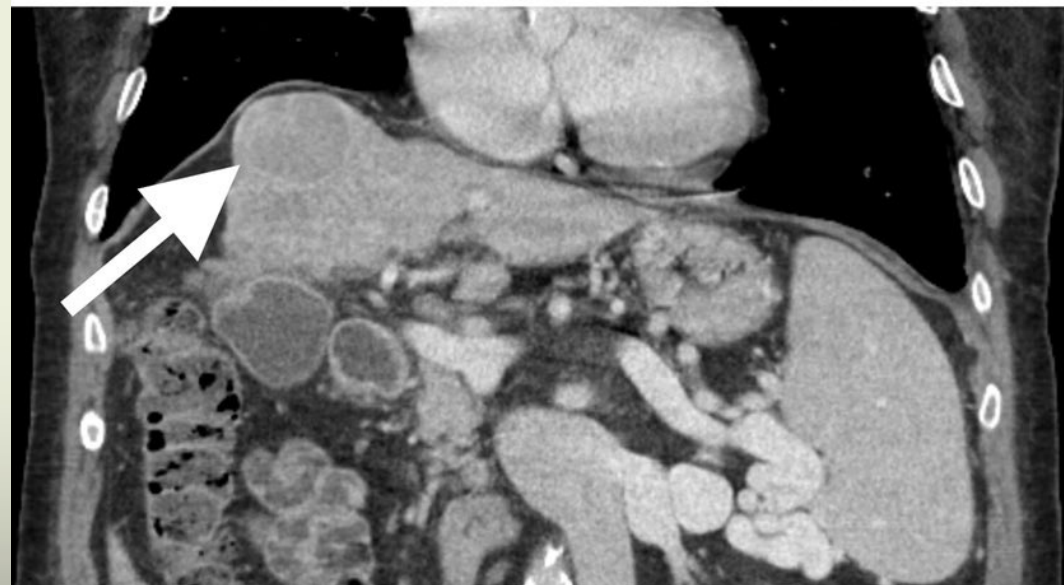
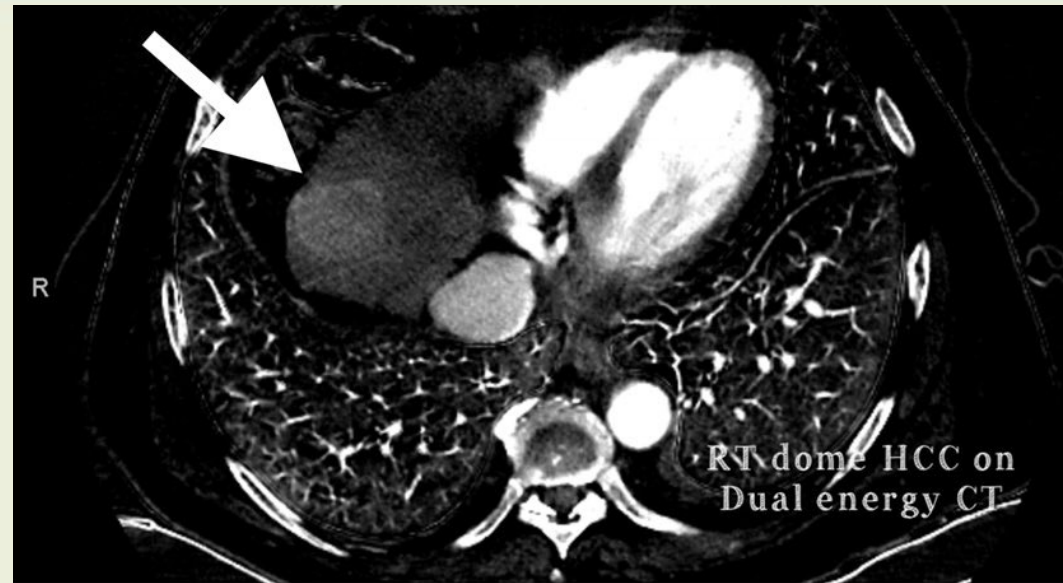
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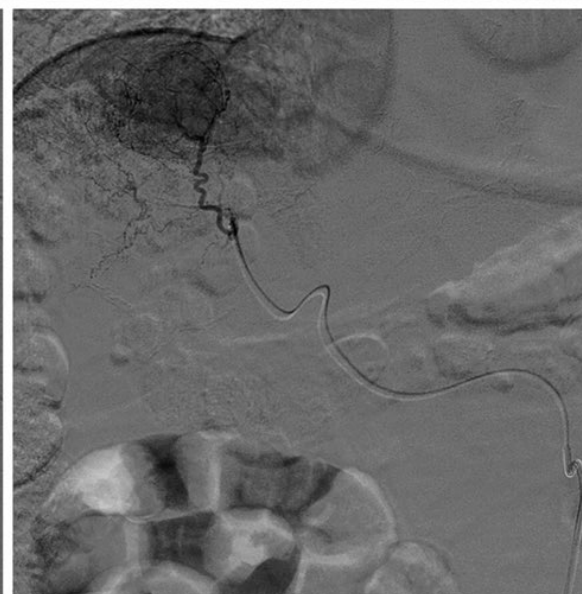
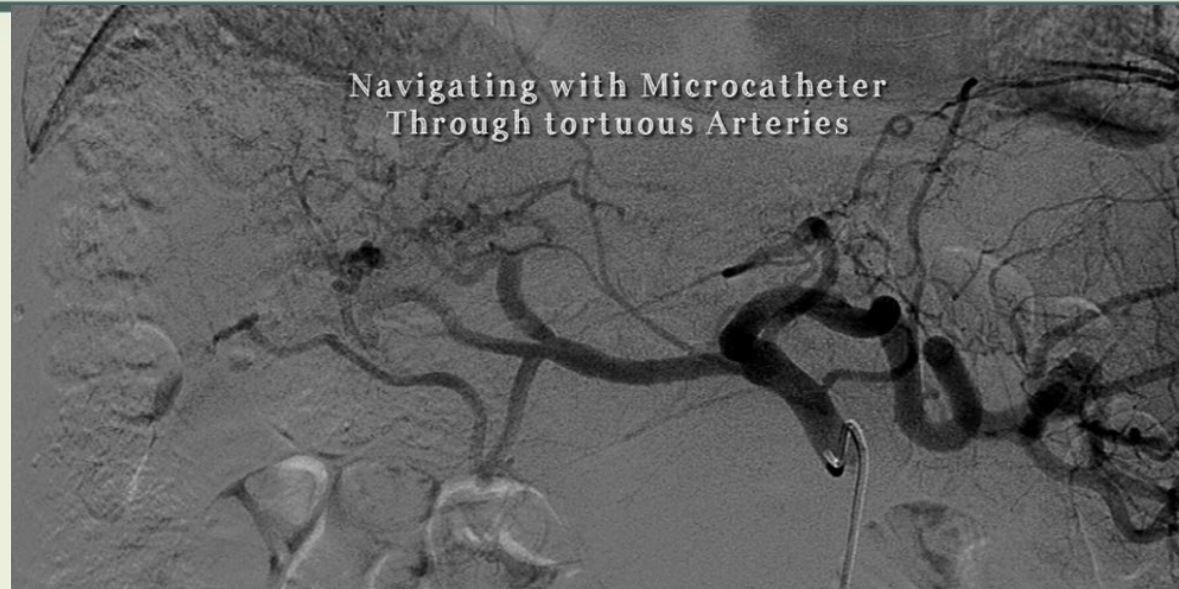
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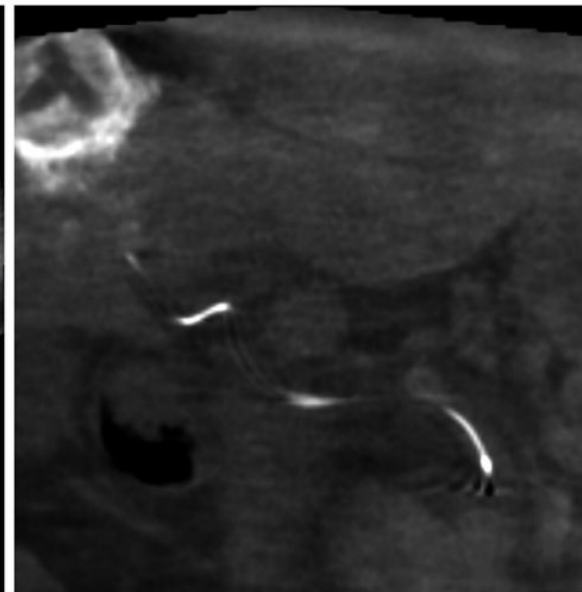
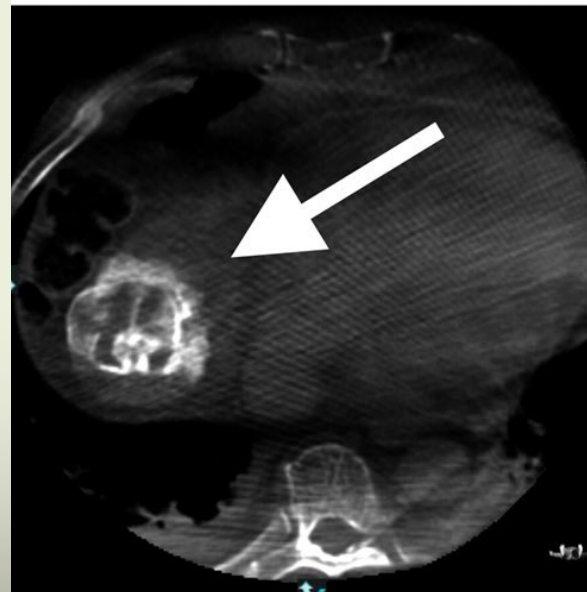
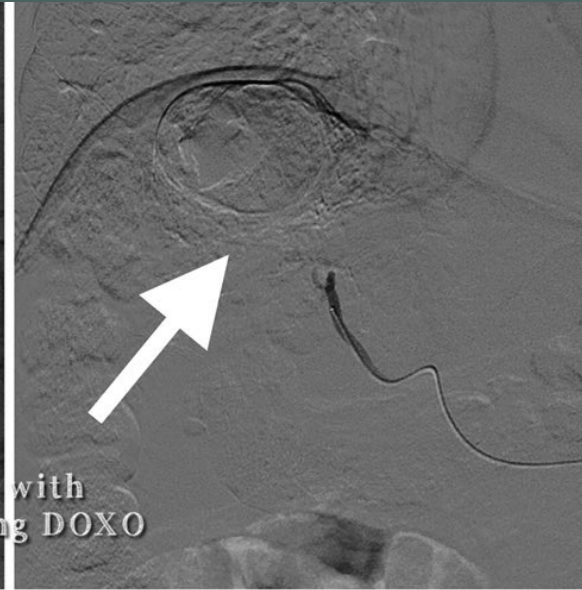
Segmental or sub-segmental approach



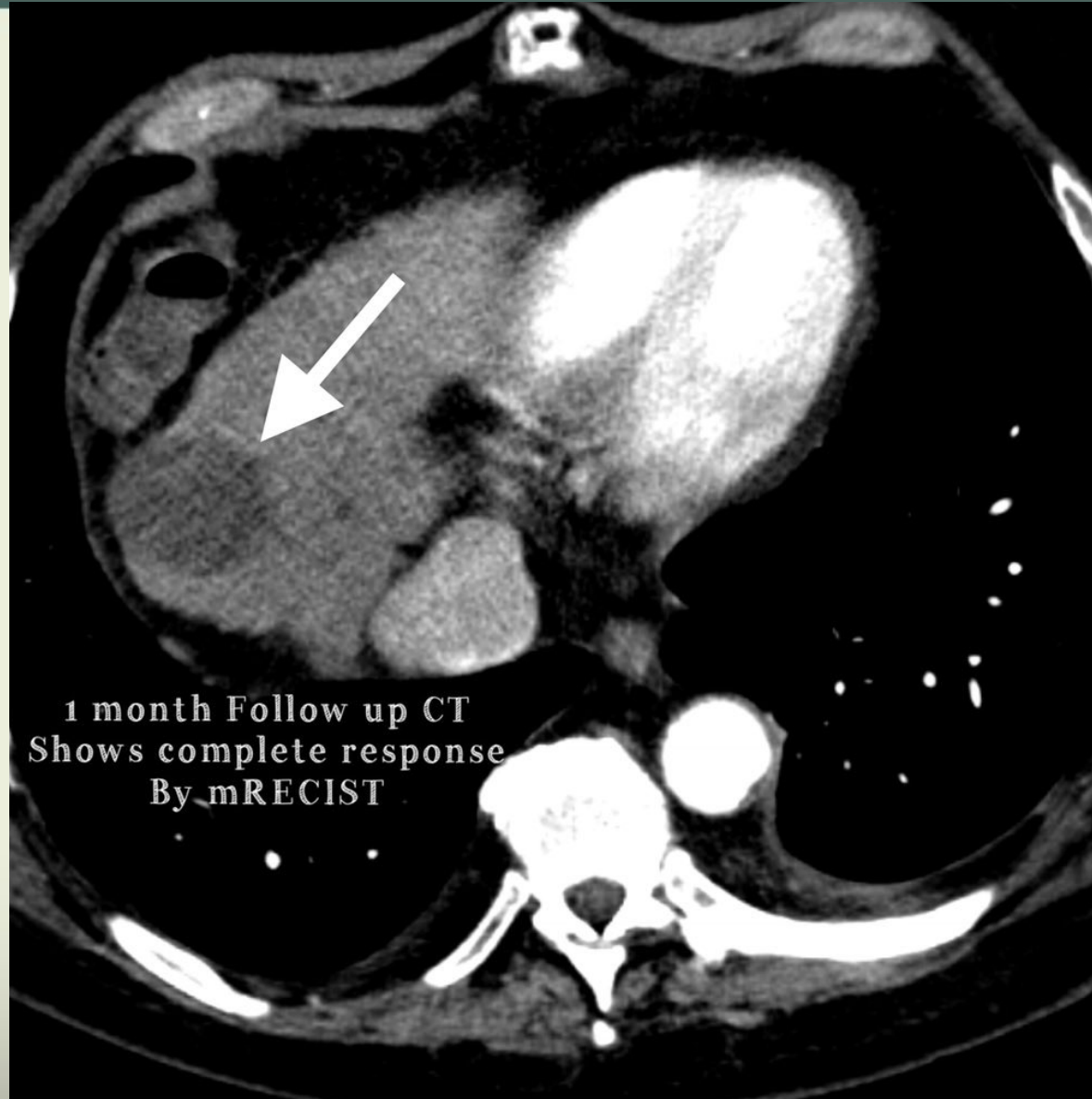
Segmental or sub-segmental approach



Technical considerations



Segmental or sub-segmental approach



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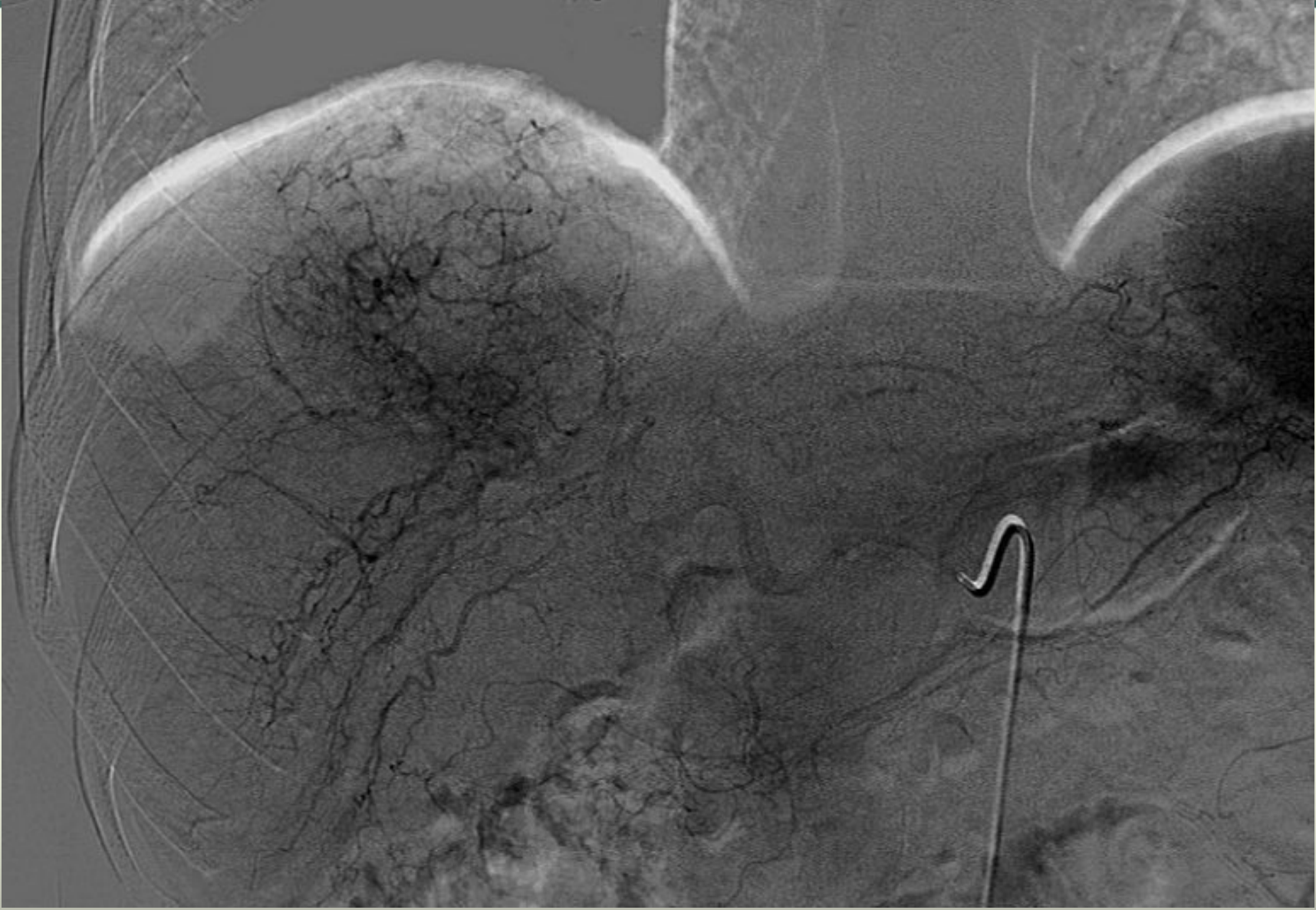
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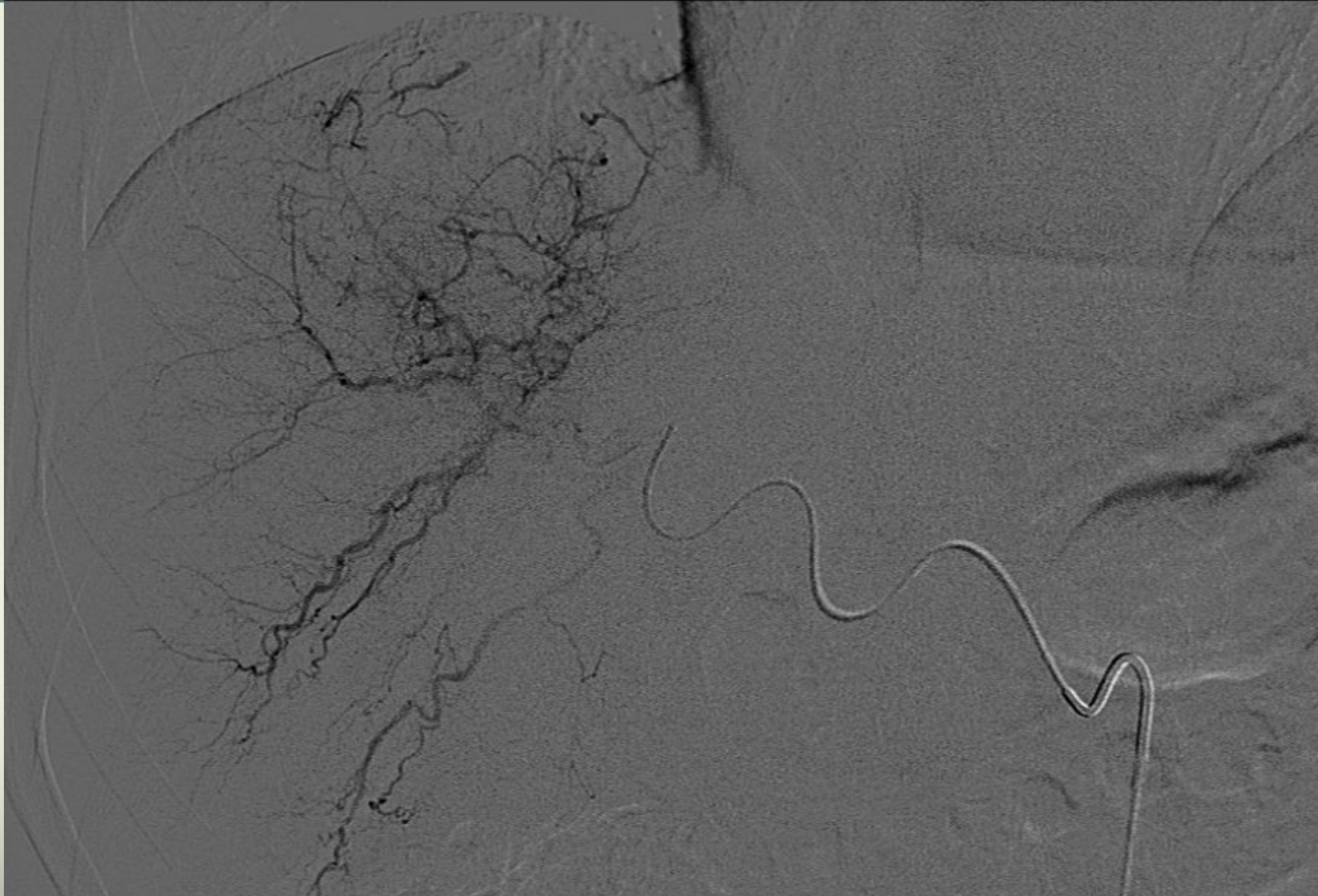
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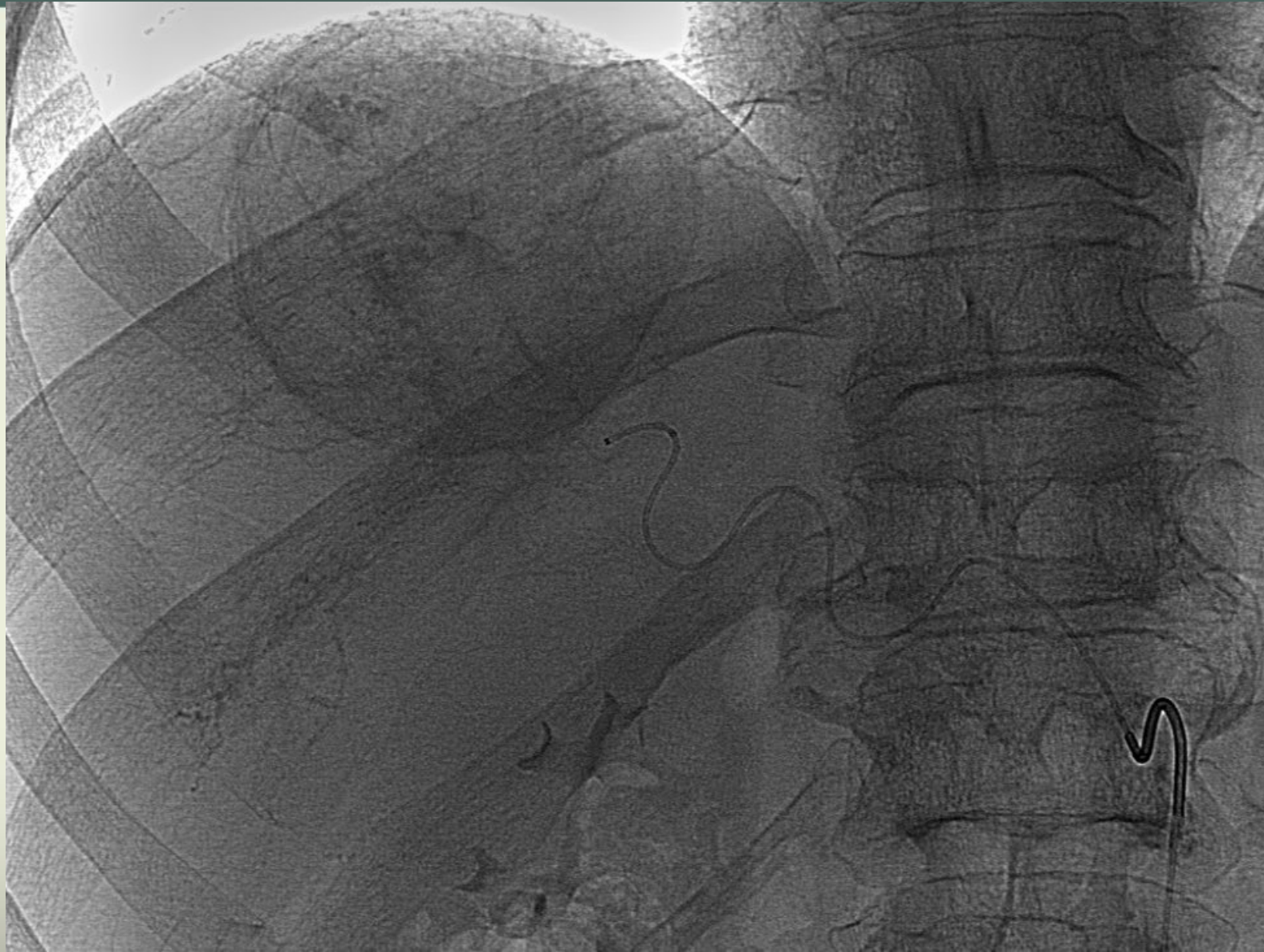
Small and shaped microcatheters



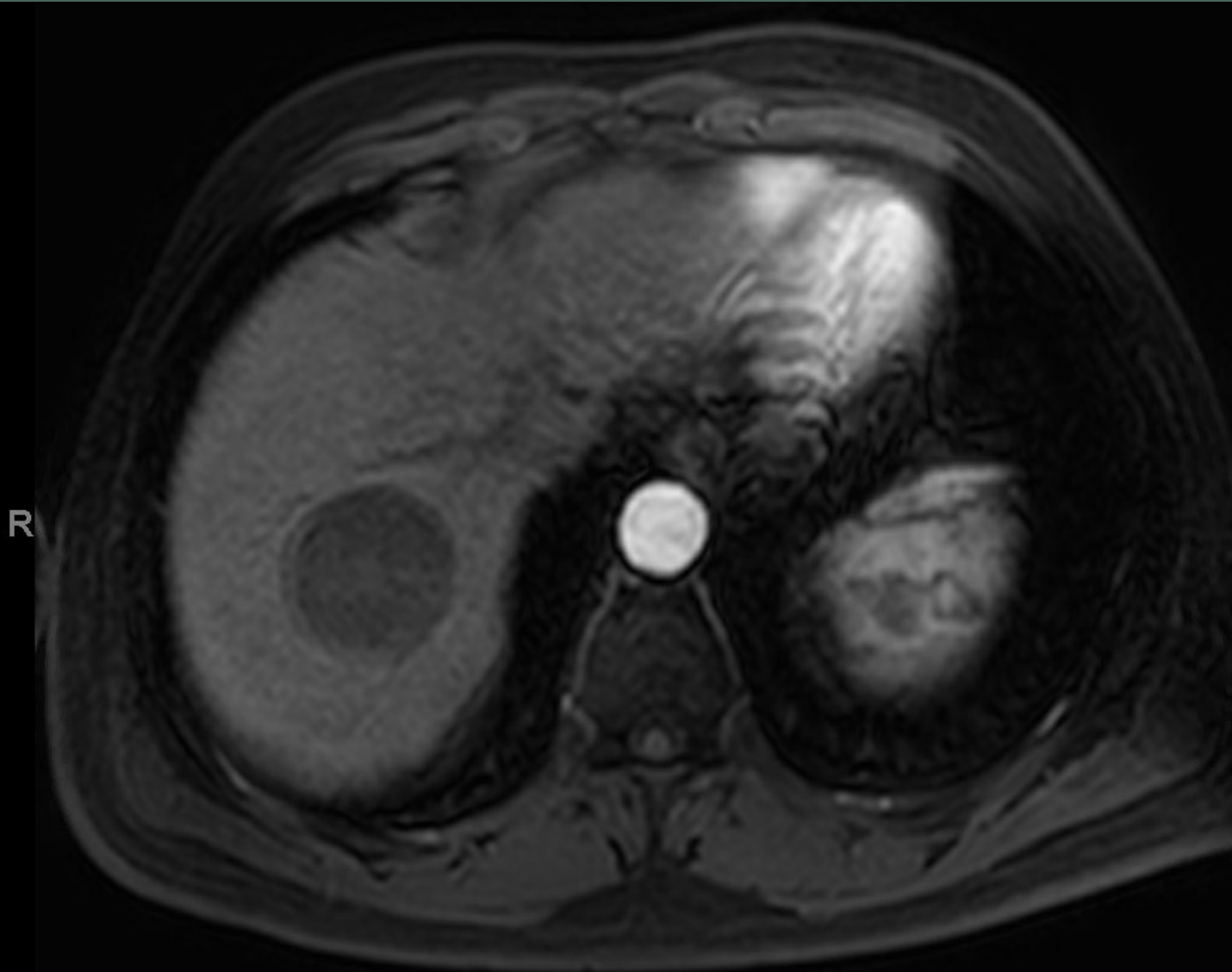
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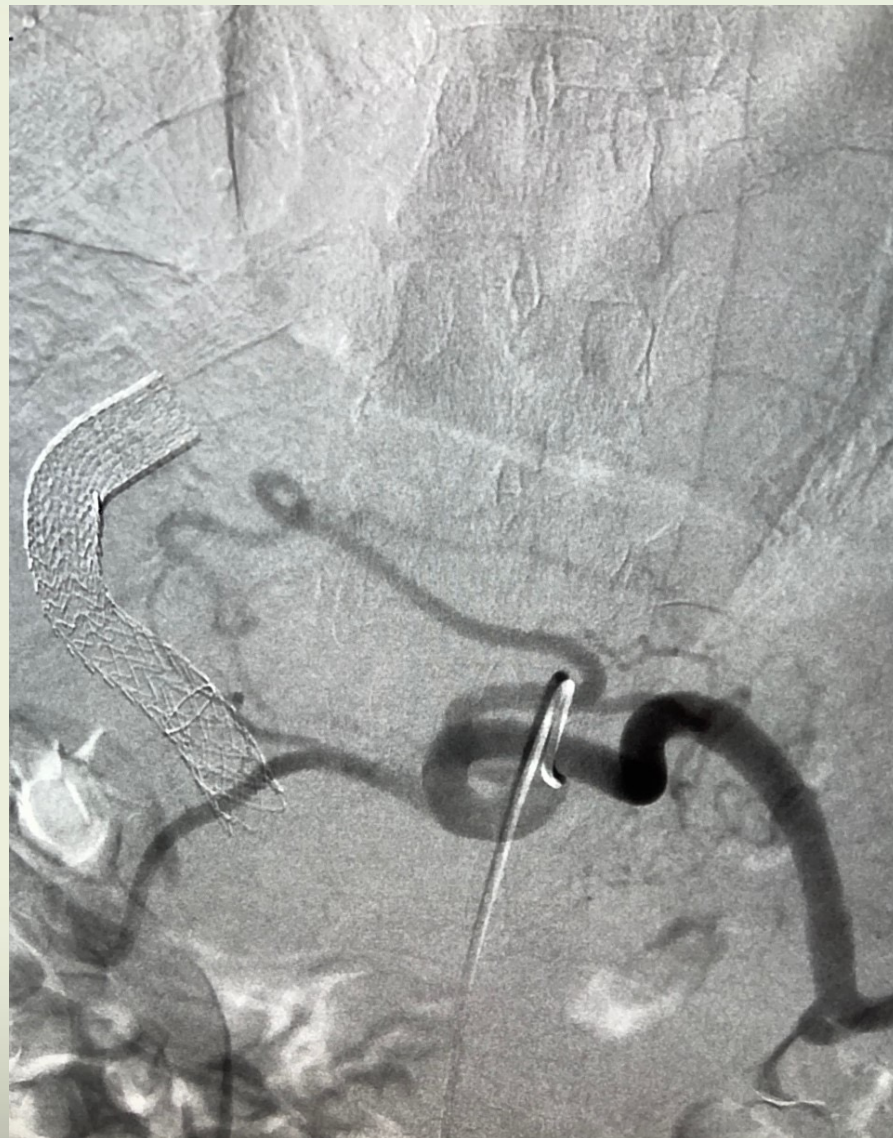
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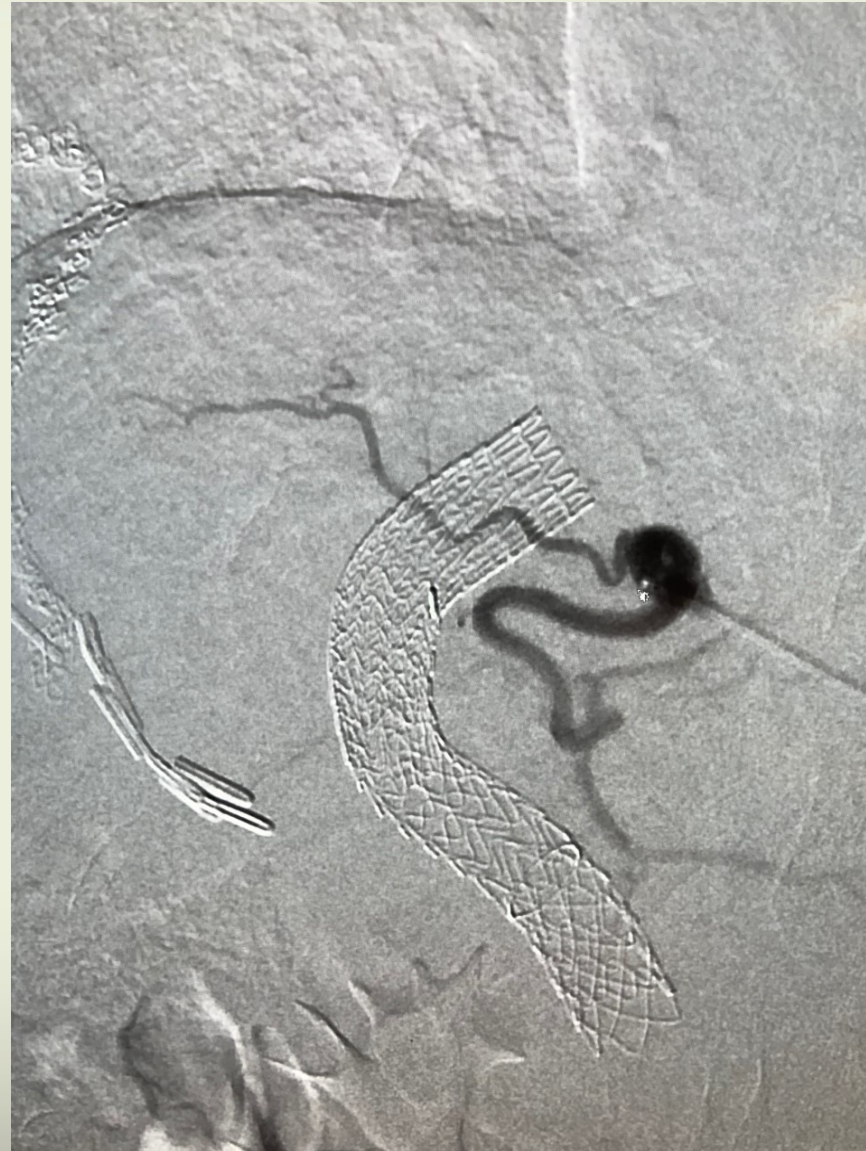
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Intraprocedural Cone-Beam CT

- Intraprocedural cone-beam CT:
 - Useful for visualization feeding arteries and enhancing tumor targeting during TACE
 - Assures complete therapy
 - Affects technique in more than 25% of patients

Virmani S, et al. J Vasc Interv Radiol 2007; 18:1305-1309

Wallace MJ, et al. J Vasc Interv Radiol 2007; 18:1500-1507

Iwazawa J, et al. AJR Am J Roentgenol 1221 2009; 192:1057-1063

Tognolini A, et al, J Vasc Interv Radiol 2010; 21:339-347



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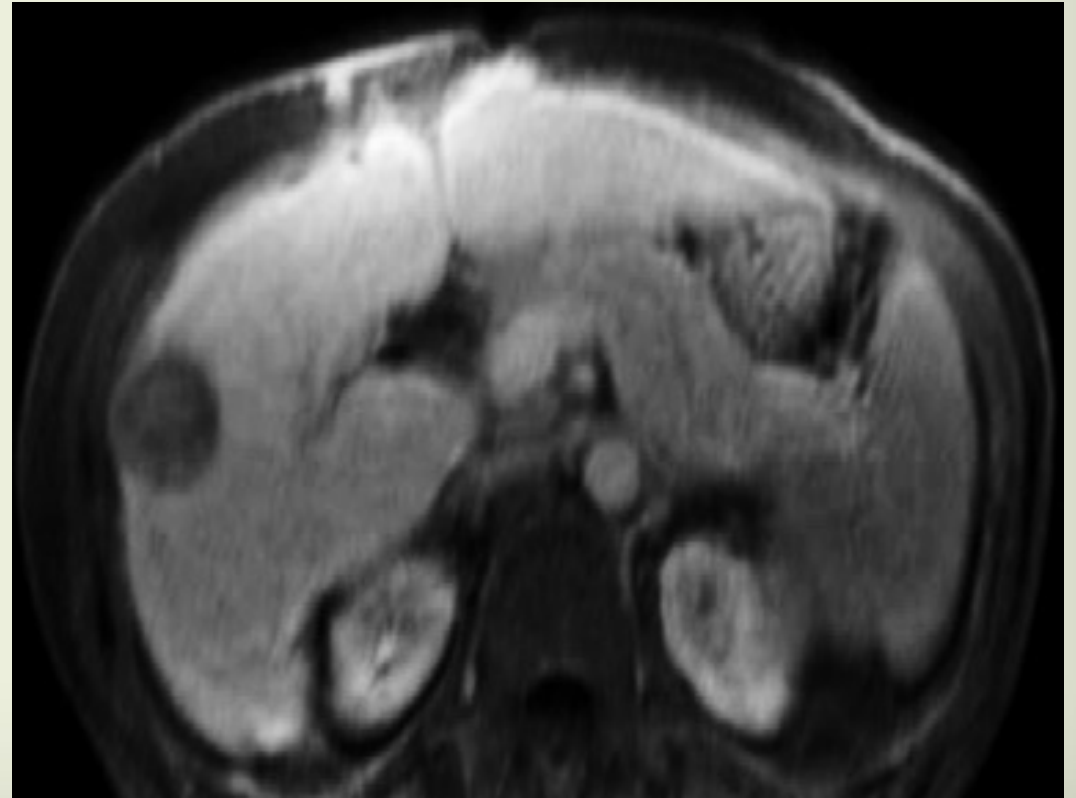
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Intraprocedural Cone-Beam CT

MRI arterial phase

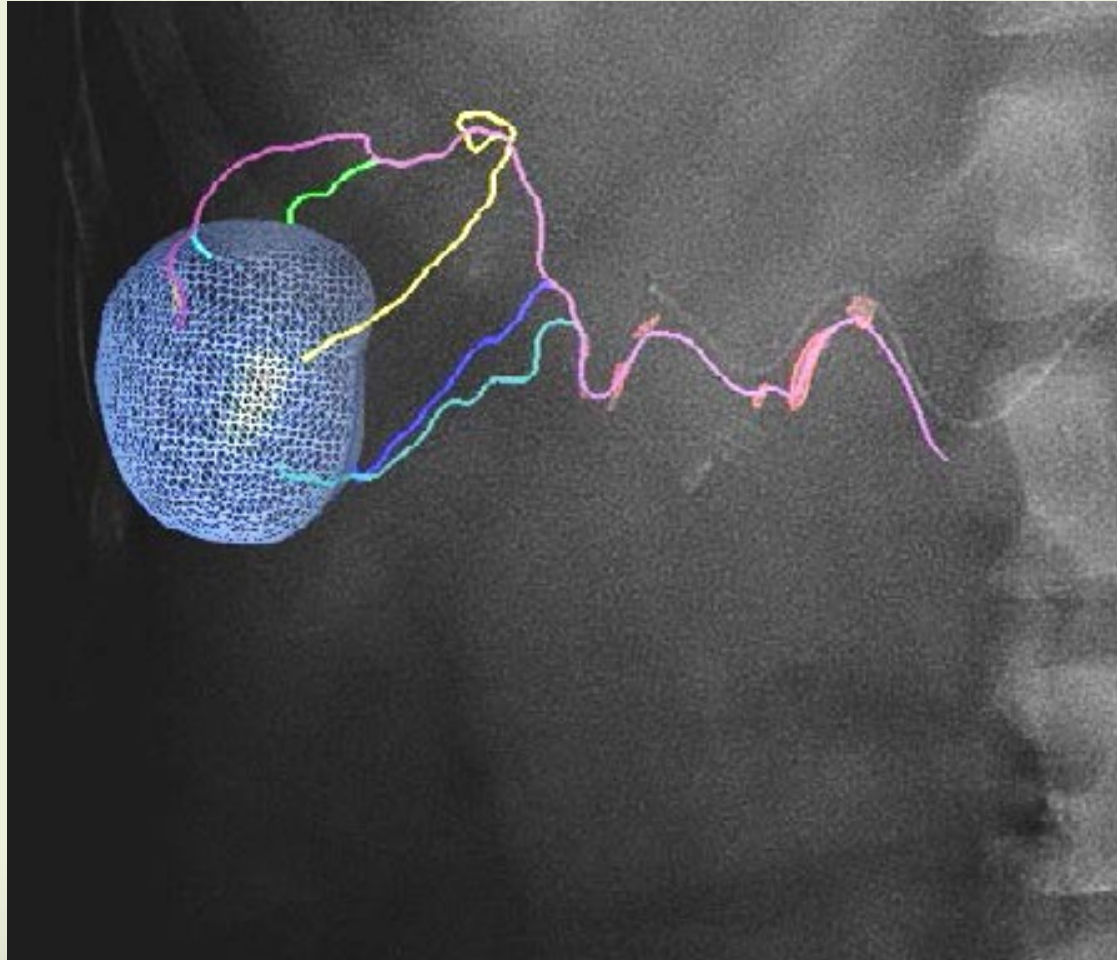


MRI venous phase



Intraprocedural Cone-Beam CT

EMBO-GUIDE



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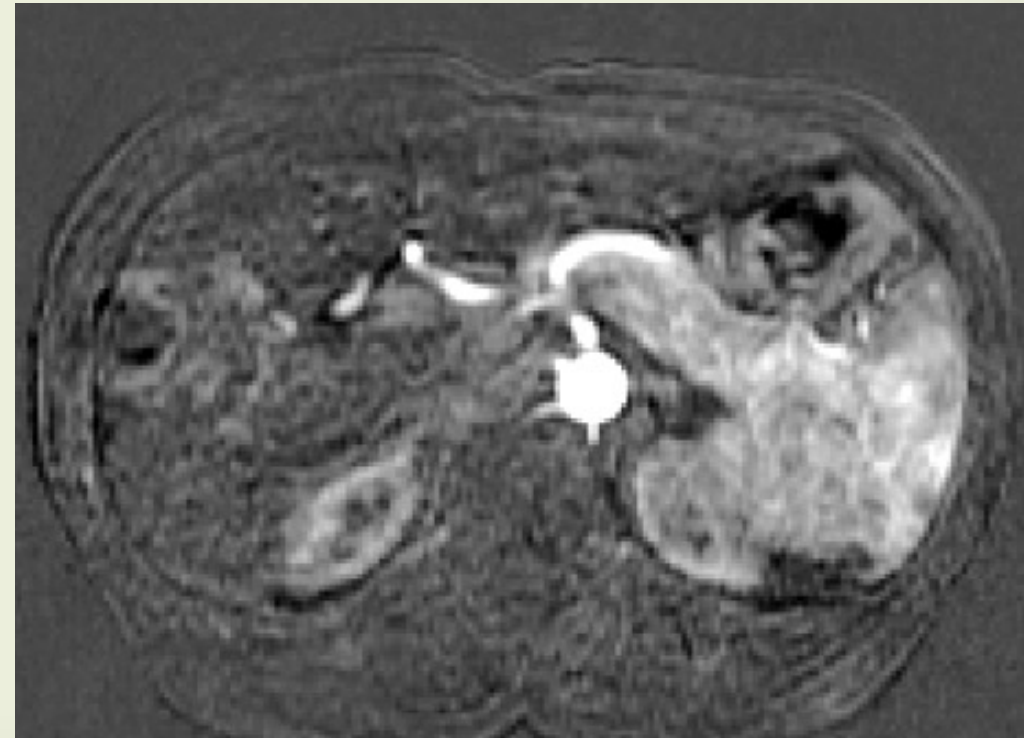
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Intraprocedural Cone-Beam CT

Follow-up CT



Follow-up MRI



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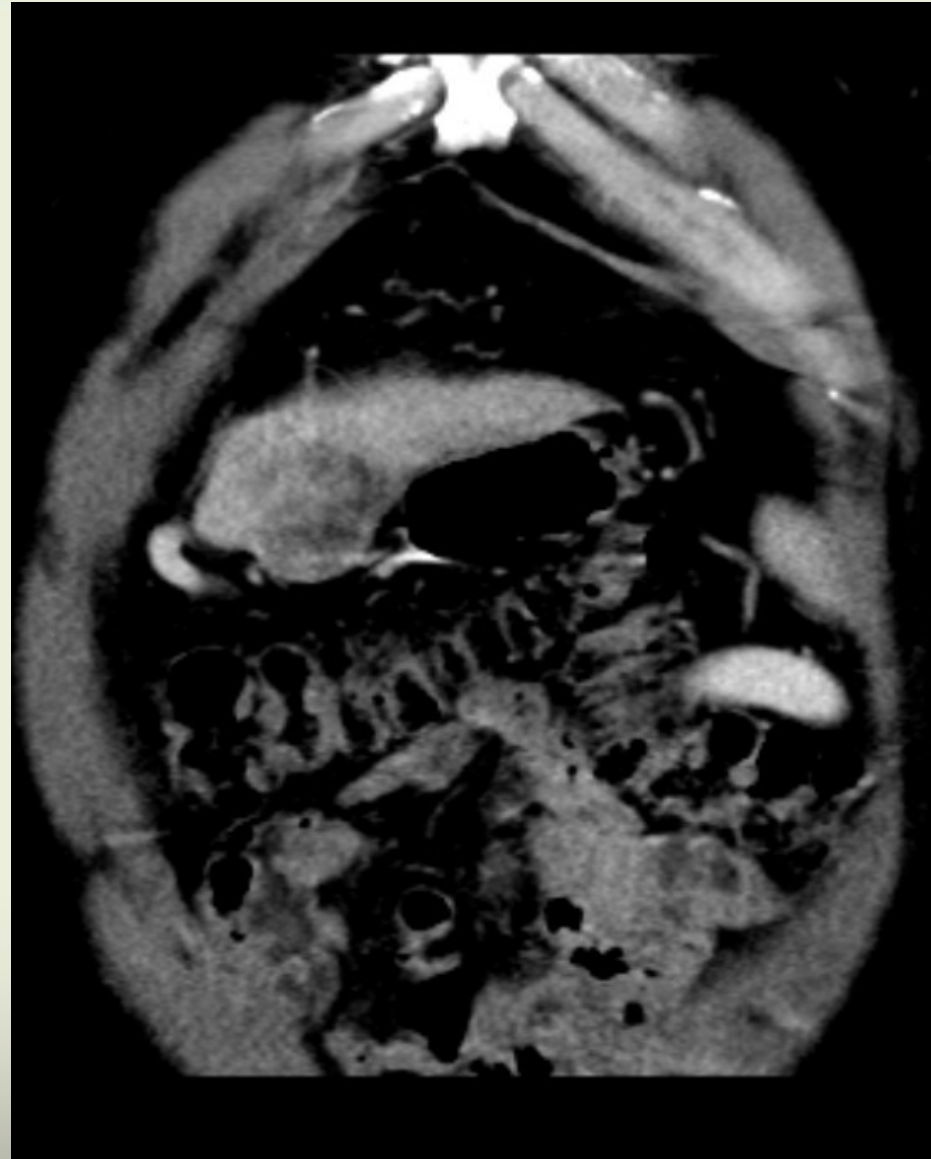
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Intraprocedural Cone-Beam CT



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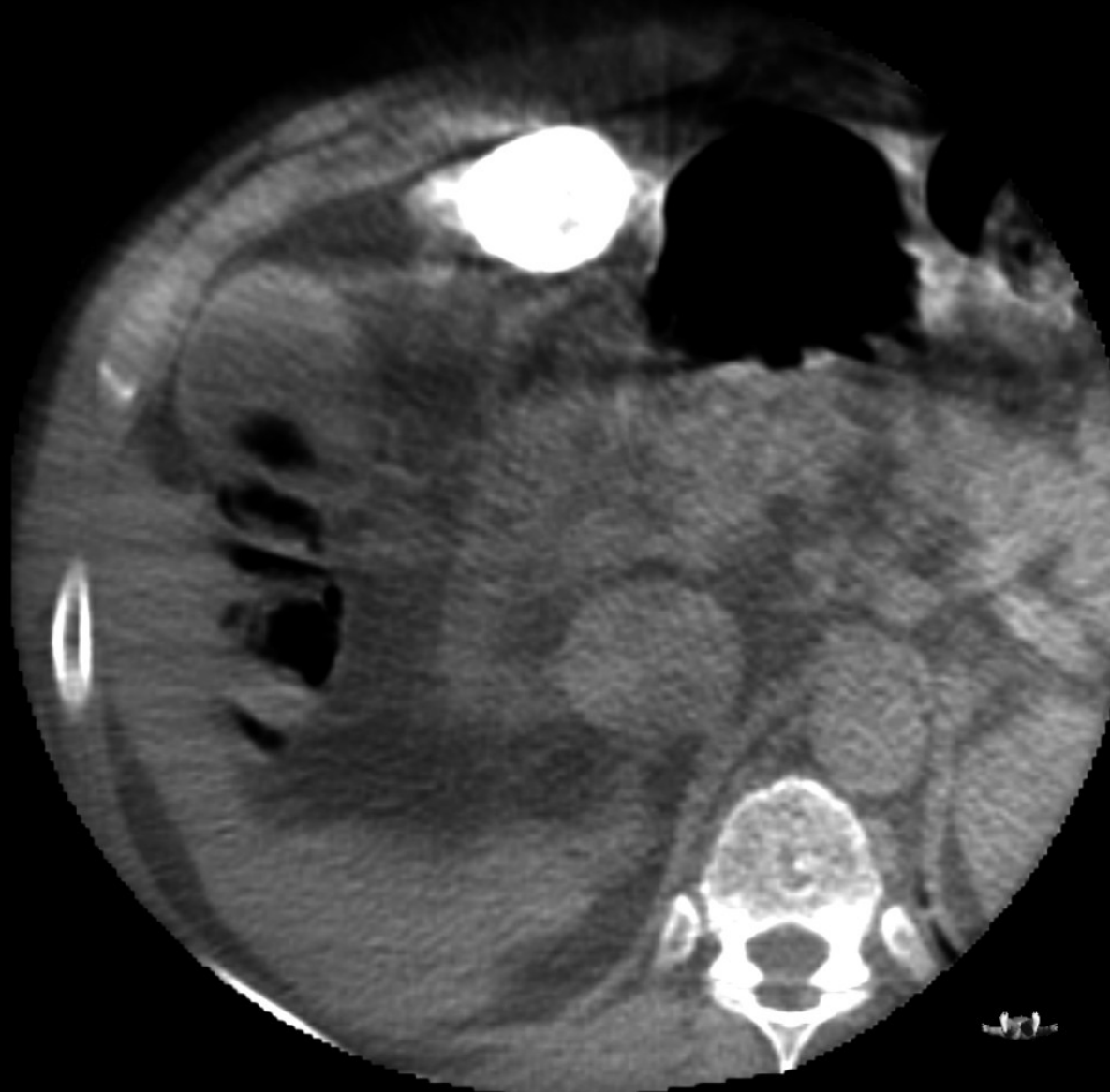
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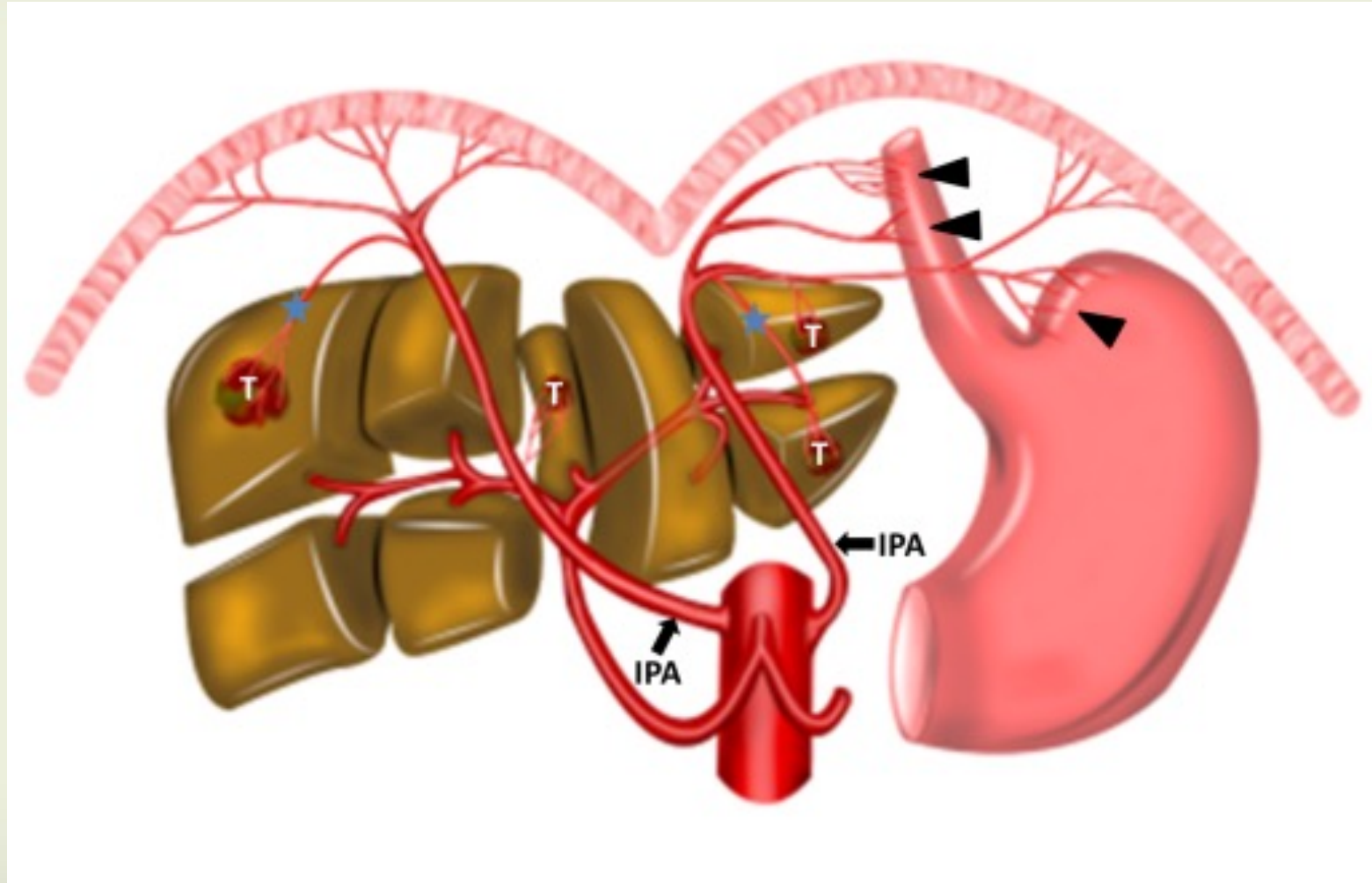
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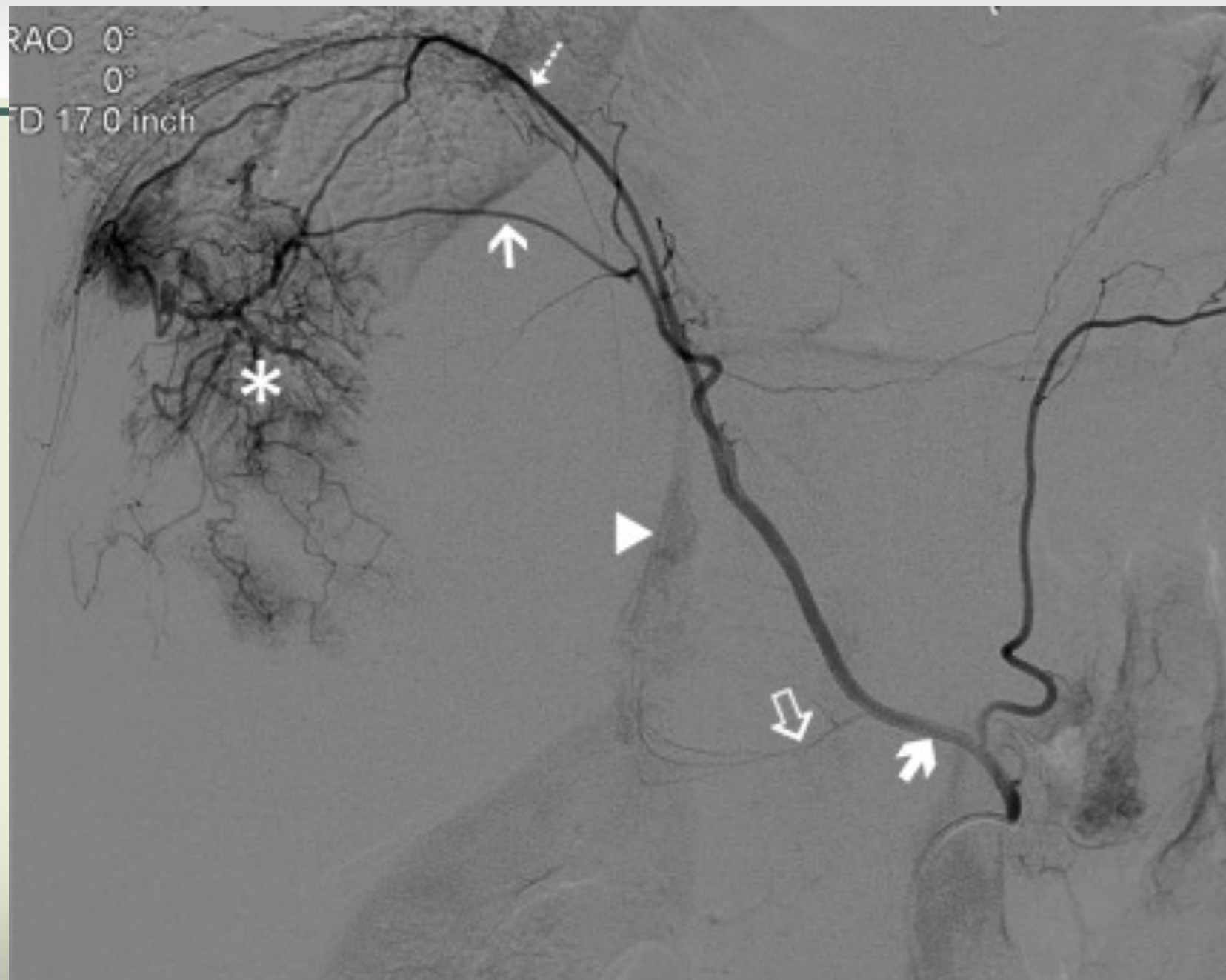
Extra Hepatic Collateral Supply

- Collateral pathways may develop before or after TACE
- This includes:
 - Inferior phrenic artery
 - Internal mammary artery
 - Intercostal artery
 - Right renal artery
 - Omental artery
 - Gastroduodenal artery
 - Cystic artery
 - Right colic artery
- These can be treated with clinical success

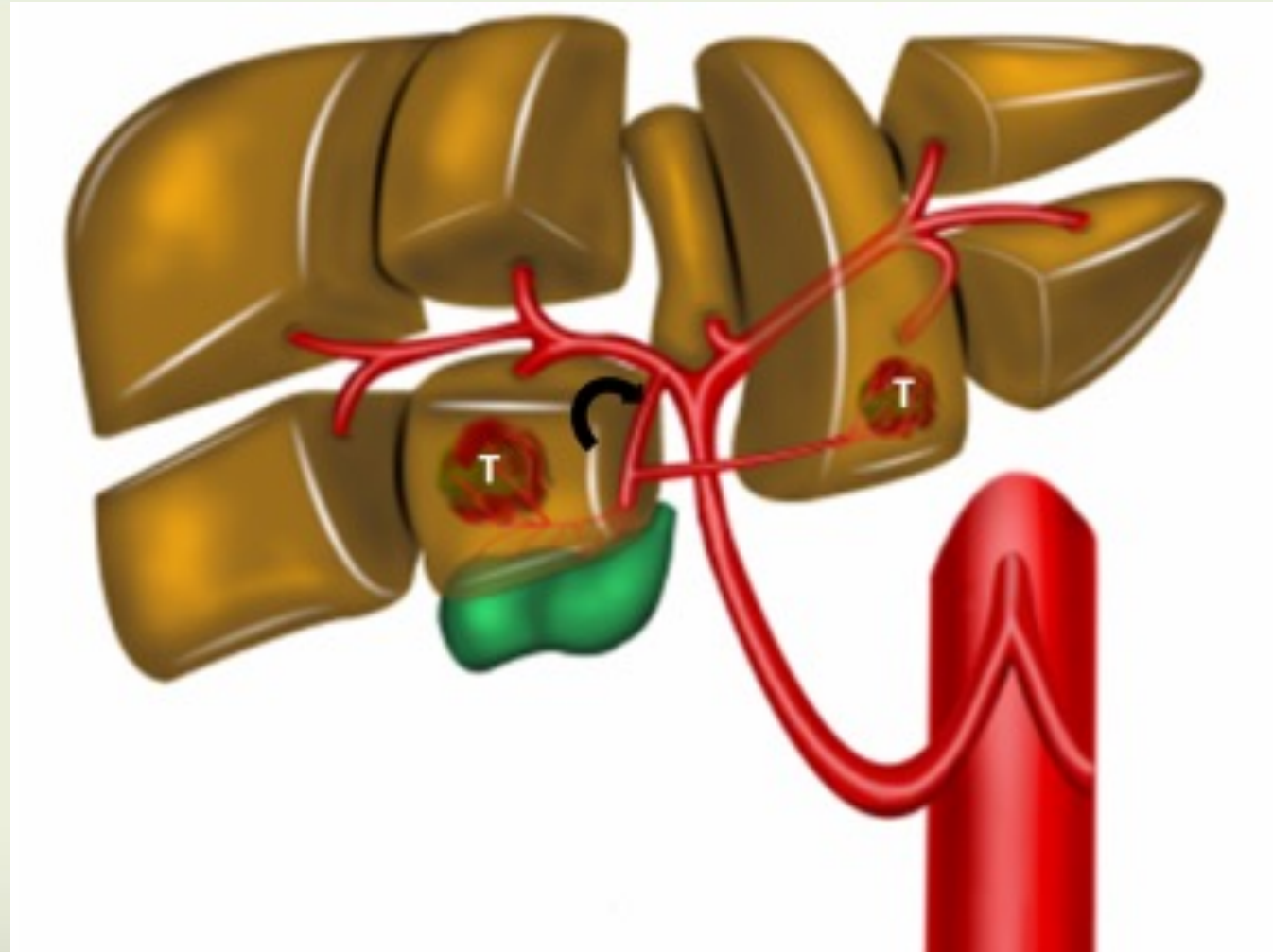
Right Inferior Phrenic Artery

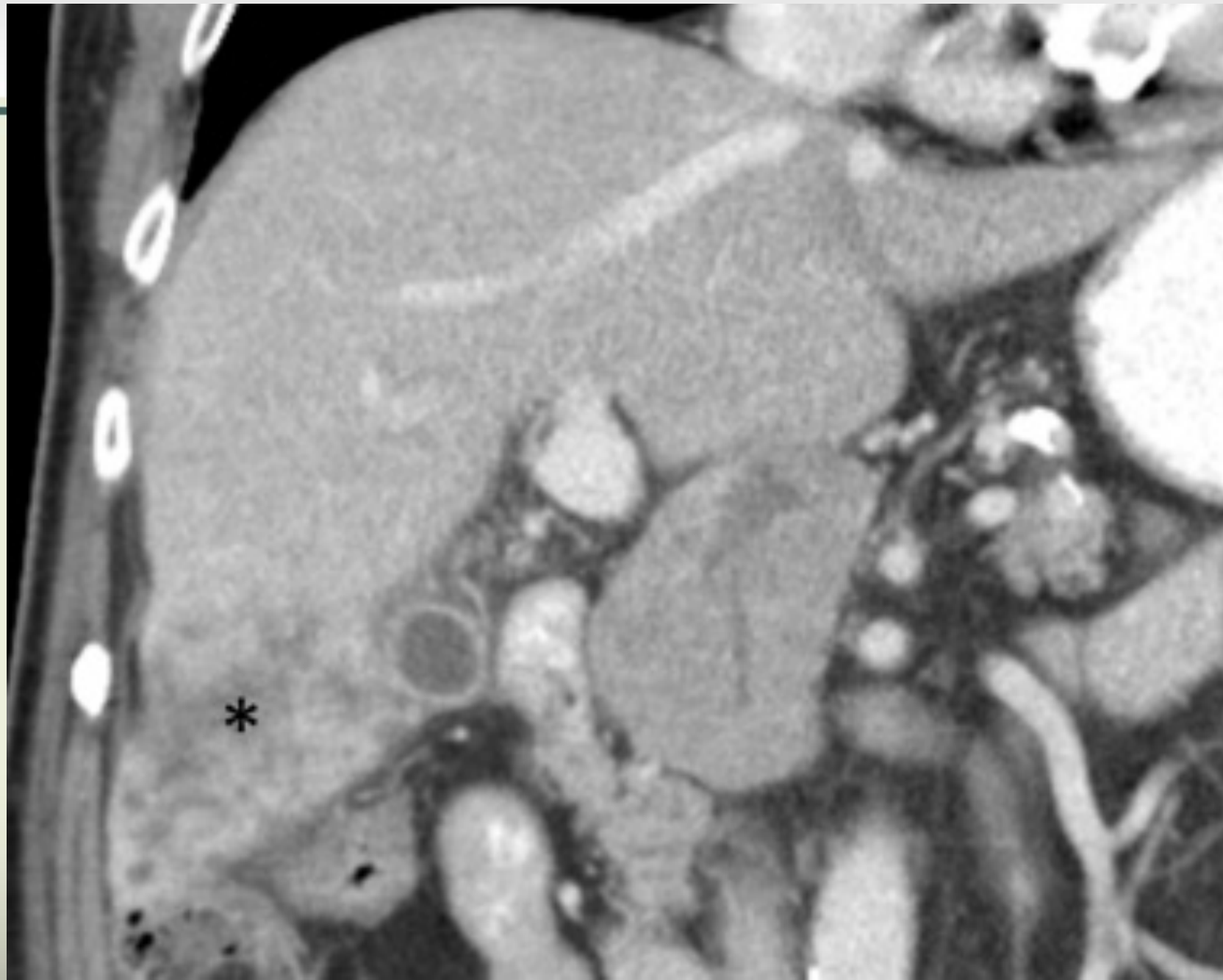




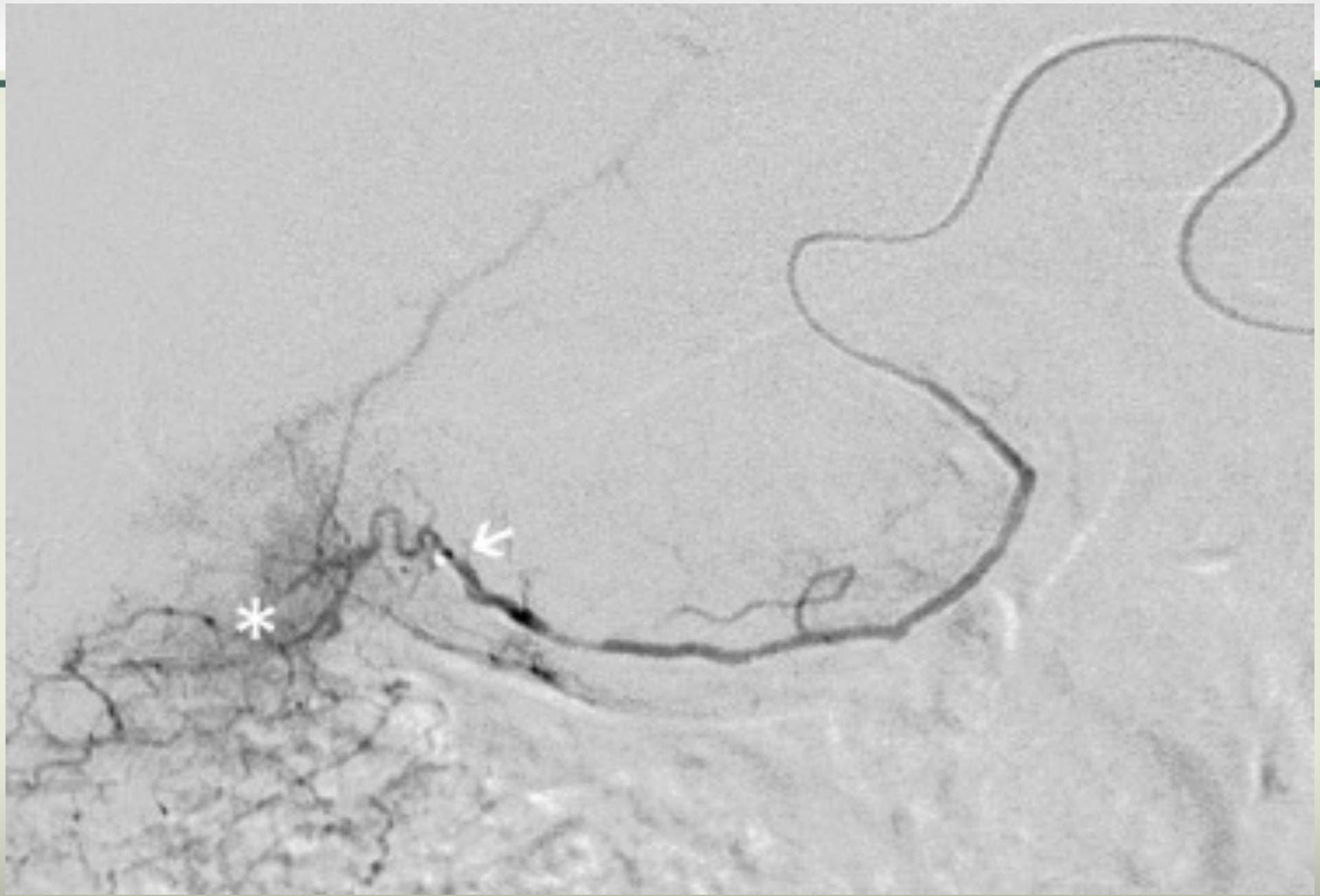


Cystic Artery







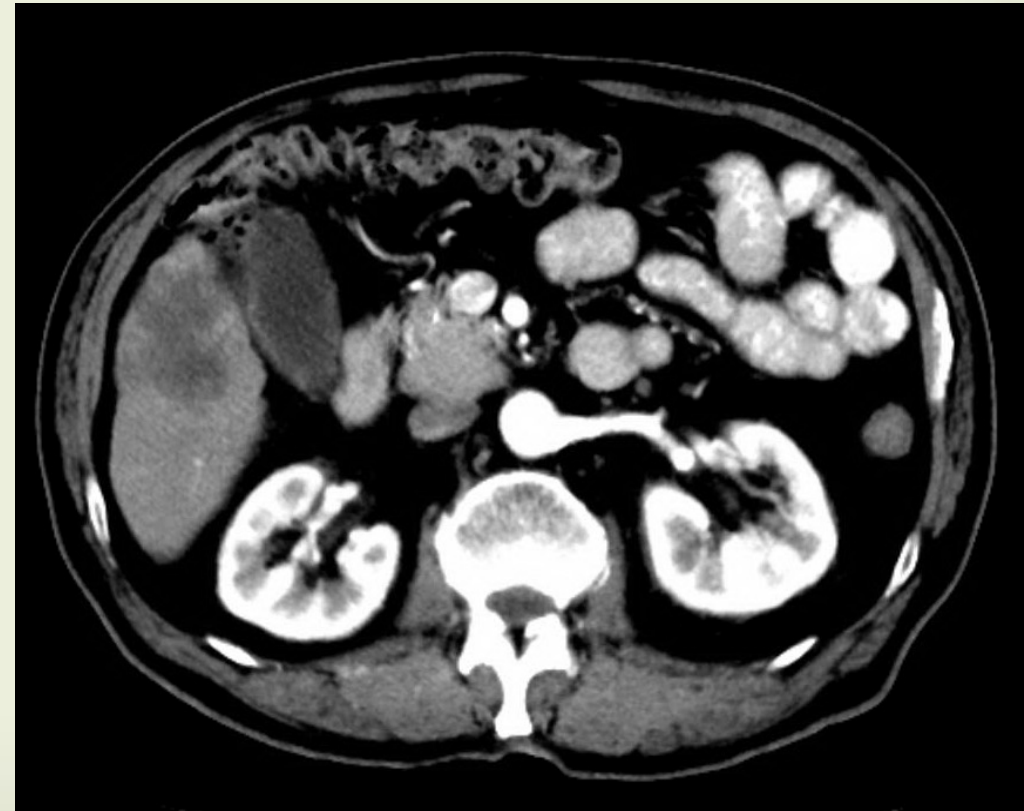


Cystic Artery

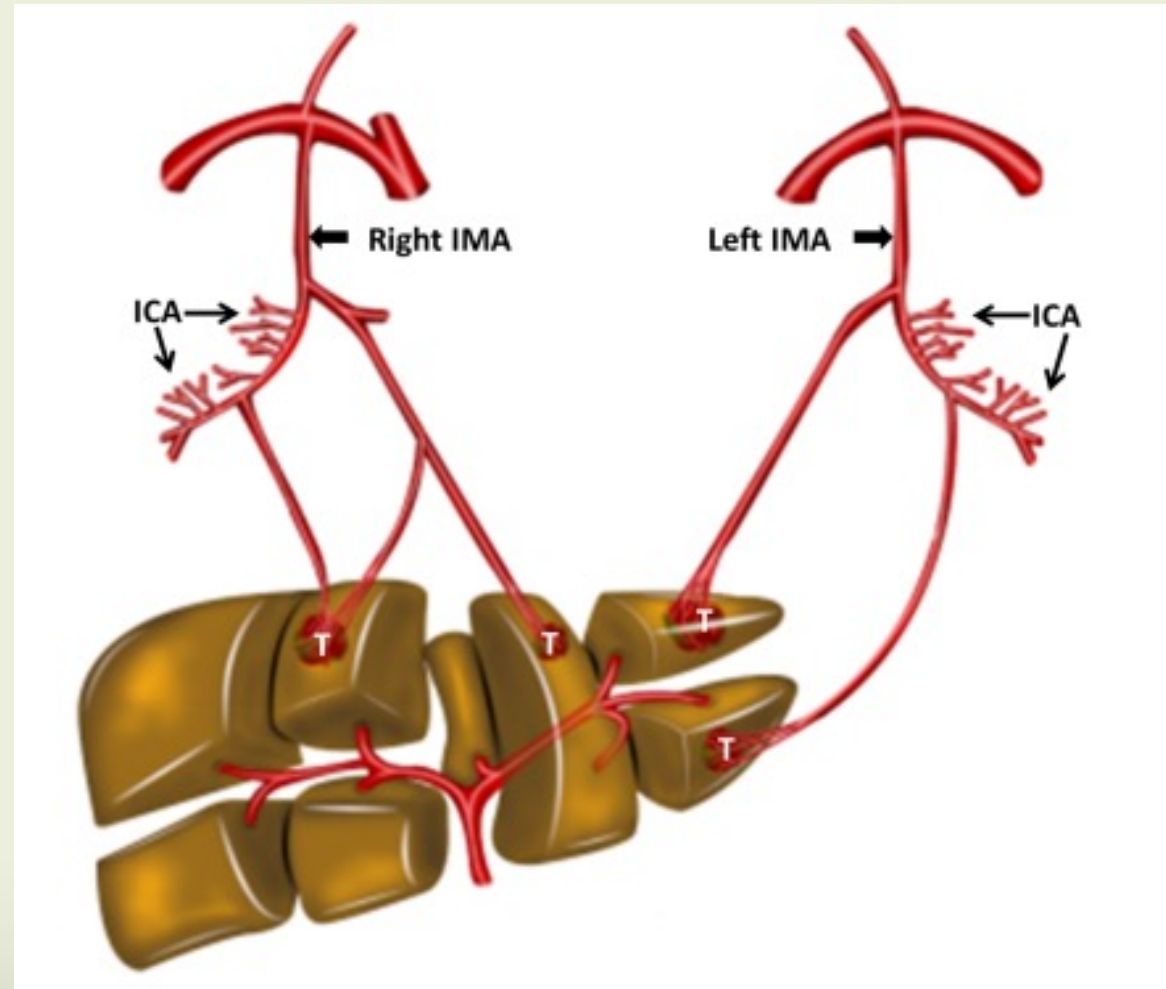
CT before TACE



CT after TACE



Internal Mammary Artery



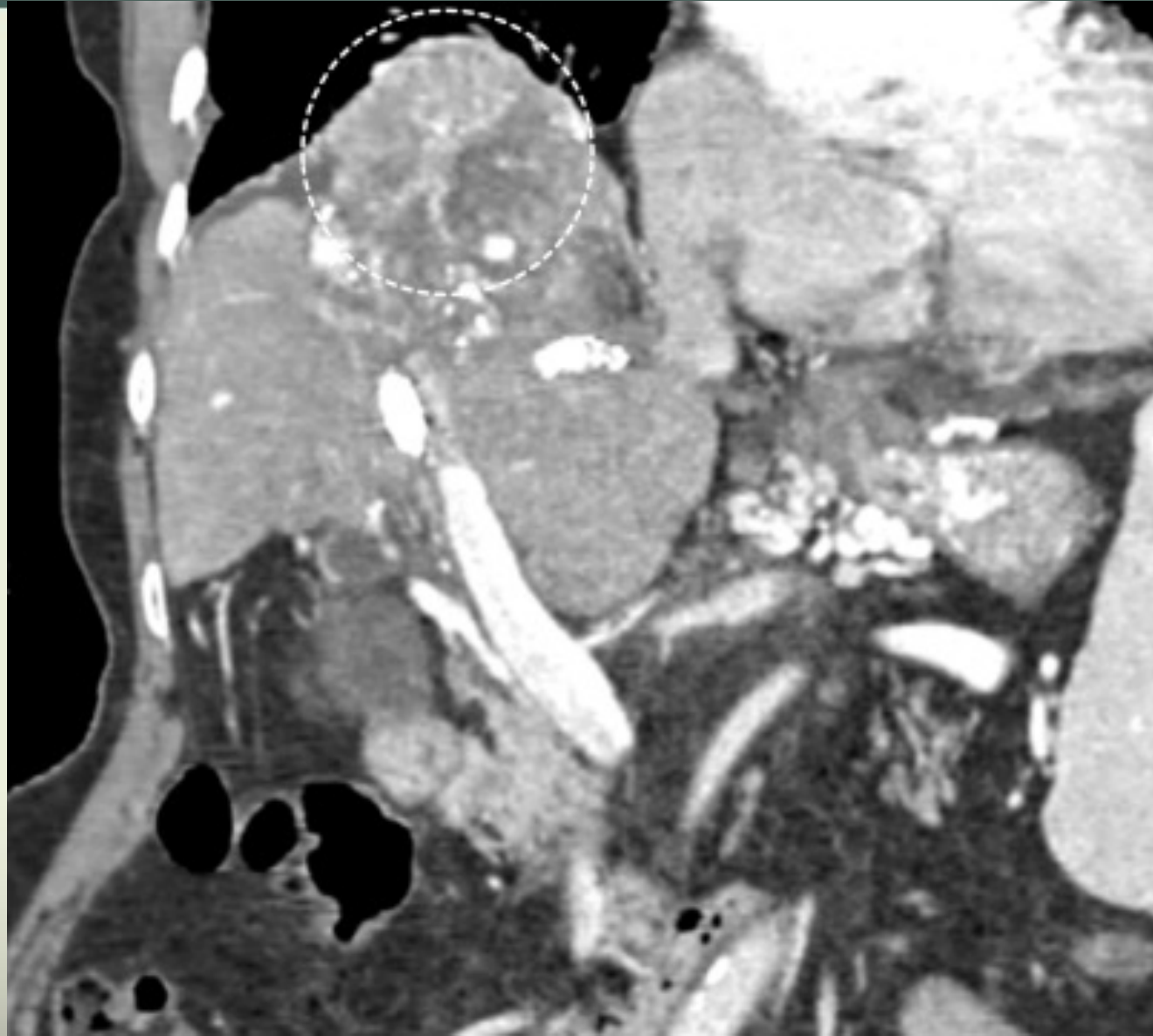


Image Courtesy: Nael Saad, MD, FSIR

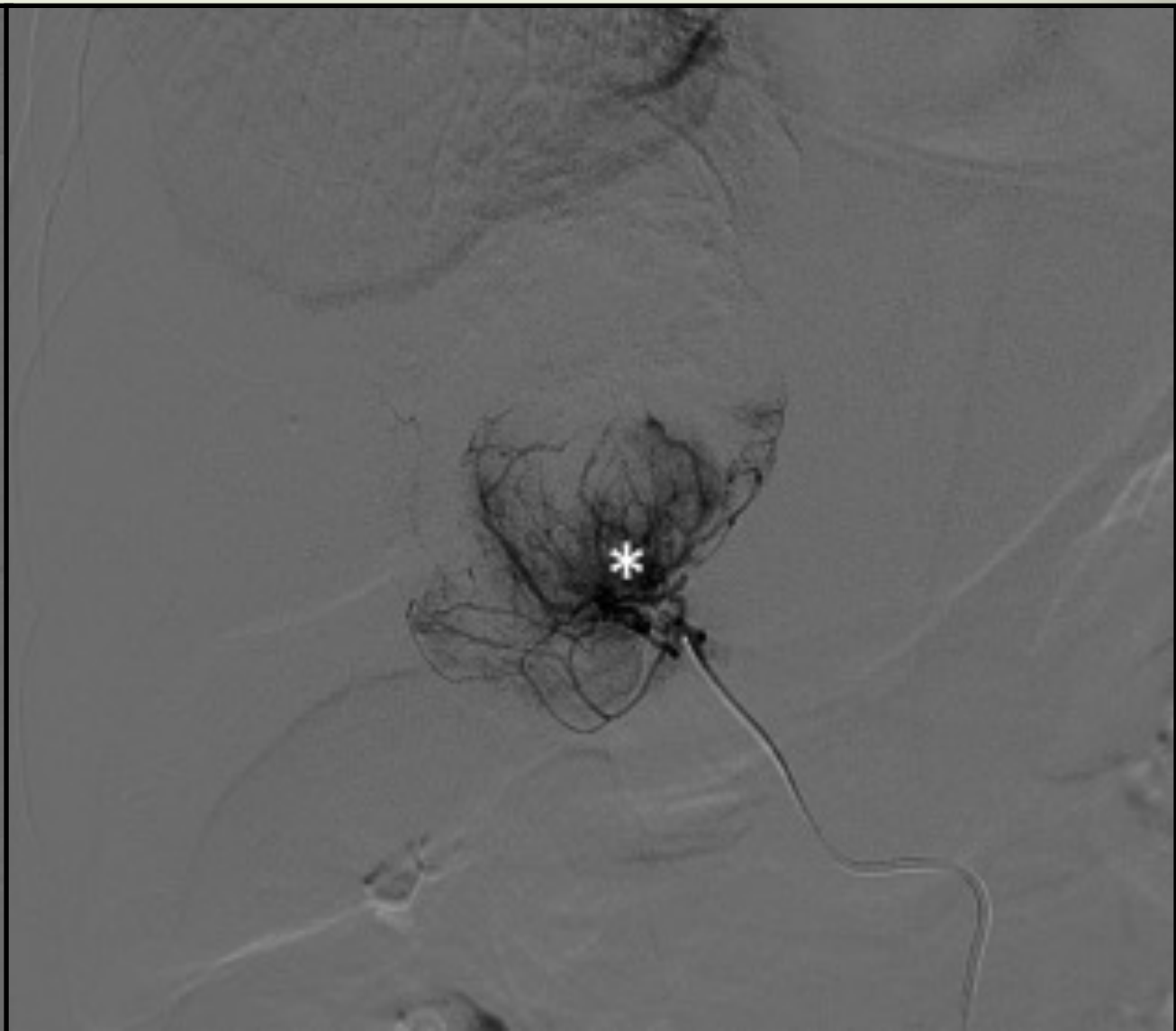


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Right Renal Artery



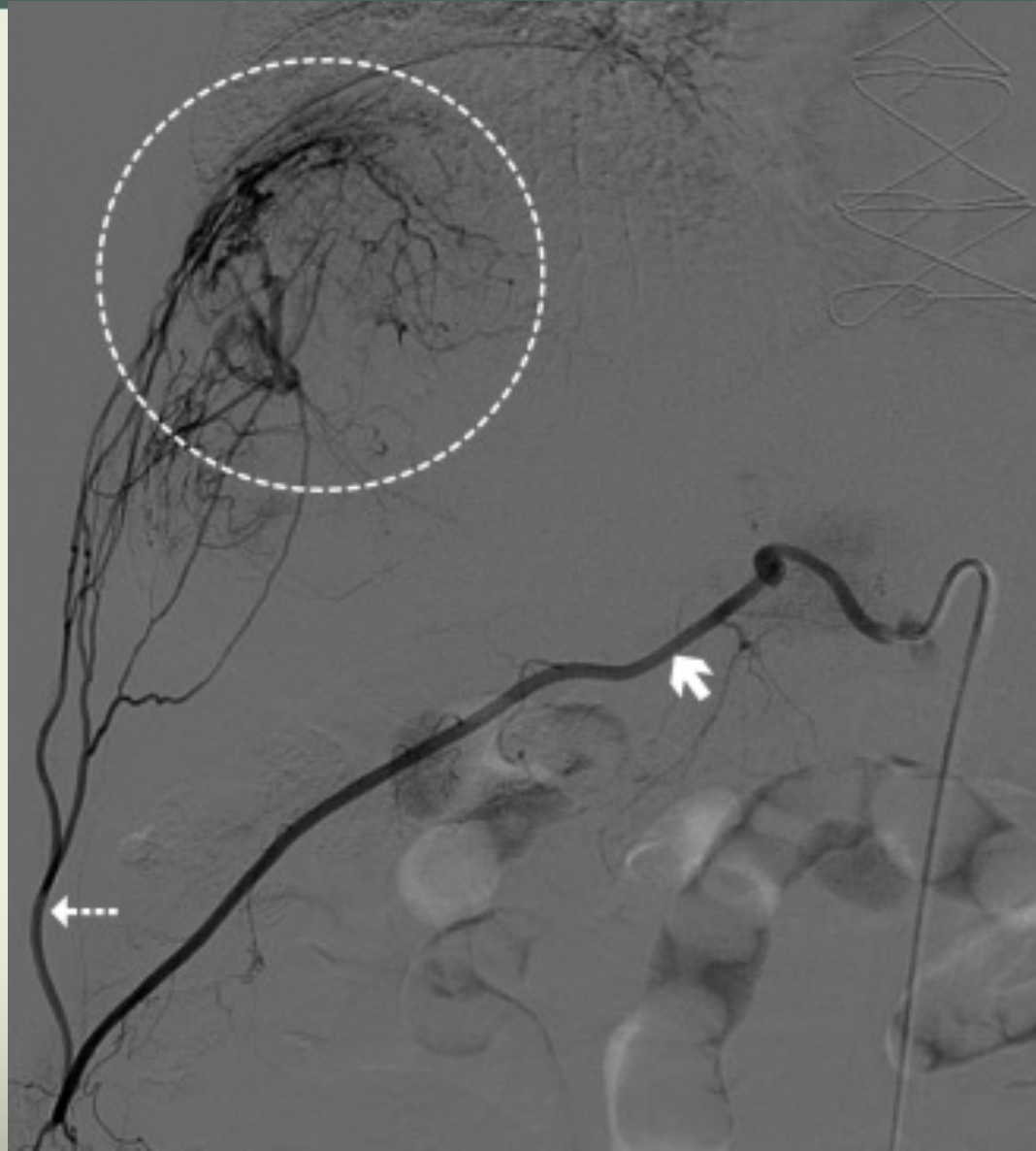
Right Renal Artery



Intercostal and Lumbar Arteries



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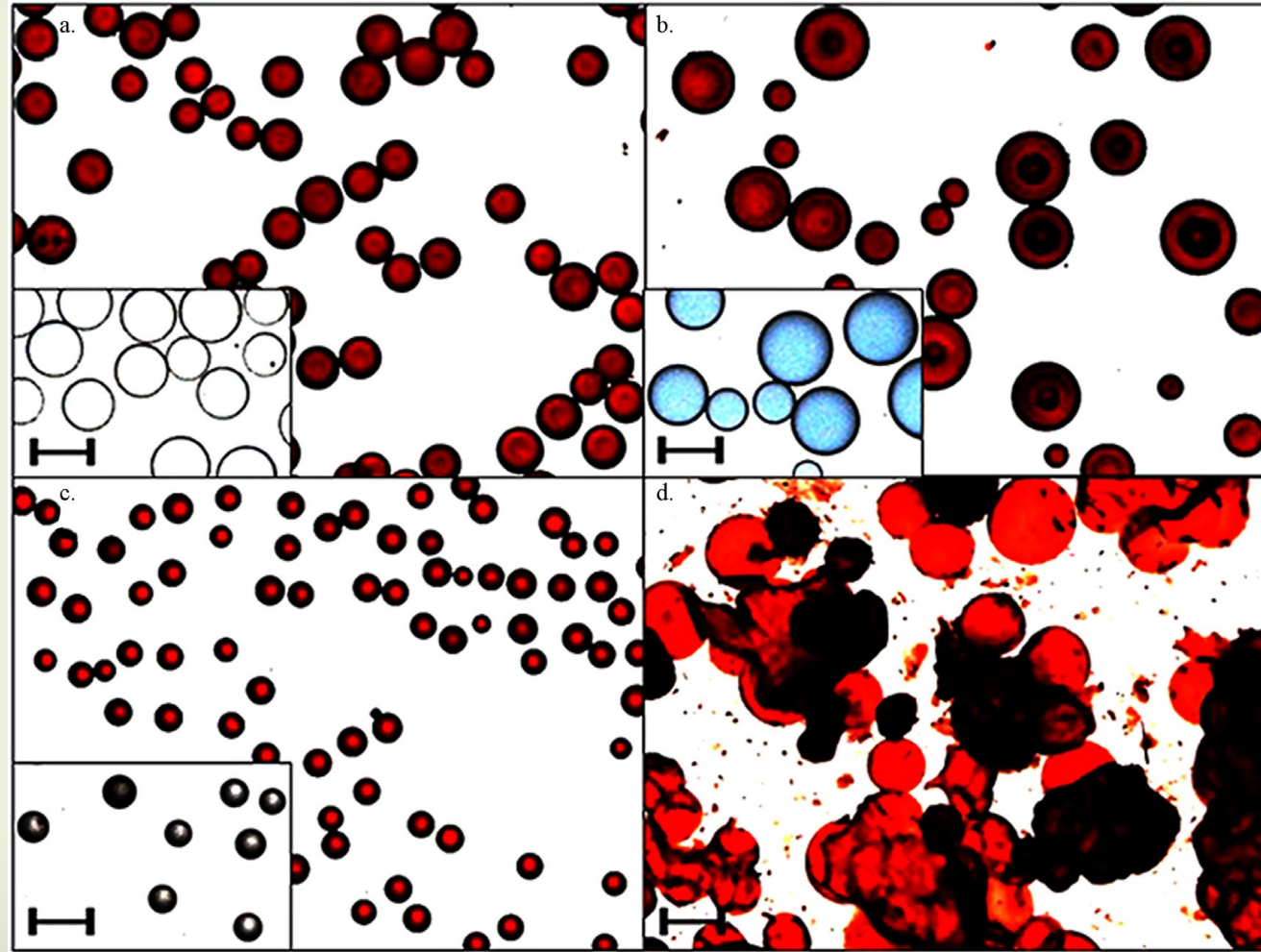
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Drug-Eluting Beads

Lifepearl

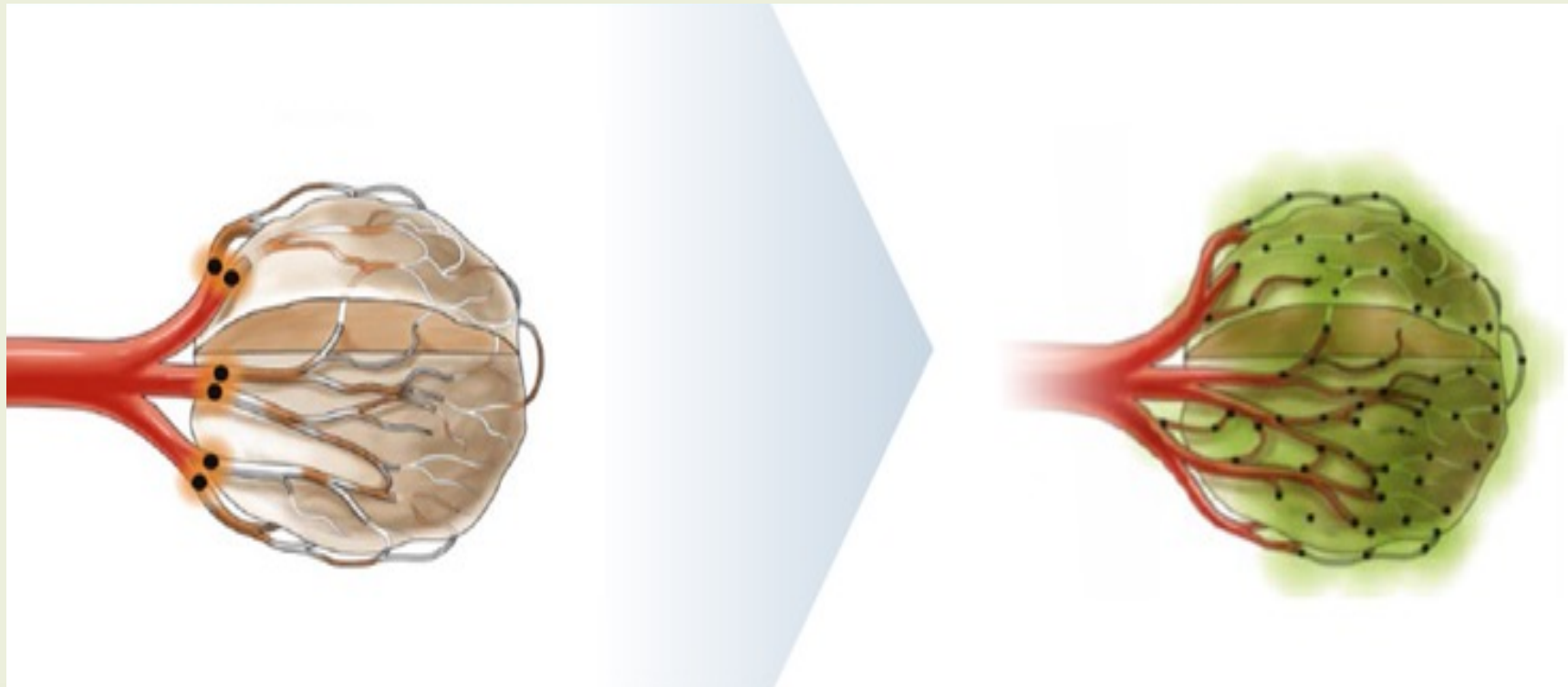


DC/LC beads

Tandem /
Oncozene

Hepasphere/
Quadrisphere

DEB Penetration and Coverage



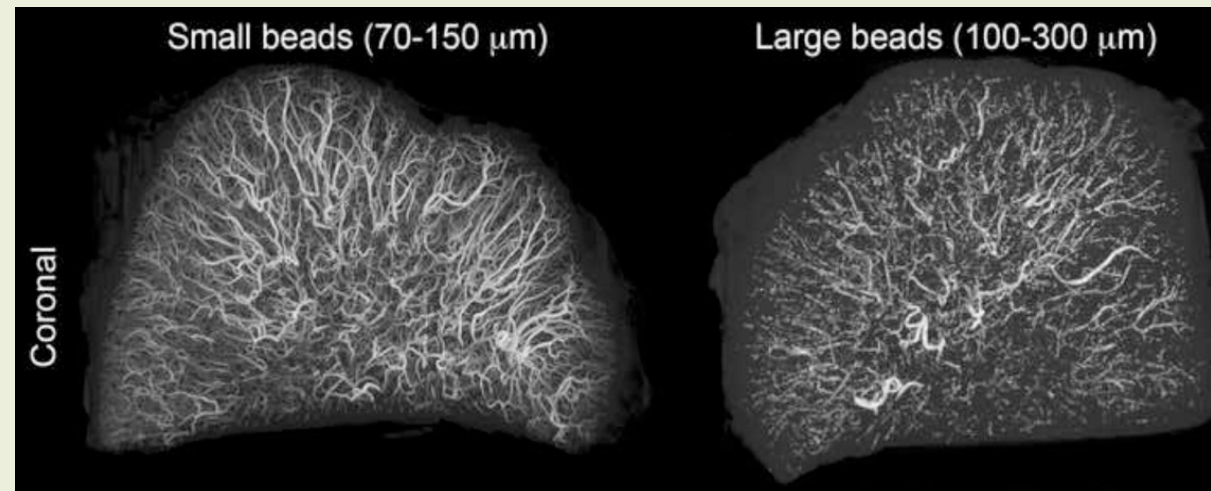
Radiopaque Drug-Eluting Beads for Transcatheter Embolotherapy: Experimental study of Drug Penetration and Coverage in Swine

Matthew R. Dreher^{1,*}, Karun V. Sharma^{1,2,*}, David L. Woods¹, Goutham Reddy¹, Yiqing Tang³, William F. Pritchard⁴, Oscar A. Chiesa⁴, John W. Karanian⁴, Juan A. Esparza⁴, Danielle Donahue¹, Elliot B. Levy¹, Sean L. Willis³, Andrew L. Lewis³, and Bradford J. Wood¹

- Bead size (70–150 μ m versus 100–300 μ m) was compared
- Micro CT demonstrated that 70–150 μ m DEB:
 - Present in more **distal arteries**
 - Located in a more frequent and **homogeneous spatial distribution**
 - **Higher concentration** and more uniform coverage of the released drug

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Survival, tumour response and safety of 70-150 μm versus 100-300 μm doxorubicin drug-eluting beads in transarterial chemoembolisation for hepatocellular carcinoma

Ya Ruth Huo,^{1*}  Hao Xiang,^{2*}  Michael Vinchill Chan^{2,3} and Christine Chan^{2,4}

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2 Department of Radiology, Concord Repatriation General Hospital, Sydney, New South Wales, Australia

3 Concord Hospital Clinical School, Faculty of Medicine, University of Sydney, Sydney, New South Wales, Australia

4 Department of Radiology, Royal Prince Alfred Hospital, Sydney, New South Wales, Australia

- **Aim:** to investigate the outcomes and safety of 70–150 μm and 100–300 μm doxorubicin DEB-TACE in patients with unresectable HCC

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- Retrospective
- 51 patients
- Treated with DEB-TACE for unresectable HCC
- 23 with 100–300 μm particles
- 28 with 70–150 μm particles
- Overall survival, progression-free survival, and tumor response were assessed

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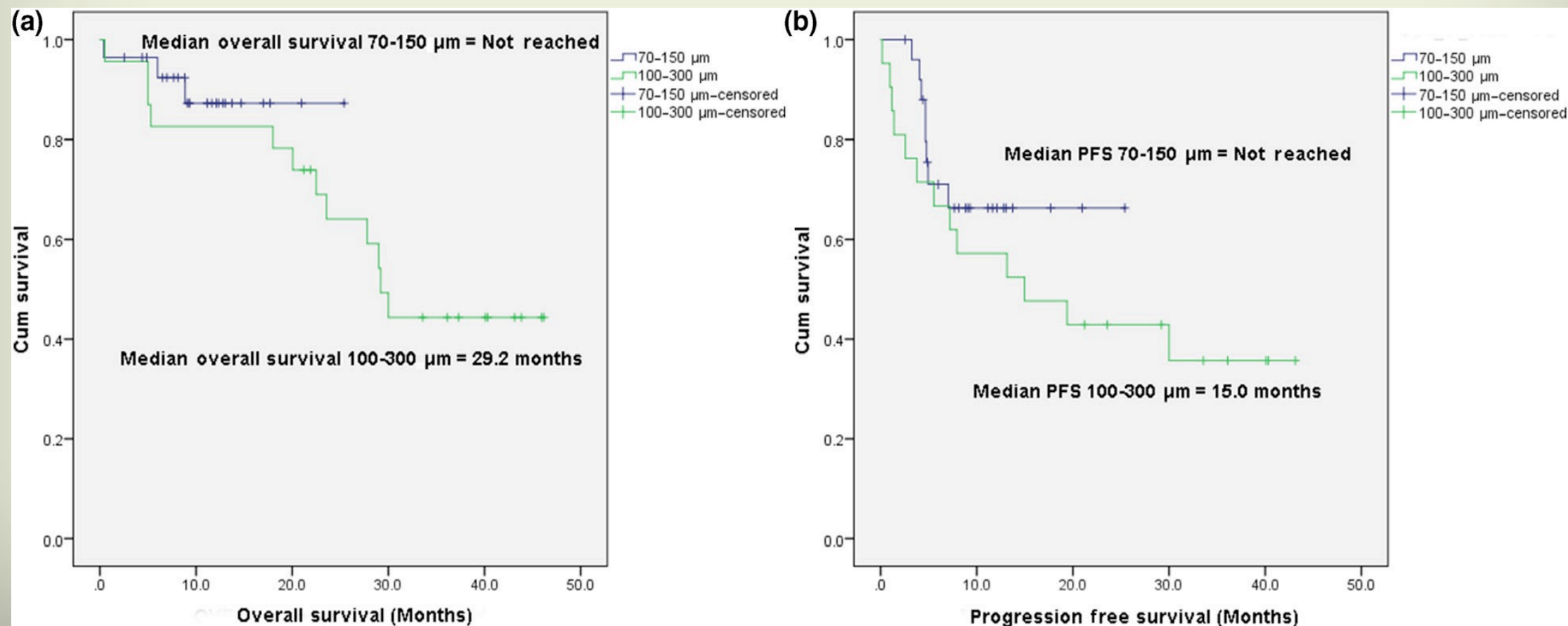
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Tumour response (mRECIST)	1 month		
	70-150 μm	100-300 μm	<i>P</i> -value
Patients with data available	26 patients	21 patients	
Complete response % (no.)	38.5% (10)	19% (4)	0.027
Partial response % (no.)	57.7% (15)	42.9% (9)	
Stable disease % (no.)	0% (0)	4.8% (1)	
Progressive disease % (no.)	3.8% (1)	33.3% (7)	

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Conclusion:

- DEB-TACE with 70–150 μm particles demonstrates improved 1-month **objective tumor response** compared to 100–300 μm , whilst having a similar safety profile.

Conclusion

- Segmental and sub-segmental TACE is preferred to lobar TACE with less side effects related to **less non-target embolization**.
- CBCT is an important tool that needs to be utilized if available and it **affects technique** in more than **25%** of patients.
- DEB-TACE using **small-sized beads** offers better **penetration** and **homogenous distribution** of DEBs and **higher concentration** of the released chemotherapy, with acceptable **safety** profile.



Thank You

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