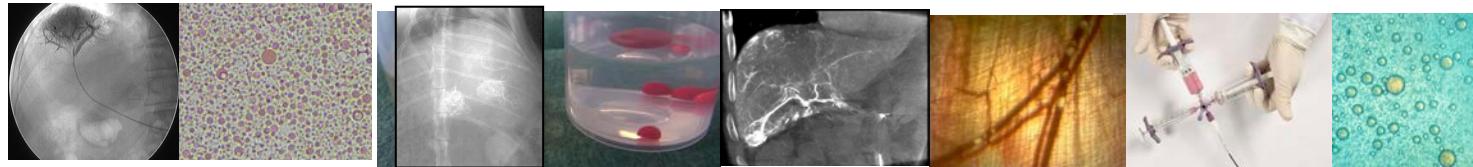


# Conventional Chemoembolization

## My Top Technical Pearls



Thierry de Baere

Gustave Roussy - Villejuif - France



# Disclosures

Consultant: Terumo, Boston Scientific, Guerbet, Eisai, AstraZeneca

Grants/Research Support: Terumo

Speakers' Bureau: Terumo, Guerbet

*Brand names are included in this presentation for participant clarification purposes only.*

*No product promotion should be inferred.*

# 1 – Use CBCT: 3D Images / Image Analysis / Guidance

## Computed Analysis of Three-Dimensional Cone-Beam Computed Tomography Angiography for Determination of Tumor-Feeding Vessels During Chemoembolization of Liver Tumor: A Pilot Study

Frederic Deschamps · Stephen B. Solomon ·  
Raymond H. Thornton · Pramod Rao ·  
Antoine Hakime · Viseth Kuoch · Thierry de Baere

83 subsegmental feeders in 25 liver tumors	2D	3D	Automatic vessel analysis
<b>Sensitivity</b>	64%	73%	<b>93% (1, 2)</b>
<b>Duration</b>	94 s	187 s	<b>135 s (2)</b>
<b>Agreement between users</b>	54%	62%	<b>82% (1, 2)</b>

(<sup>1</sup>)  $p < 0.05$  compare with 2D data, (<sup>2</sup>)  $p < 0.05$  compared with 3D data

# 1 – Use CBCT: 3D Images / Image Analysis / Guidance

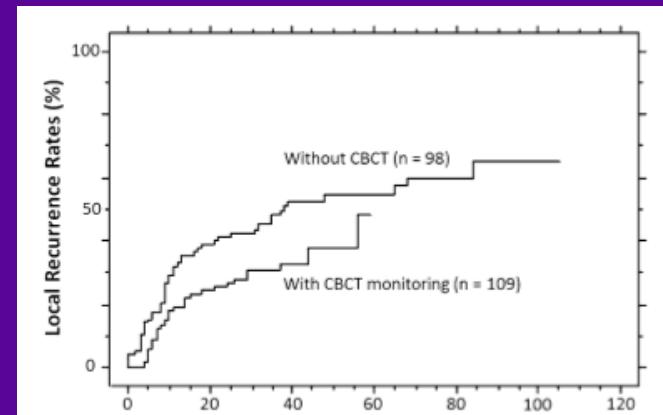
## Comparison of Local Control in Transcatheter Arterial Chemoembolization of Hepatocellular Carcinoma $\leq 6$ cm With or Without Intraprocedural Monitoring of the Embolized Area Using Cone-Beam Computed Tomography

207 HCCs  $\leq 6$  cm superselective TACE: DSA in 98 tumors & CBCT in 109 tumors

1-, 2-, and 3-year local recurrence rates

DSA : 33.3%, 41.3%, 48%

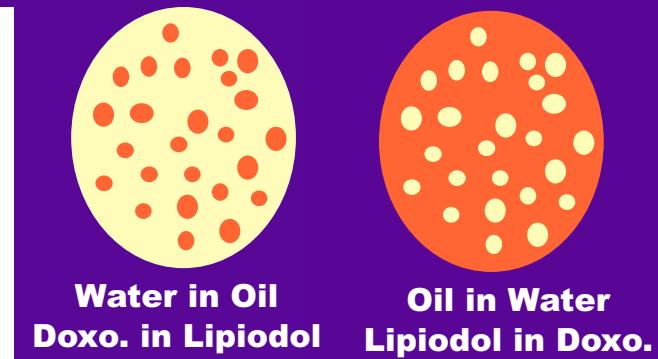
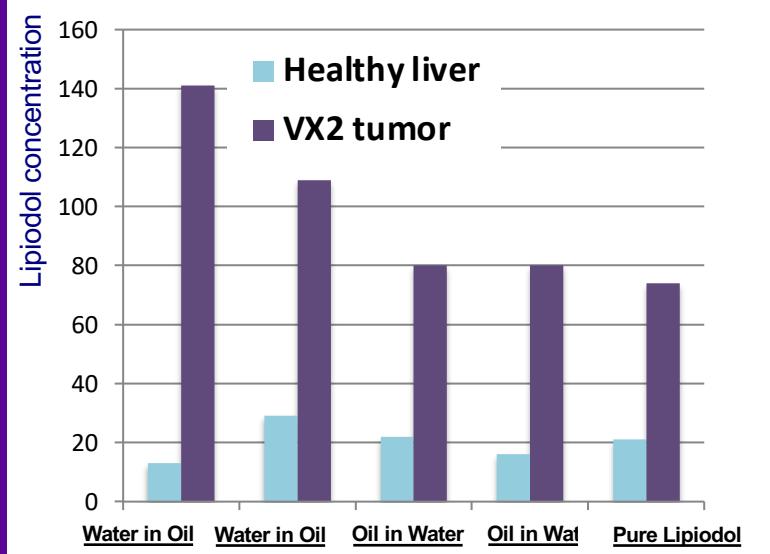
CBCT : 22.3 %, 26.8 %, 30.6 %



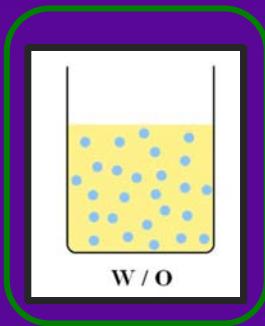
Safety margins in 65.3% of DSA vs. 87.2% of CBCT

Safety margin: Lipiodol uptake 5 mm wide around HCC  $< 25$  mm, 10 mm wide around HCC  $> 25$  mm

## 2 – Water in Oil Emulsion / Drug in Lipiodol



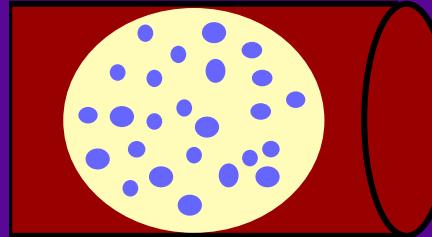
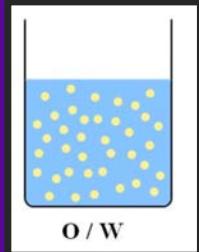
## 2 – Water in Oil Emulsion / Drug in Lipiodol



Lipiodol® + methylene blue

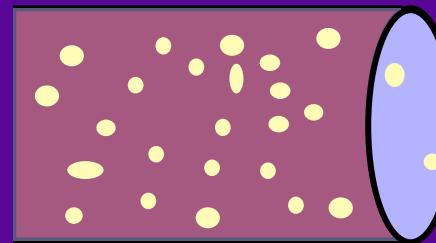
W/O = water in oil

O/W: oil in water



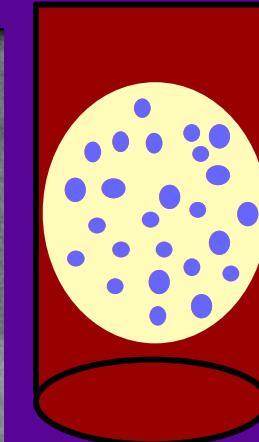
Lipiodol as a drug carrier

Drug diluted in blood



— Lipiodol  
— Drug

## 2 – Water in Oil Emulsion / Drug in Lipiodol



## 2 – Water in Oil Emulsion / Drug in Lipiodol

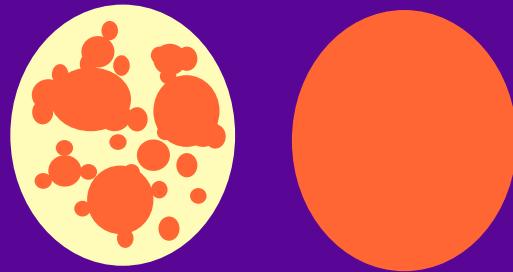
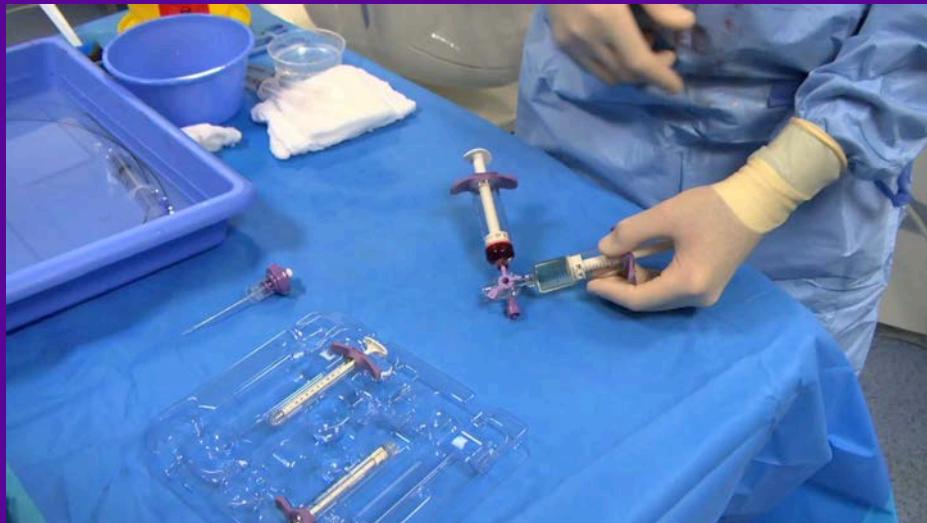
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Favor a drug in oil emulsion with a 3-way stopcock method:

Lower volume of drug versus Lipiodol

Push Drug toward Lipiodol

Dilution of drug in contrast medium increases stability



## 2 – Water in Oil Emulsion / Drug in Lipiodol

Cardiovasc Intervent Radiol (2017) 40:1927–1932  
DOI 10.1007/s00270-017-1763-5



LABORATORY INVESTIGATION

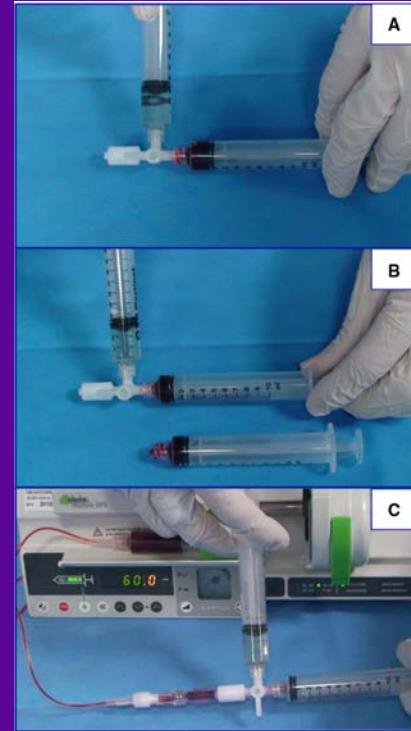
### Parameters for Stable Water-in-Oil Lipiodol Emulsion for Liver Trans-Arterial Chemo-EMBOLIZATION

F. Deschamps<sup>1,2</sup> · L. Moine<sup>3,4</sup> · T. Isoardo<sup>3</sup> · L. Tselikas<sup>1,4</sup> · A. Paci<sup>2,4</sup> ·  
L. M. Mir<sup>2,4</sup> · N. Huang<sup>3</sup> · E. Fattal<sup>3,4</sup> · T. de Baere<sup>1,4</sup>

Injection of doxorubicin (diluted in saline) in Lipiodol :

- Bolus
- Incremental: 2 consecutive aliquots
- Continuous injection over 3 minutes

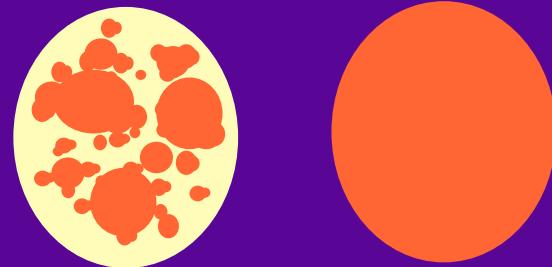
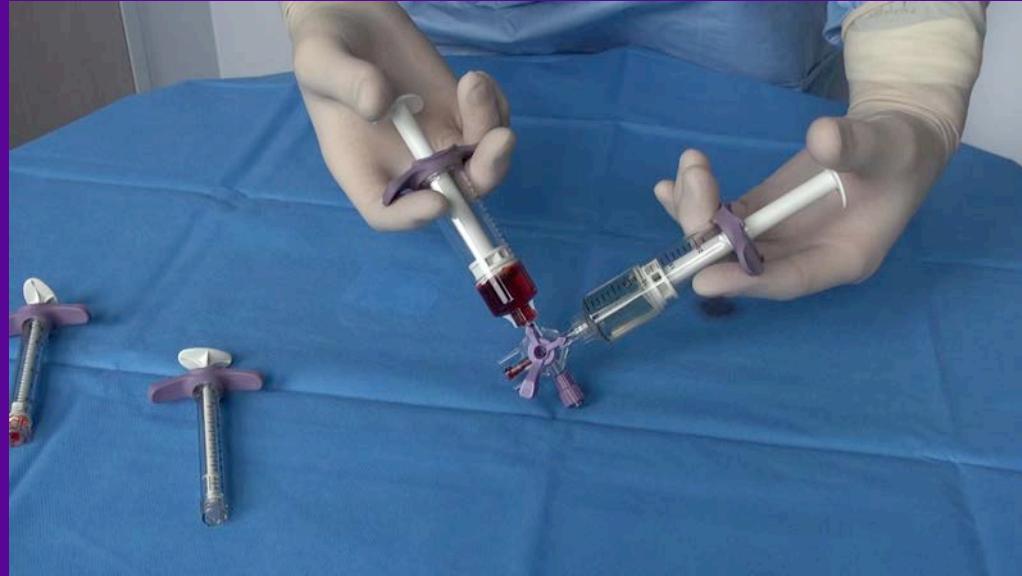
Incorporation method	Percentage of water-in-oil emulsion	Stability of water-in-oil emulsion
Bolus (n = 16)	6.25% (n = 1)	
Incremental (n = 16)	93.7% (n = 15) $p < 0.0001^a$	96 ± 101 min $p = 0.018$
Continuous (n = 16)	100% (n = 16) $p < 0.0001^b$	326 ± 309 min



## 2 – Water in Oil Emulsion / Drug in Lipiodol

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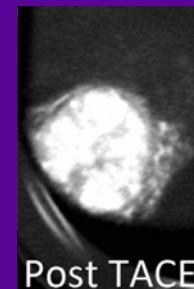
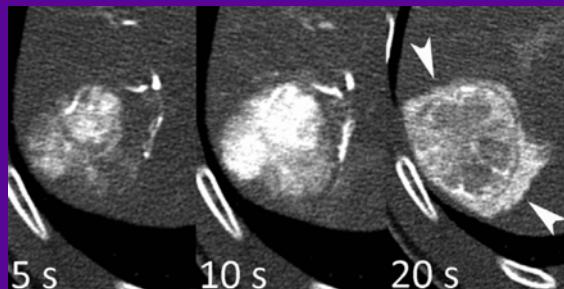
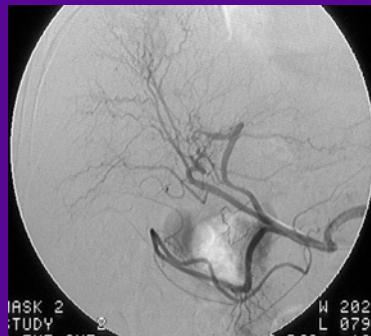
Incremental



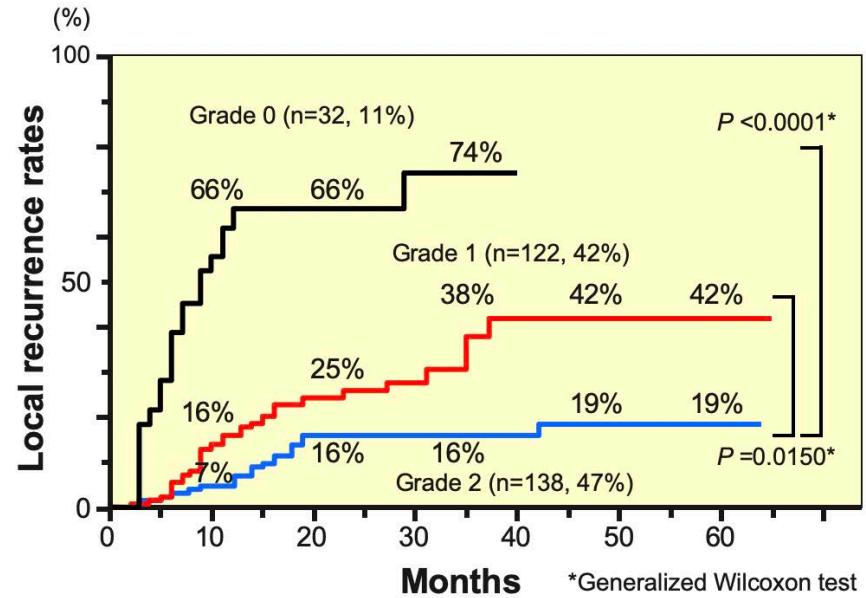
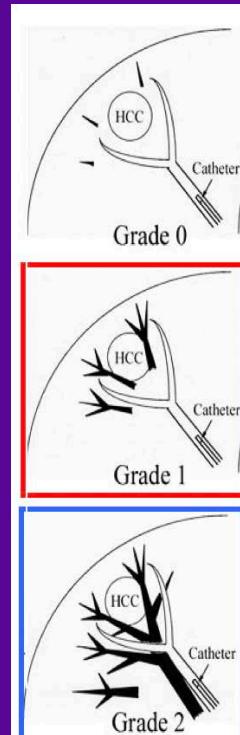
### 3 – Lipiodol Opacification of the Portal Vein

*In hypervascular HCC, Lipiodol injected into the hepatic artery is initially retained in the tumor sinusoids, and then flows into the portal veins through:*

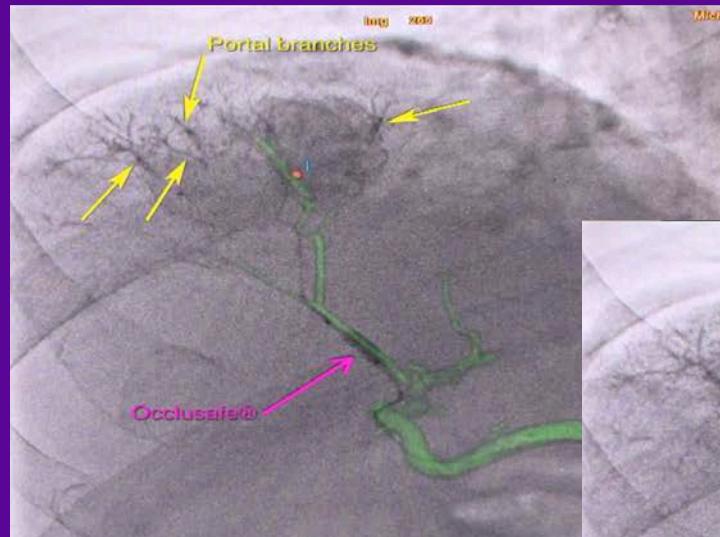
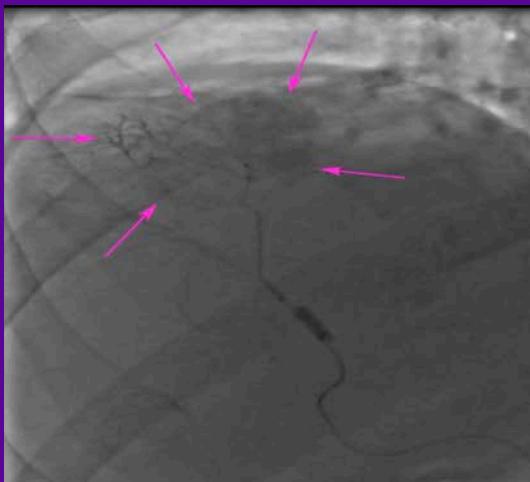
- the drainage route from HCC
- the peribiliary plexus



### 3 – Lipiodol Opacification of the Portal Vein



### 3 – Lipiodol Opacification of the Portal Vein

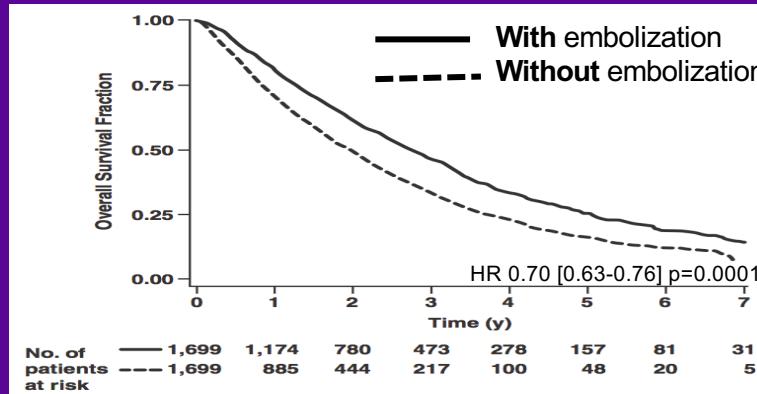


The endpoint for the Lipiodol drug emulsion :

- stasis in very peripheral tumor-feeding arteries
- appearance of Lipiodol in portal vein branches near the tumor

## 4 – Always Particle Embolized

Prospective observational cohort study over 8 years: 11,030 patients with HCC  
8,507 TACE  
2,523 Lipiodol + anticancer agent



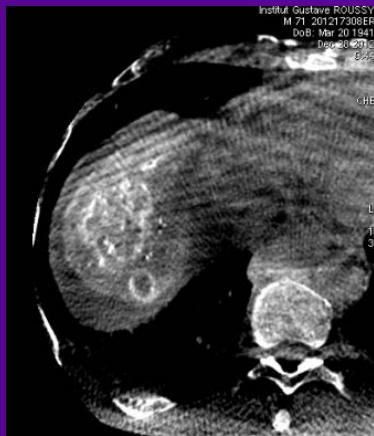
### The endpoint for Gelfoam embolization

- complete stasis up to the catheter tip when placed superselectively
- “tree-in-the winter” appearance when TACE is less selective  
(lobar or major segments)

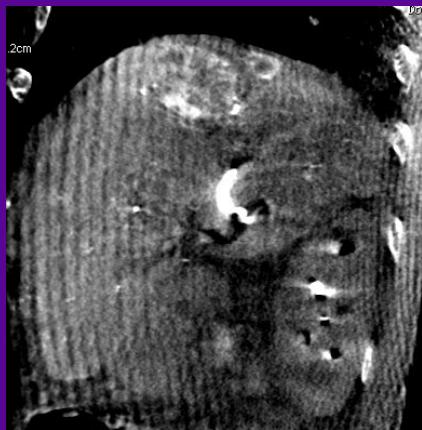
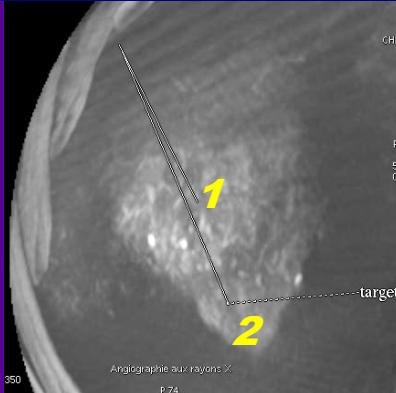
## 5 – Use CBCT: Immediate Evaluation $\pm$ Lipiodol-Guided Thermal Ablation

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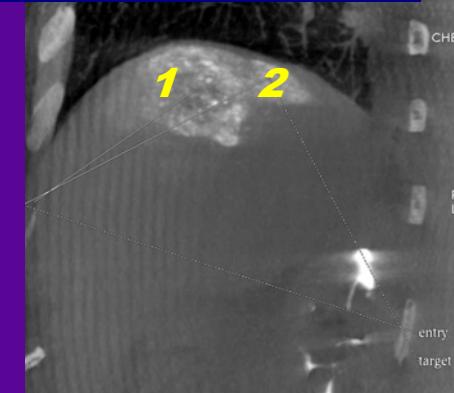
## 5 – Use CBCT: Immediate Evaluation ± Lipiodol-Guided Thermal Ablation



*CBCT after chemolipiodol  
needle tract definition*

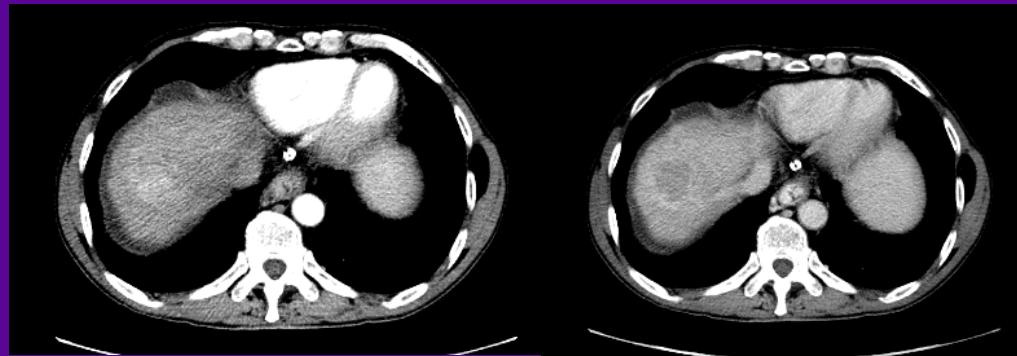


*CBCT after chemolipiodol  
needle tract definition*

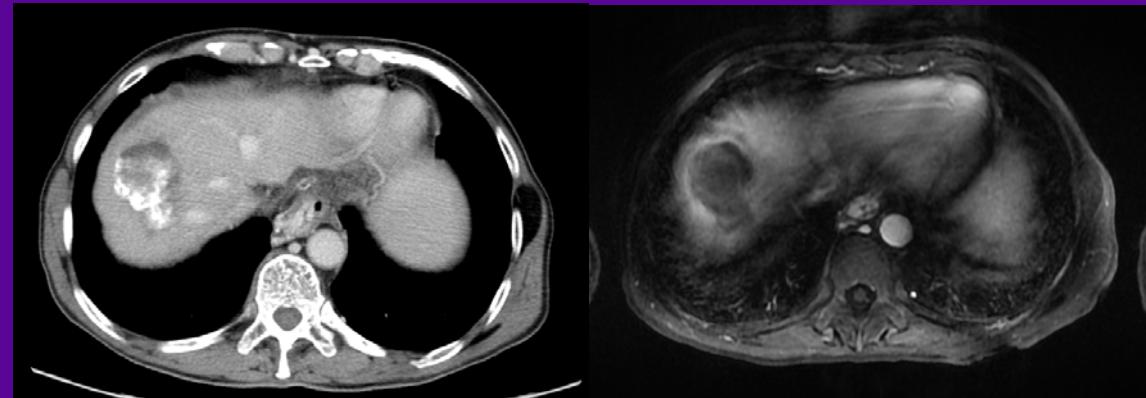


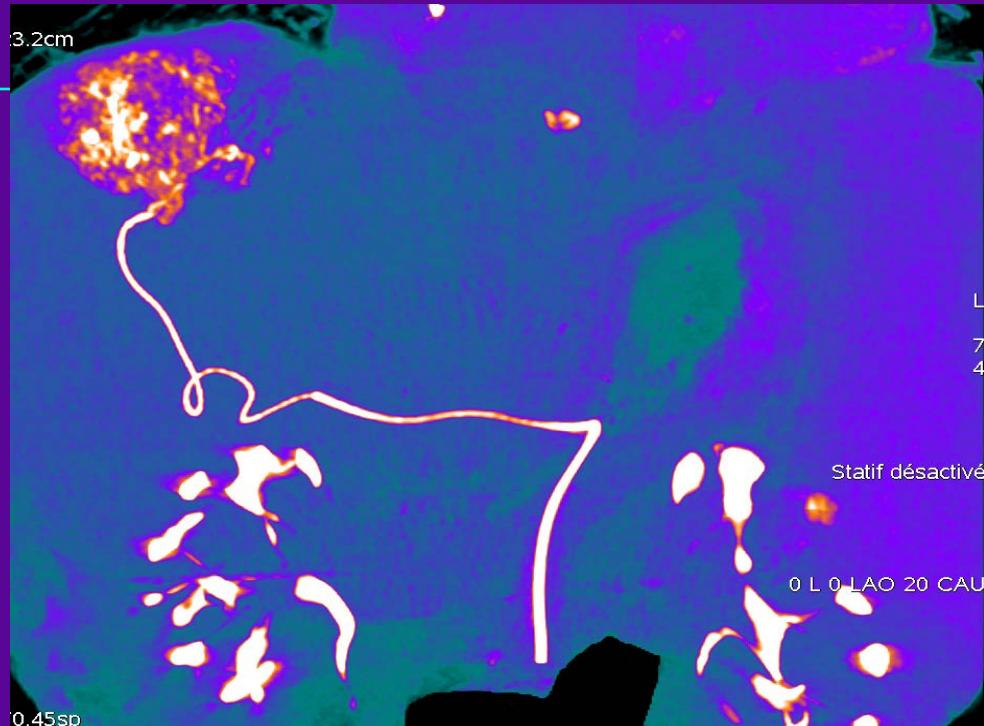
## 5 – Use CBCT: Immediate Evaluation $\pm$ Lipiodol-Guided Thermal Ablation

Baseline



Follow-up post TACE + RFA





# Thank you

