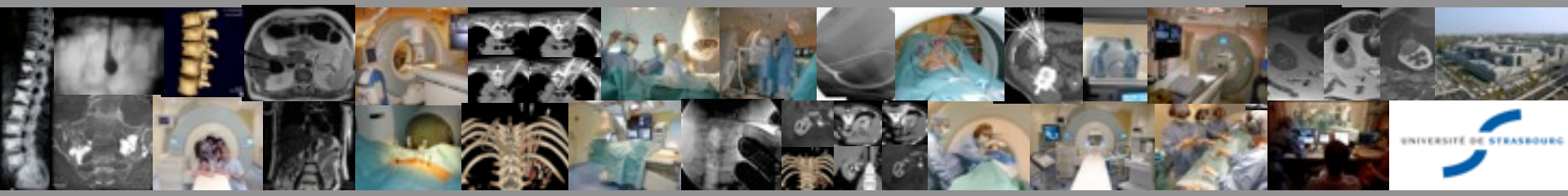
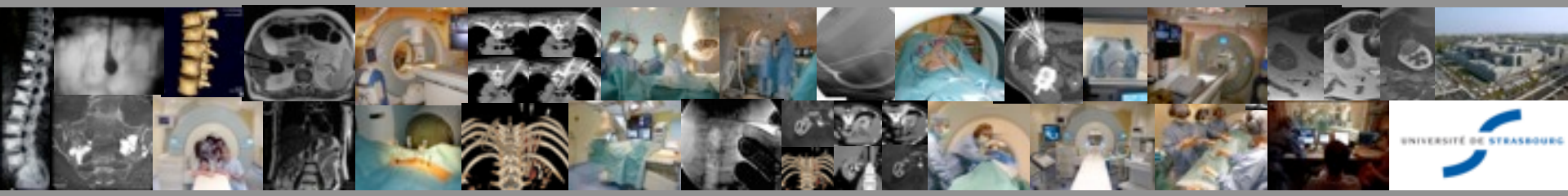
Tumeurs Pulmonaires en Imagerie Interventionnelle

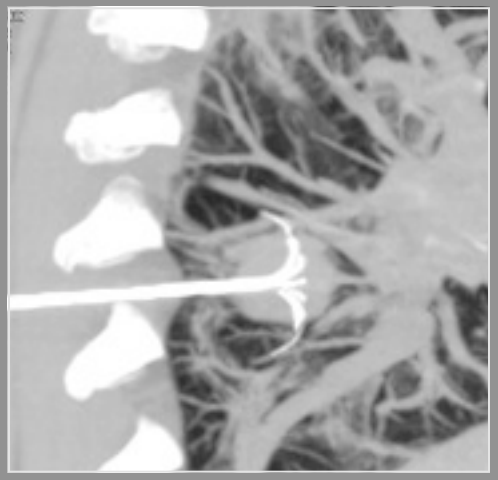
A Gangi, X Buy, J Palussiere , T. de Baère

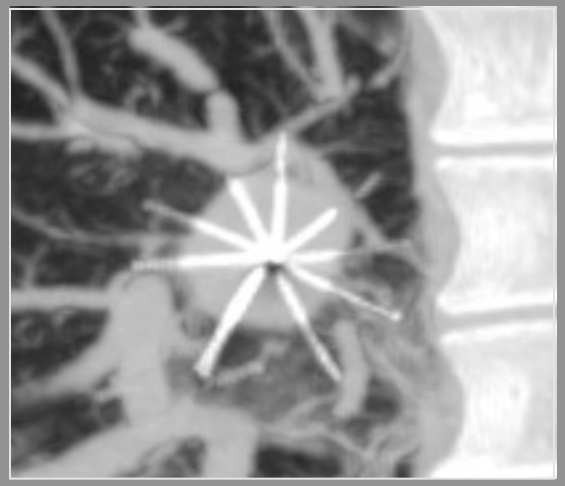


Traitement des tumeurs pulmonaires par RF



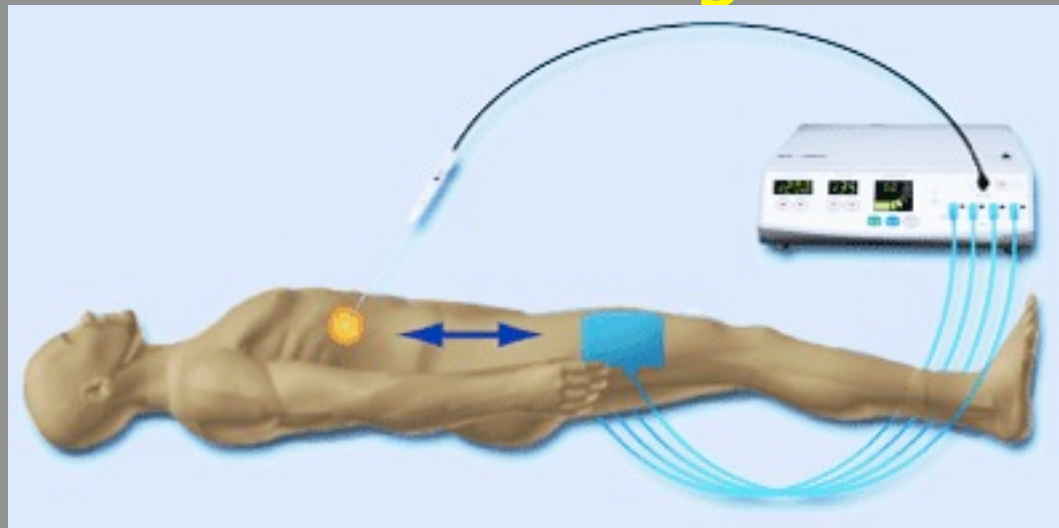
Chauffage : particularités pulmonaires





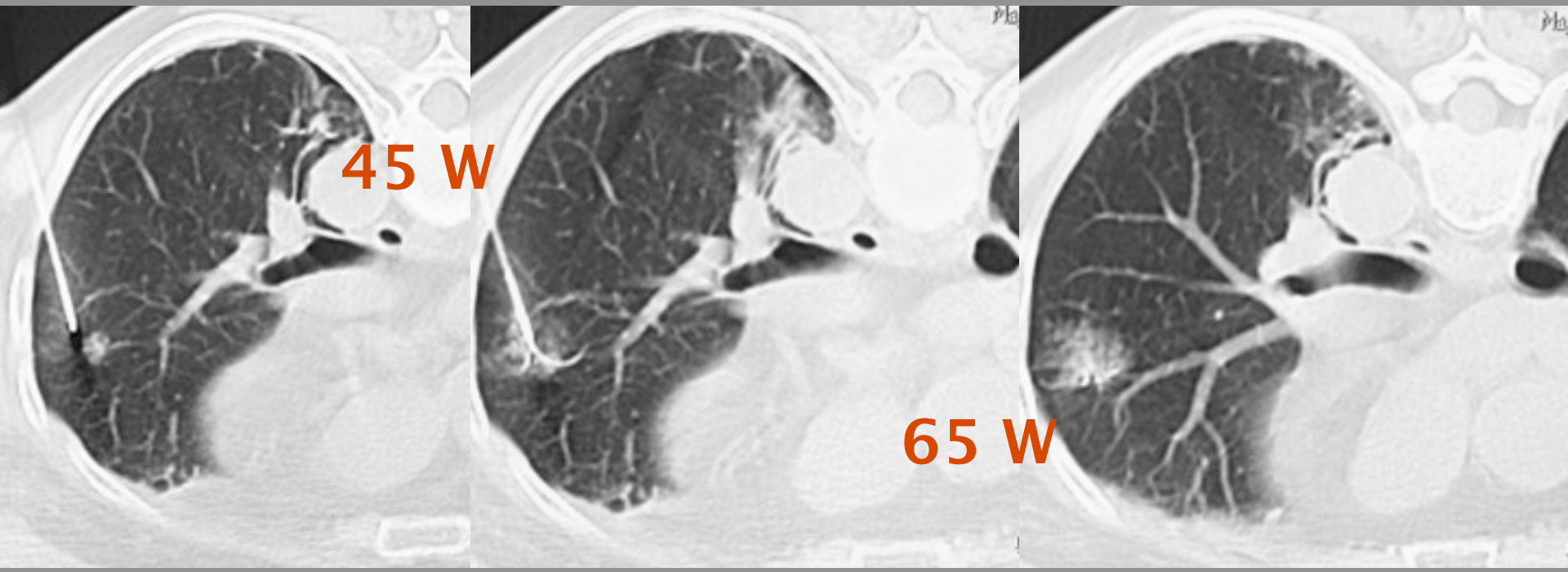
NICE guidelines
RFA LUNG

- Percutaneous radiofrequency ablation may be used in patients with small early-stage lung cancer for whom surgery is not appropriate or who do not wish to undergo conventional surgery, and for patients with a small number of lung metastases

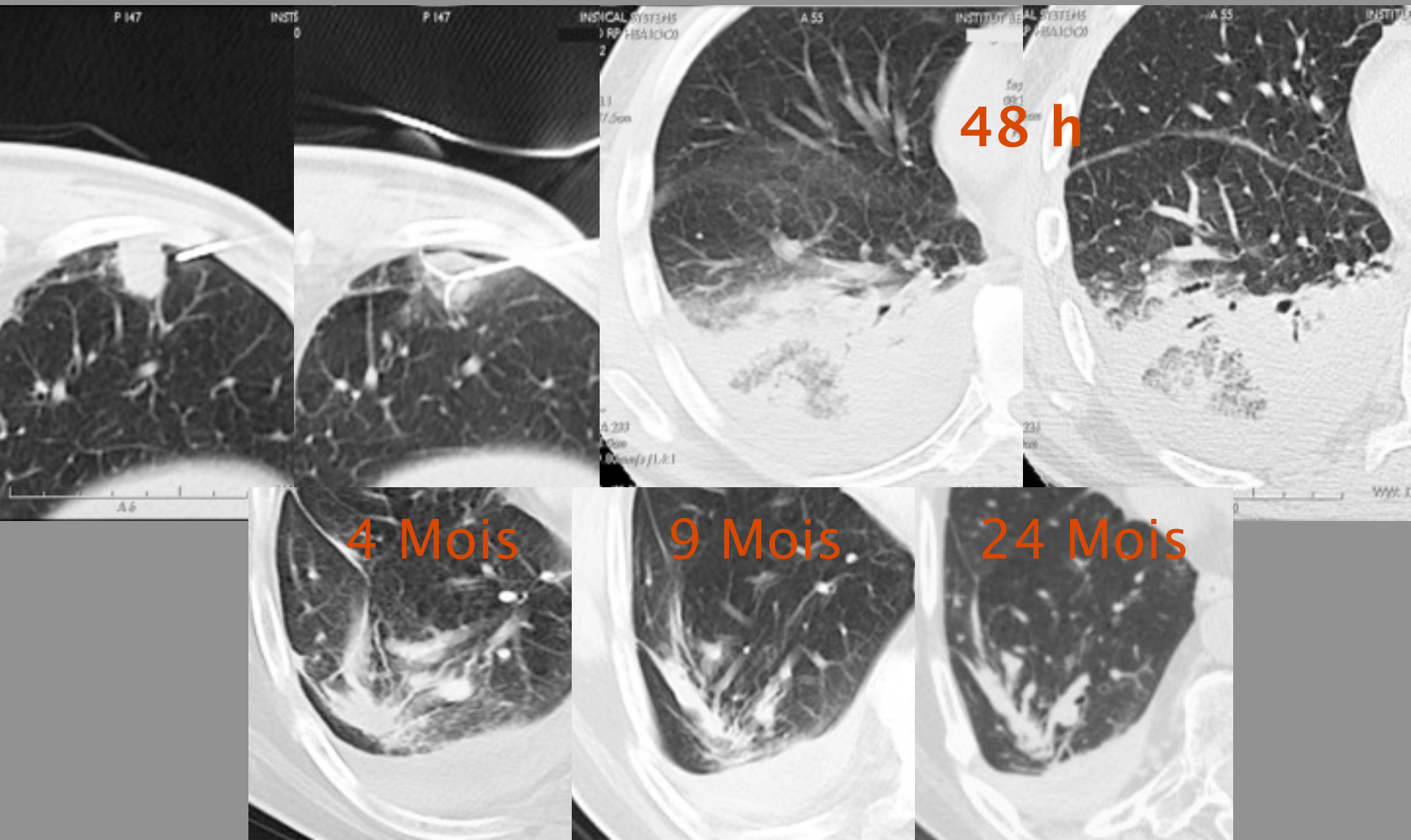


Protocoles de chauffage

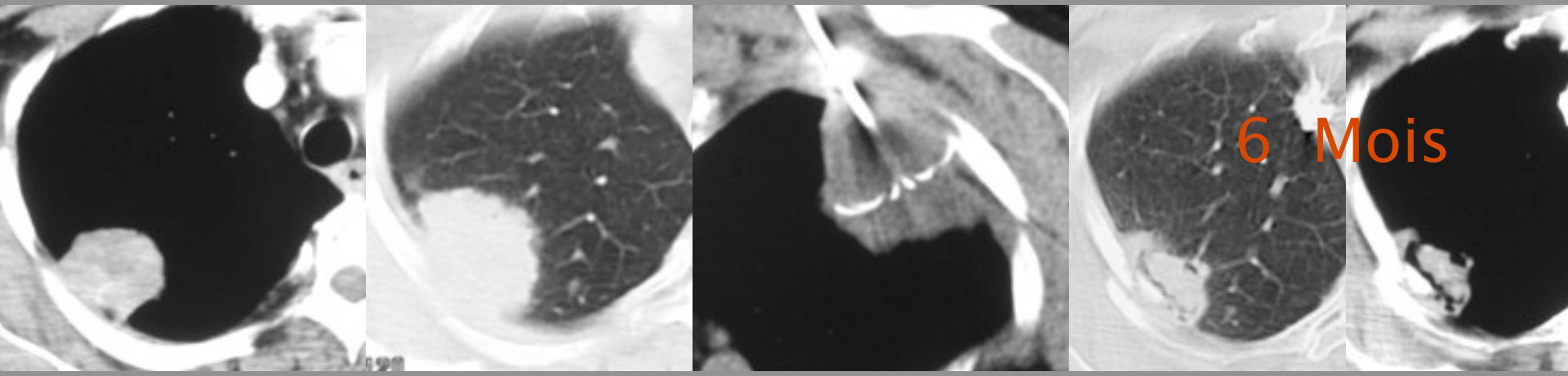
TUMOR	POWER	ELECTRODE SIZE			
		2	3	3,5	4
PARENCHYMA	INITIAL	5W	5-10W	10-15W	15-20W
	INCREMENT	5W / 1- 3 mn			
PLEURAL CONTACT < 50%	INITIAL	10W	20W	30W	40W
	INCREMENT	5-10W / 1- 3 mn			
PLEURAL CONTACT > 50%	INITIAL	30W	40W	50W	60W
	INCREMENT	10W / 1mn			

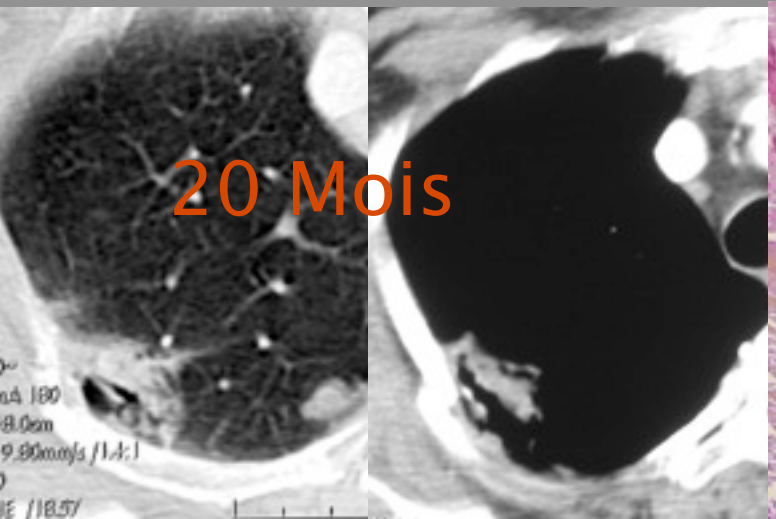

45 W
65 W

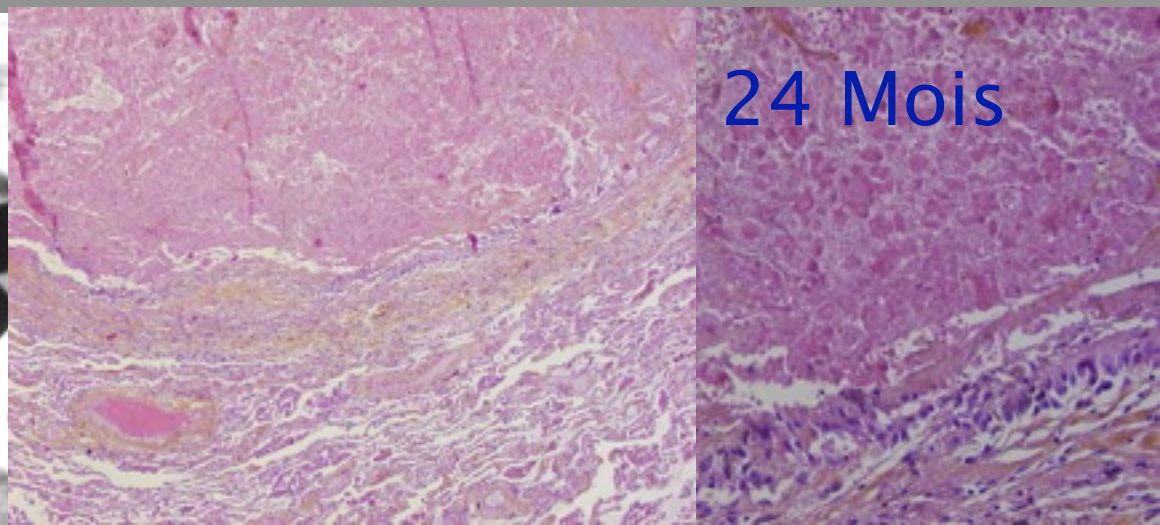
Evolution : particularités pulmonaires


48 h
4 Mois
9 Mois
24 Mois

Réaction inflammatoire peut persister







Evolution d'un nodule pulmonaire traité par RFA

Cavitation est une évolution possible

Signifie une fistule avec une bronche segmentaire (études animales Yamamoto AJR Nov 05)

Facteurs de risque (Okuma JVIR Mars 07) : lésion périphérique, cancer primitif, emphysème

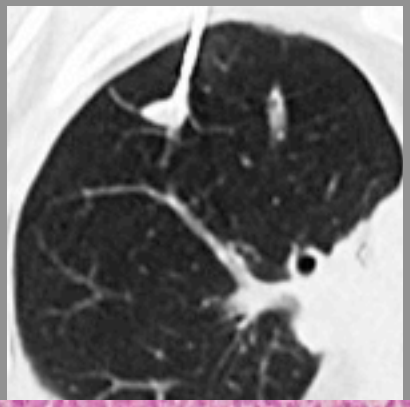
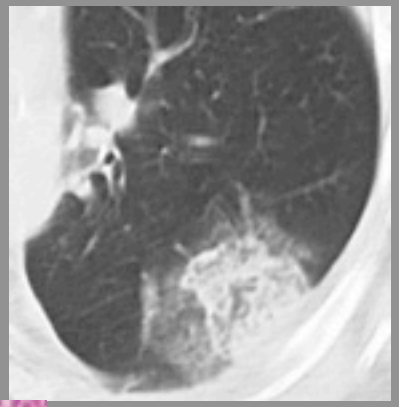
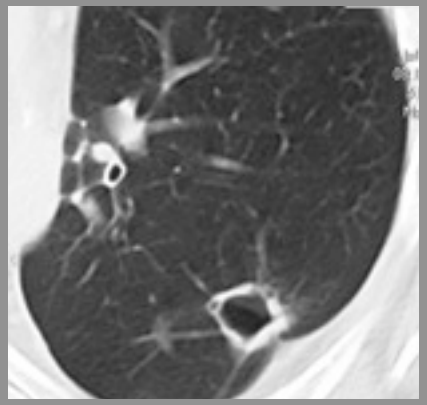
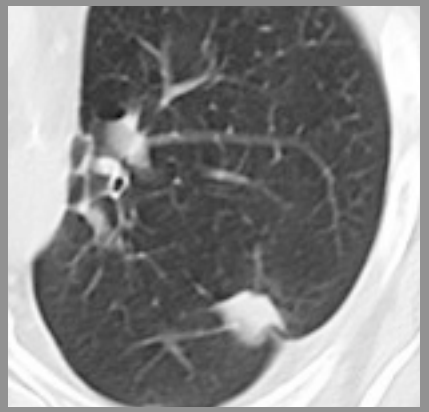
Expérience Bergonié: 10%

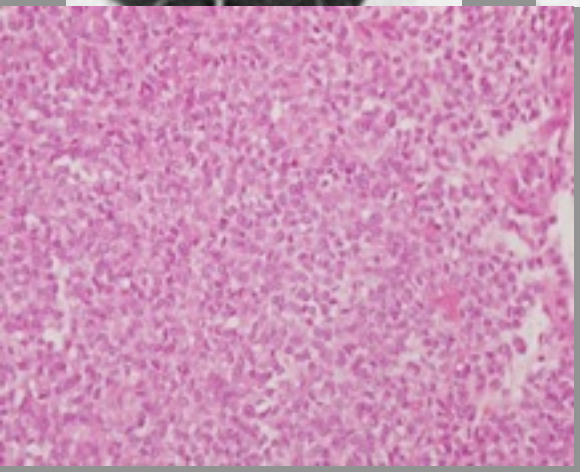
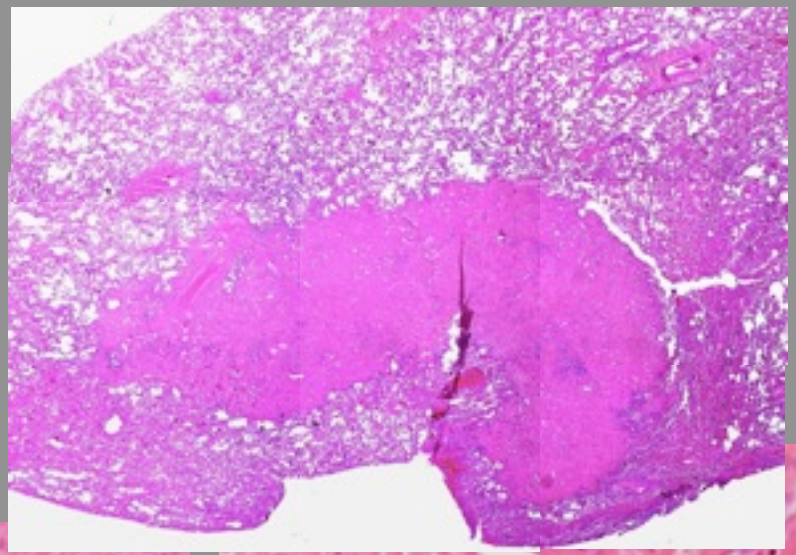
Autres publications : 30% (Bojarski AJR Aug 05), 14% (Okuma JVIR Mars 07)

Evolution : cicatrisation progressive

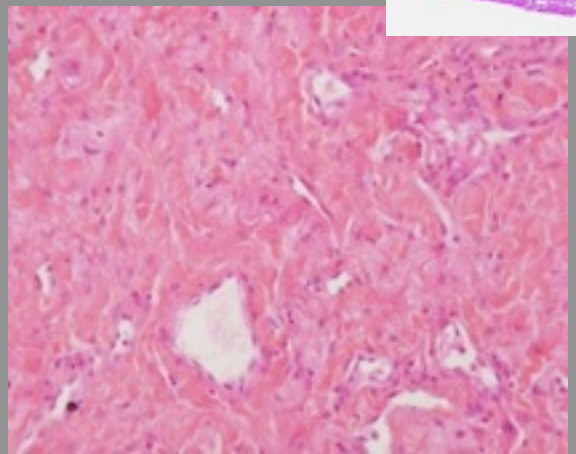
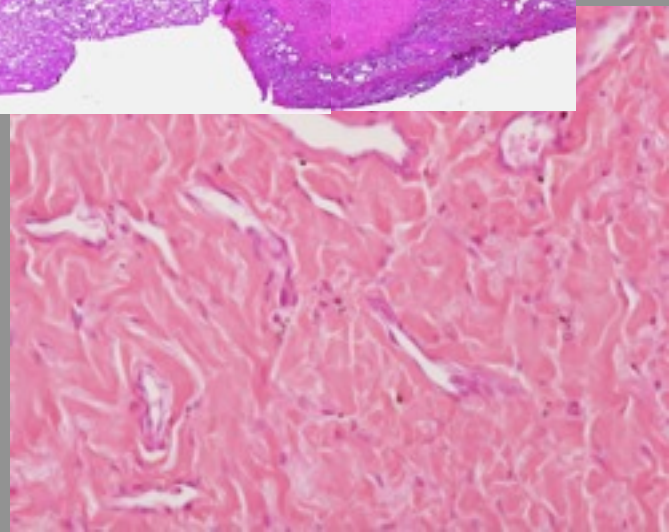
remplissage

surinfection?

Métastase sarcome Ewing
Biopsie nodule pulmonaire

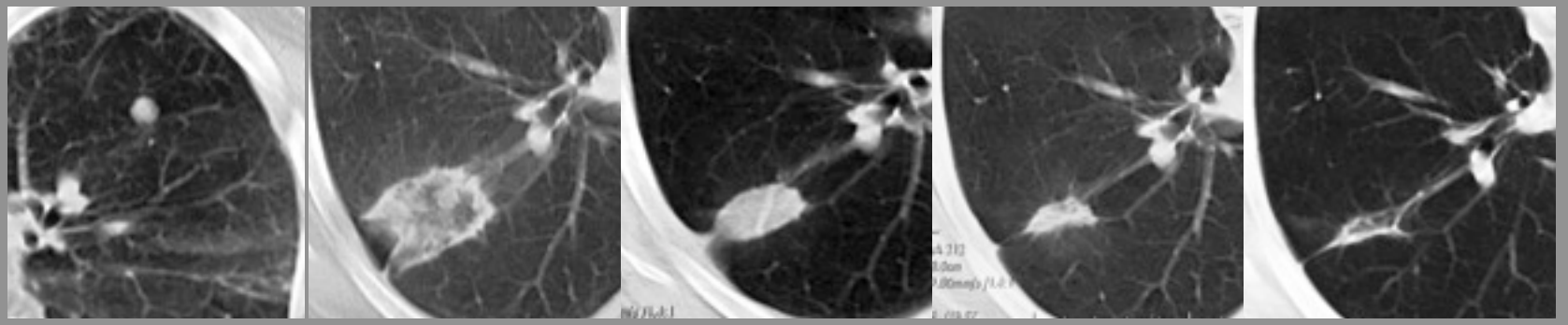



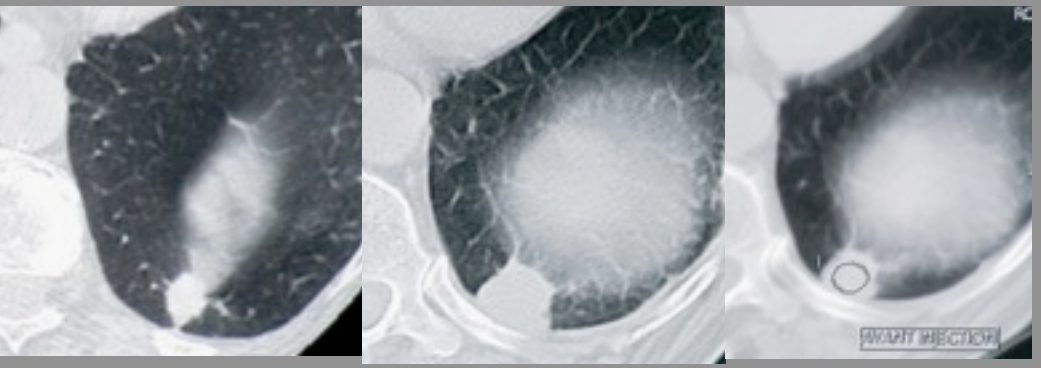
Collagène

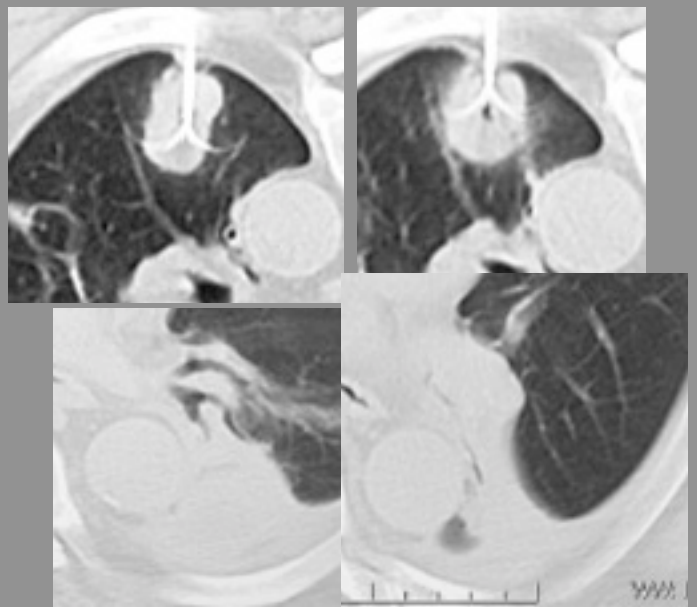
Fibroblastes

D’autres aspects sont possibles:

- Opacités en verre dépoli (2 mois)
- Fibrose
- Cavitation
- Nodule
- Atélectasie







Patients avec méta pulmonaire ou cancer primitif traité par RF d'Octobre 02 à Decembre 05

Avt traitement 2 groupes sont identifiés:

- lésion moins de 2 cm
- lésion plus de 2 cm

Après RF patients sont suivis par scanner CT à 2, 4, 6, 9 et 12 mois

98 Patients 176 lesions

2 mois : 88 patients 146 lesions

6 mois : 71 patients 120 lesions

12 mois : 49 patients 82 lesions

DC, Chimiothérapie, Données manquantes

Survie : 69,6% 24 mois

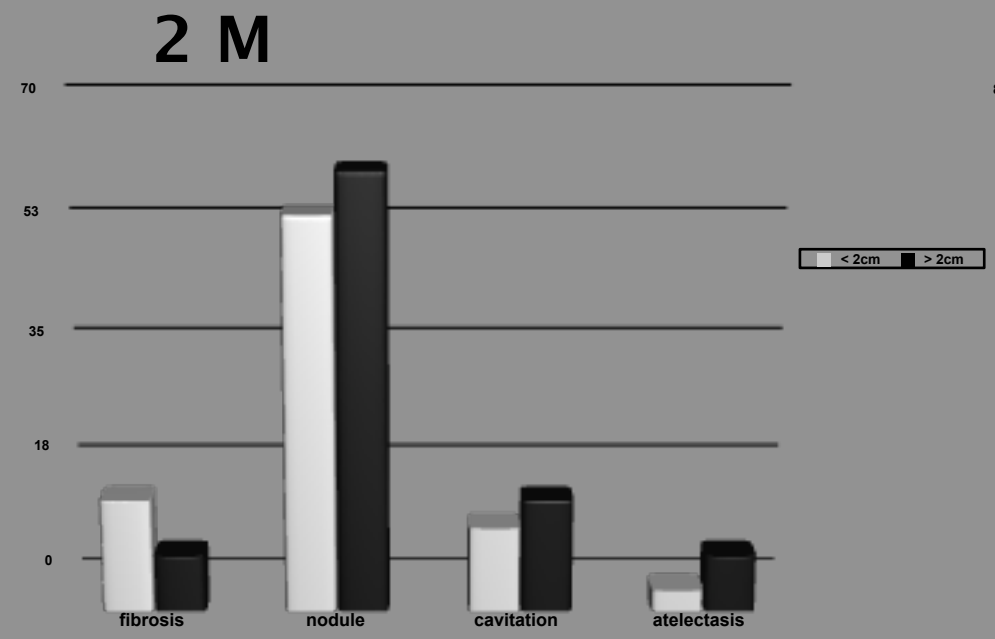
176 lesions

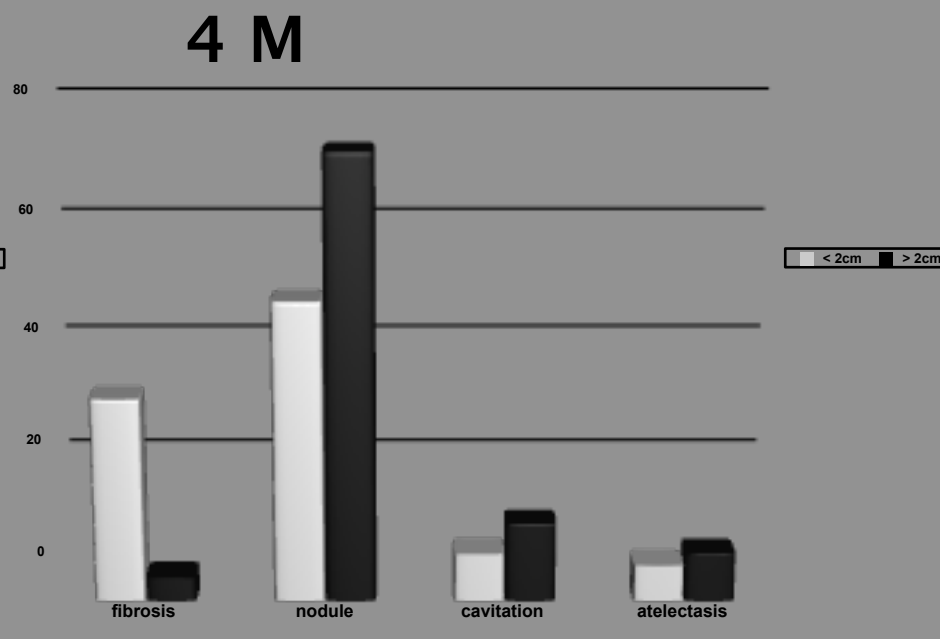
Parenchyme 66%,

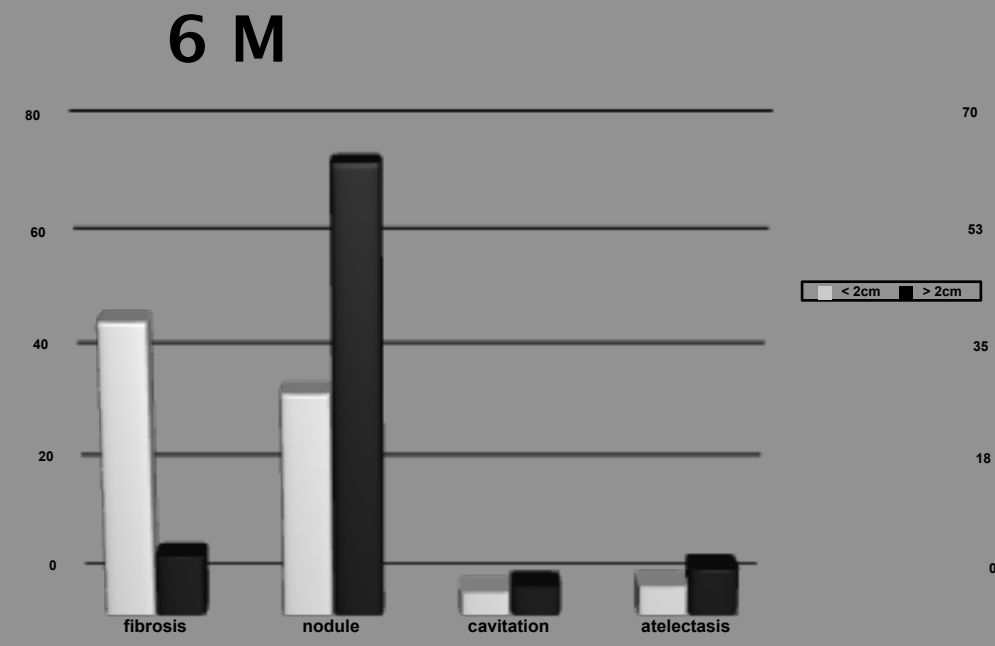
Contact pleural< 50% 23% , Contact pleural >50% 11%

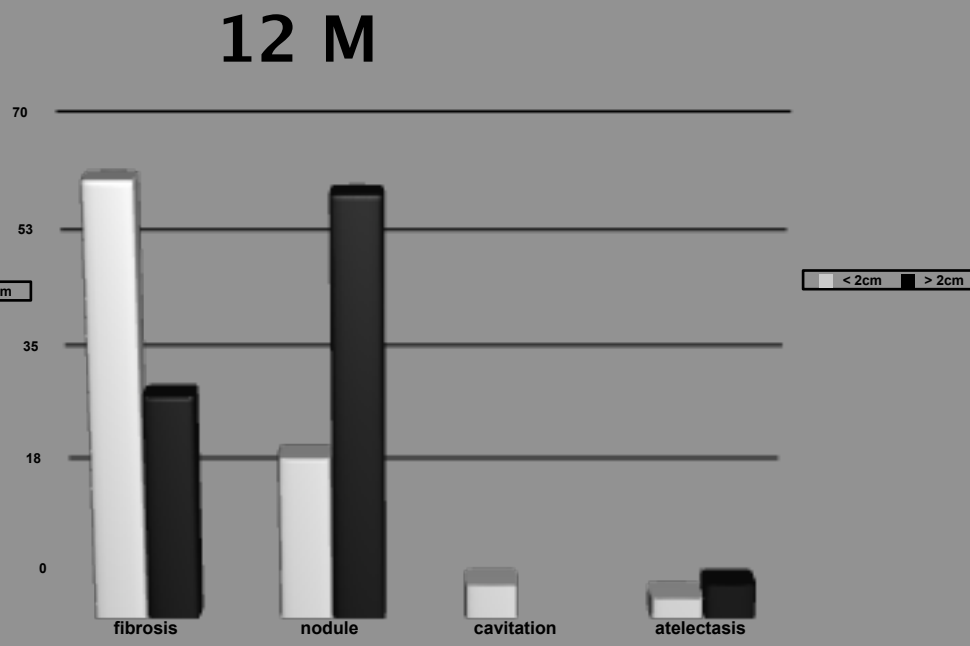
< 2cm 68% > 2cm 32%

J Palussiere CVIR 2008


2 M
70
53
35
18
0
< 2cm
> 2cm
fibrosis
nodule
cavitation
atelectasis


4 M
80
60
40
20
0
< 2cm
> 2cm
fibrosis
nodule
cavitation
atelectasis


6 M
80
60
40
20
0
< 2cm
> 2cm
fibrosis
nodule
cavitation
atelectasis


12 M
70
53
35
18
0
< 2cm
> 2cm
fibrosis
nodule
cavitation
atelectasis

Résultats :

Fibrose

Plus fréquente pour lésion < 2 cm

Resorption complète de la zone coagulée

	2M	4M	6M	9M	12M
< 2cm %	16	34	50	58	64
> 2cm %	8	4	10	15	33

Résultats :

Nodule

Plus fréquent pour lesion de plus de 2 cm

Lésion garde un aspect sphérique

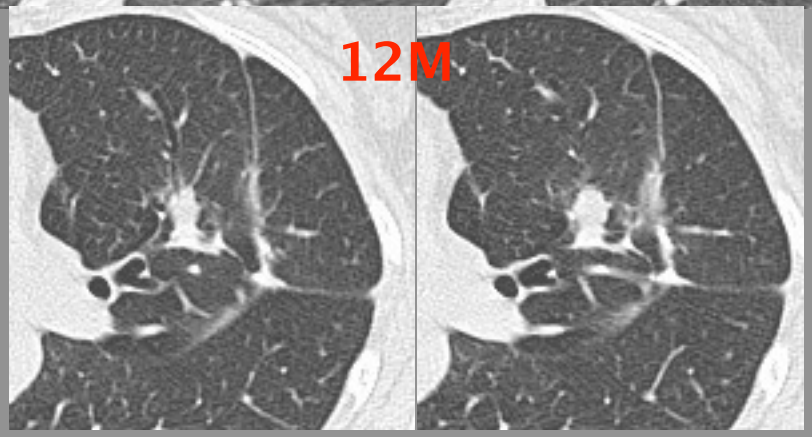
Difficulté de faire la différence entre cicatrisation et reliquat tumoral

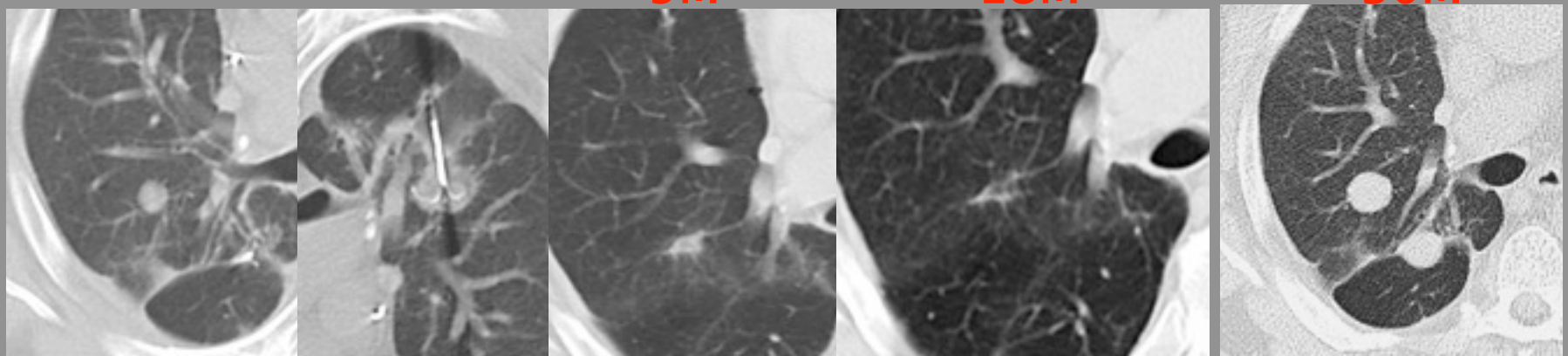
	2M	4M	6M	9M	12M
<2CM %	56	50	38	30	25
>2CM %	62	74	76	76	62

Progression tumorale locale

11 lesions

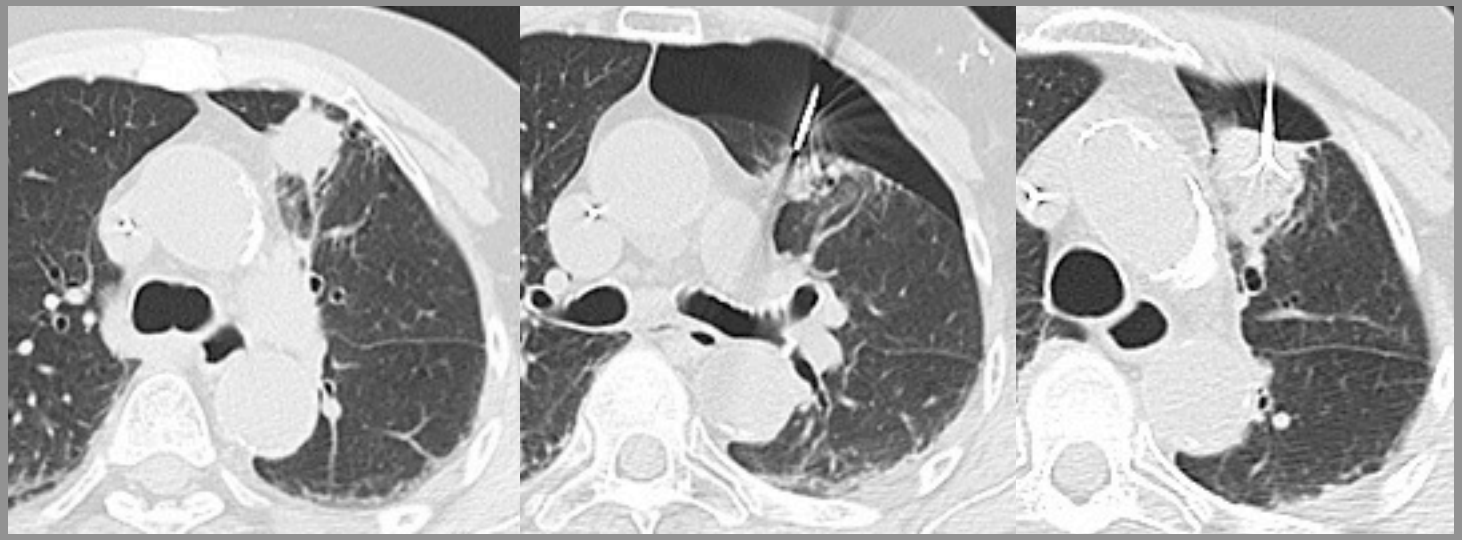
- fibrose 2
- cavitation 2
- nodule 6
- atélectasie 1

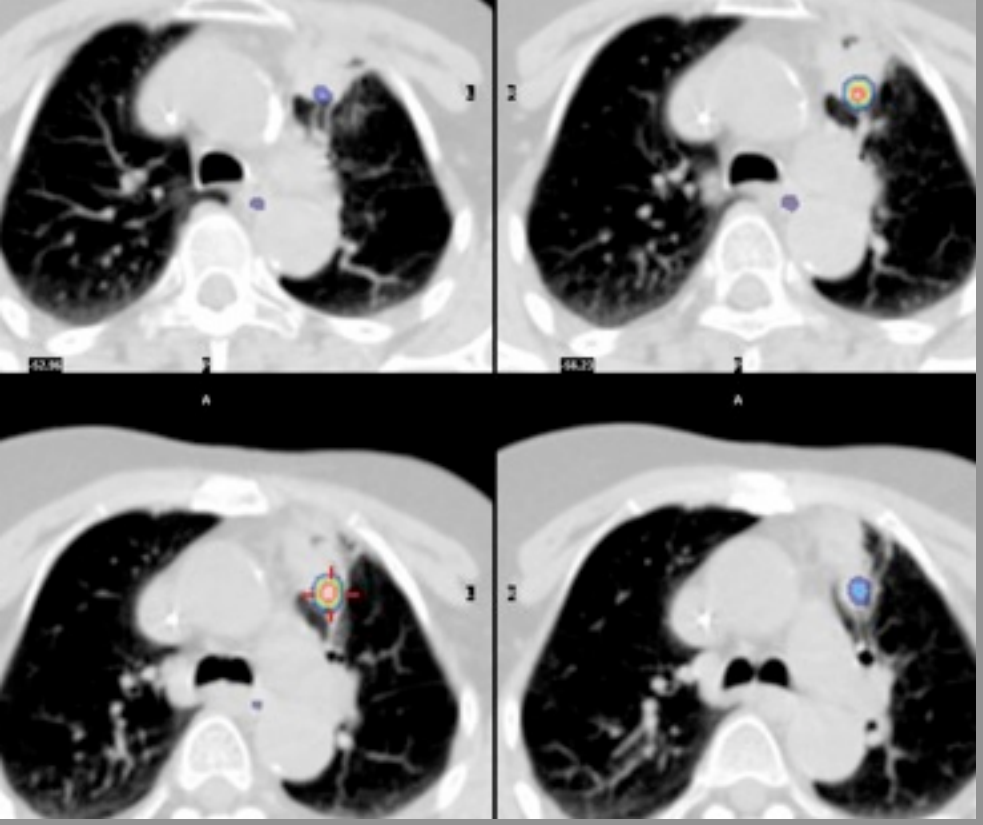


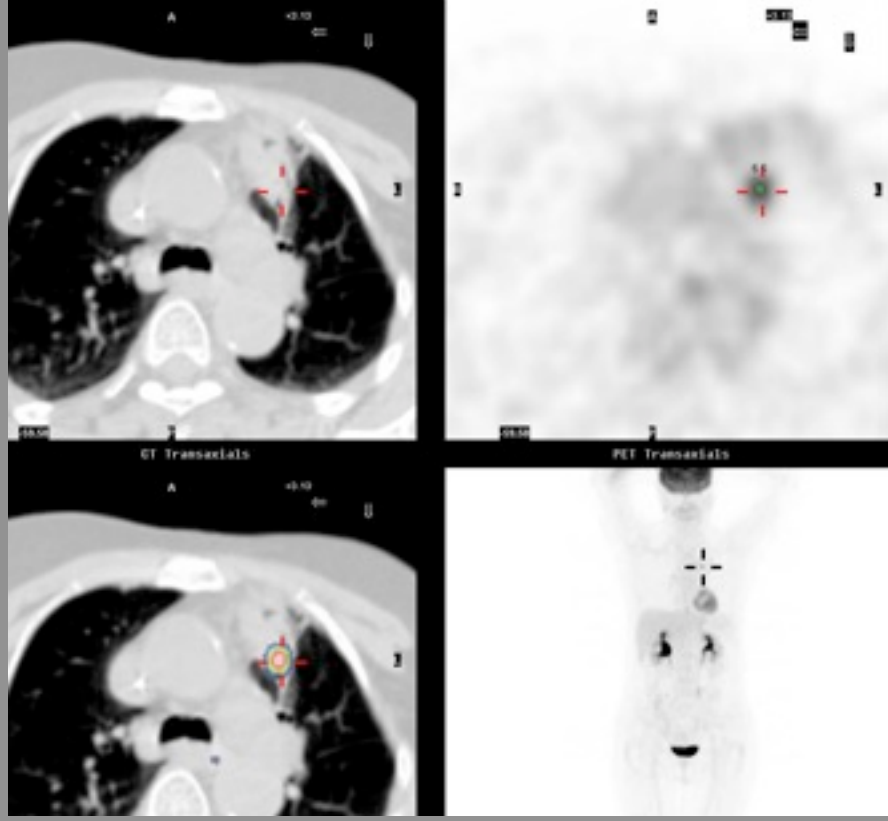


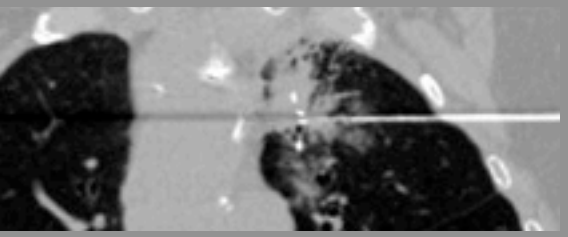
Echec

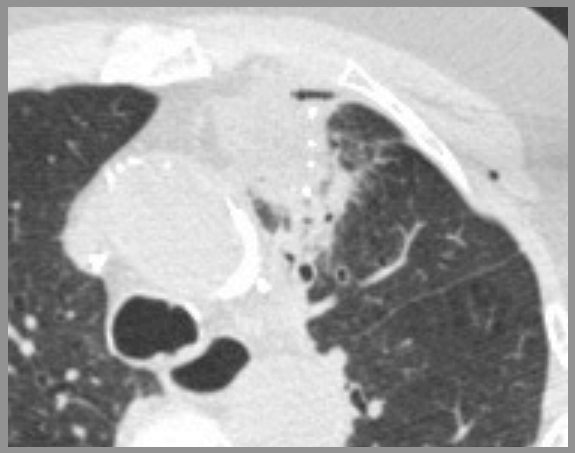
MME C 62 ans Carcinome bronchique en territoire irradié (cancer du sein)





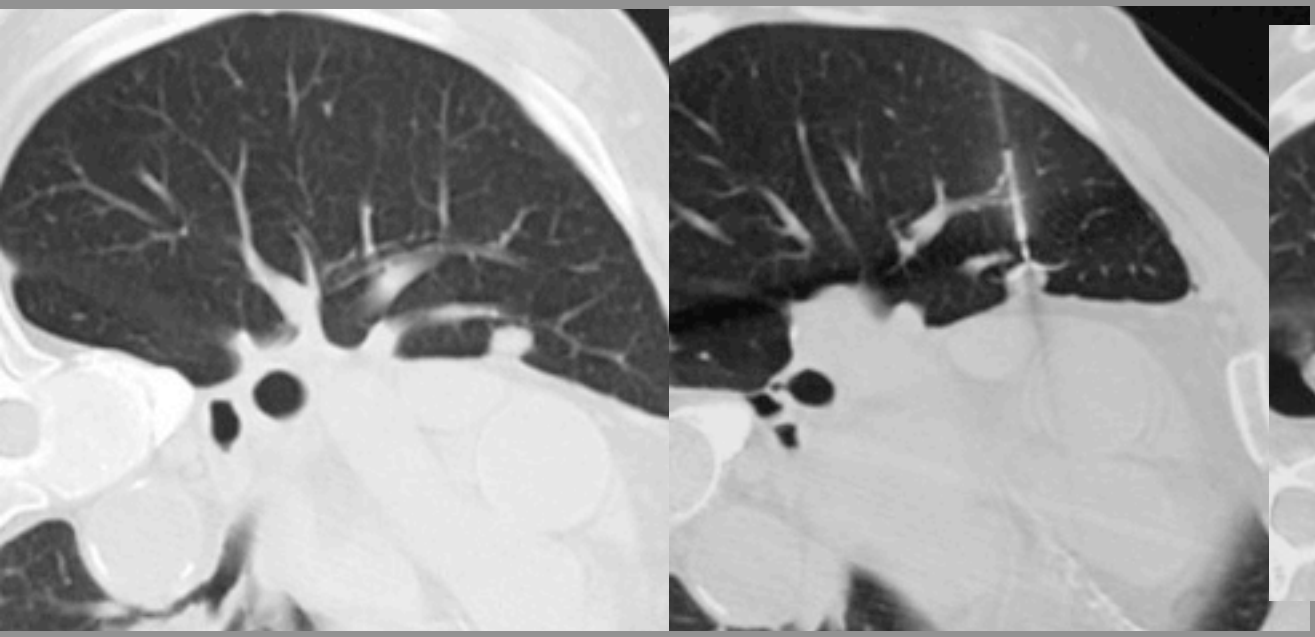

CT Transaxials
PET Transaxials

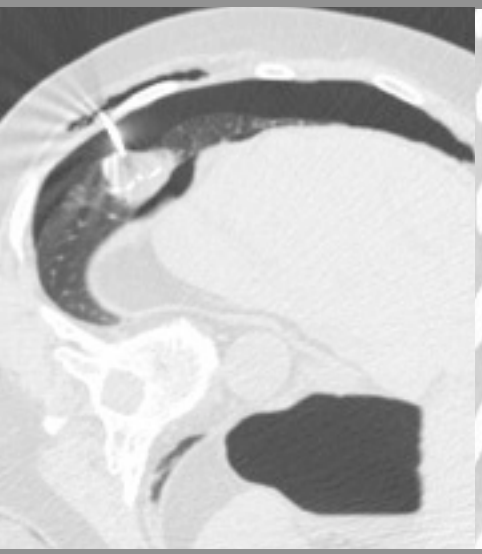
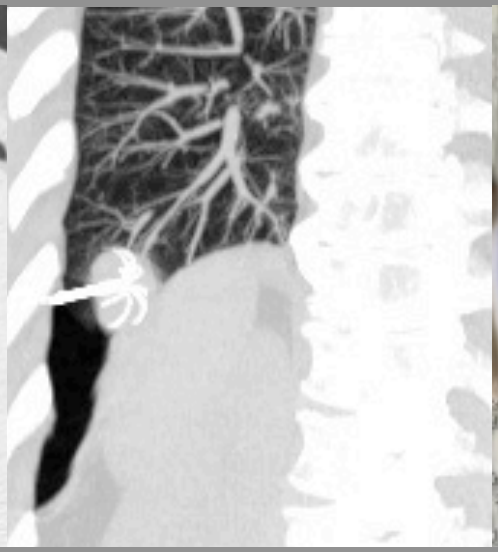
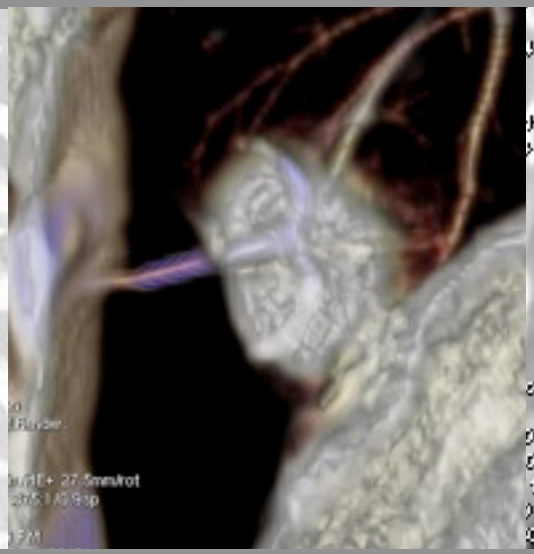


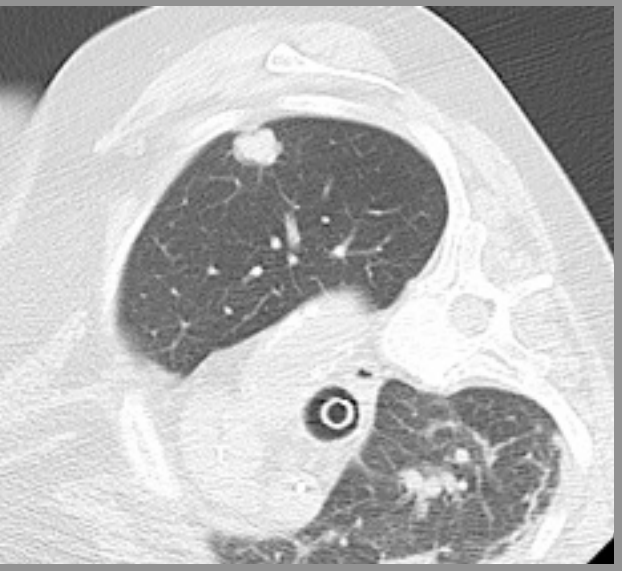


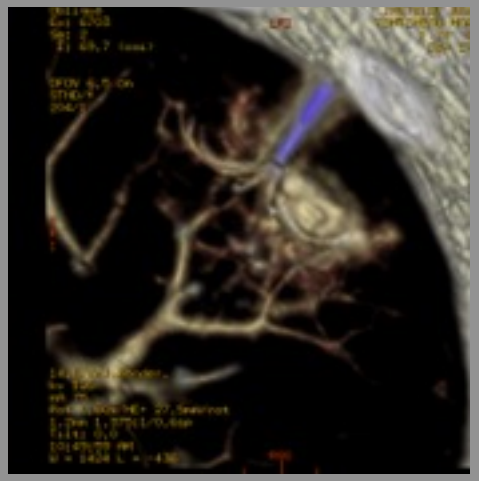
IRM

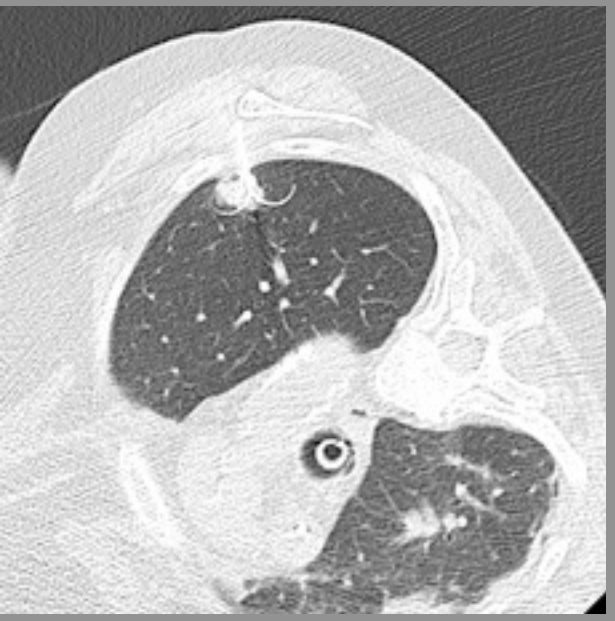
VOIES D'ABORD

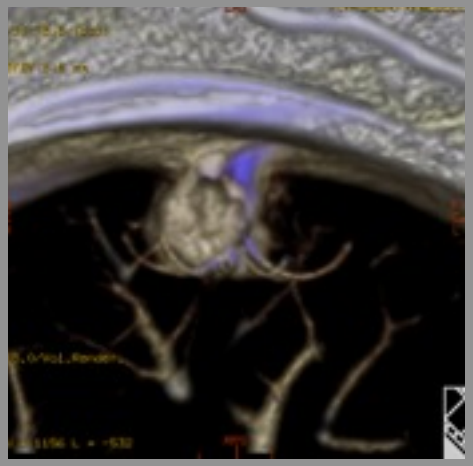


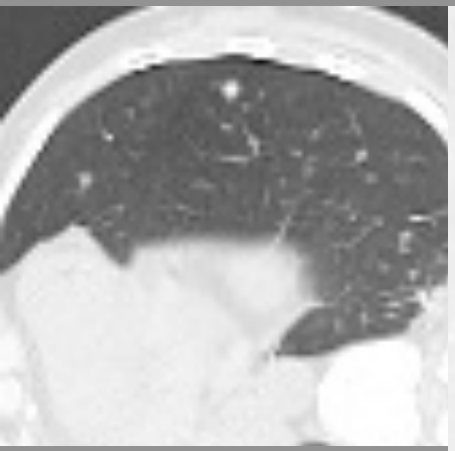



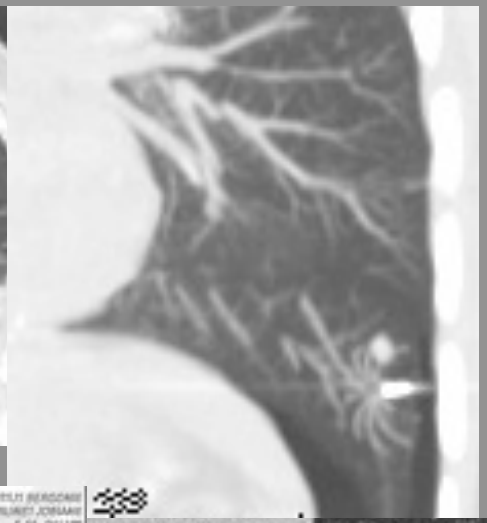


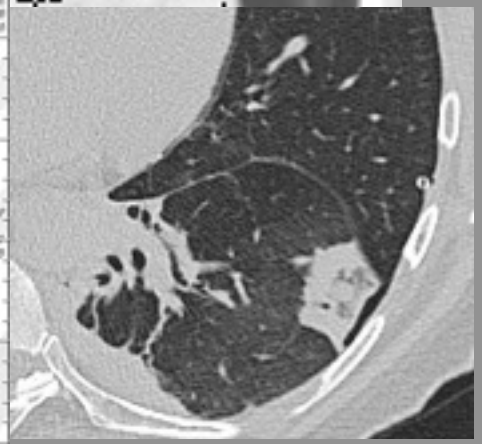




QUEL ABORD? QUEL MATERIEL?



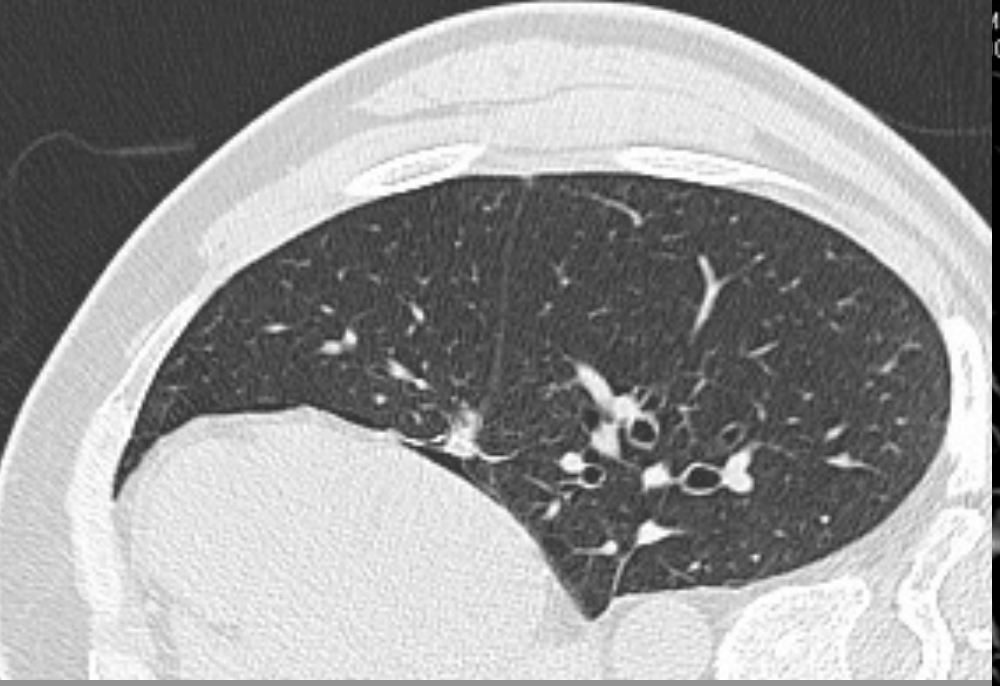




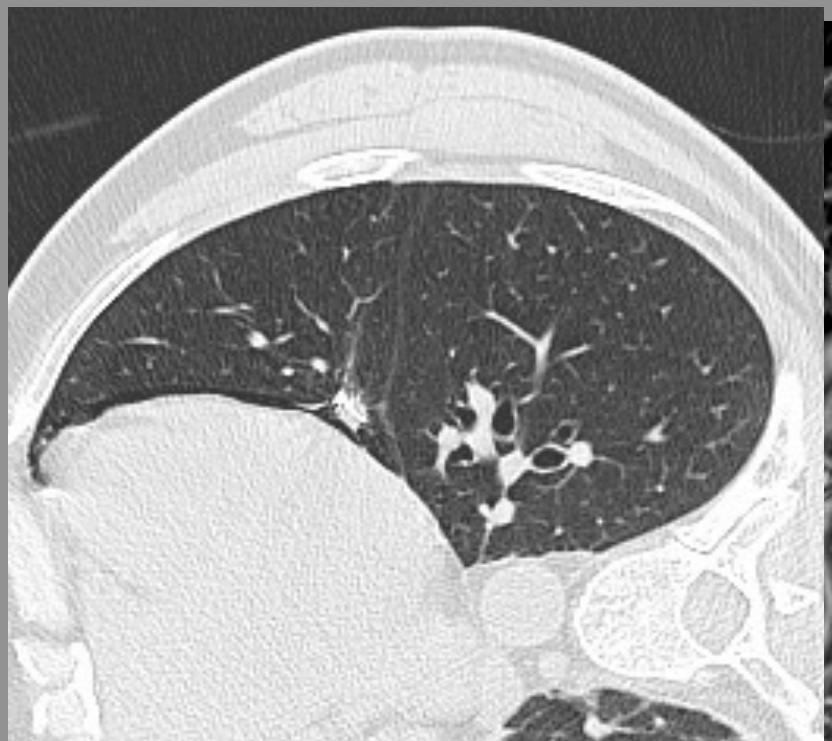
Failure of the technique : Risk factors

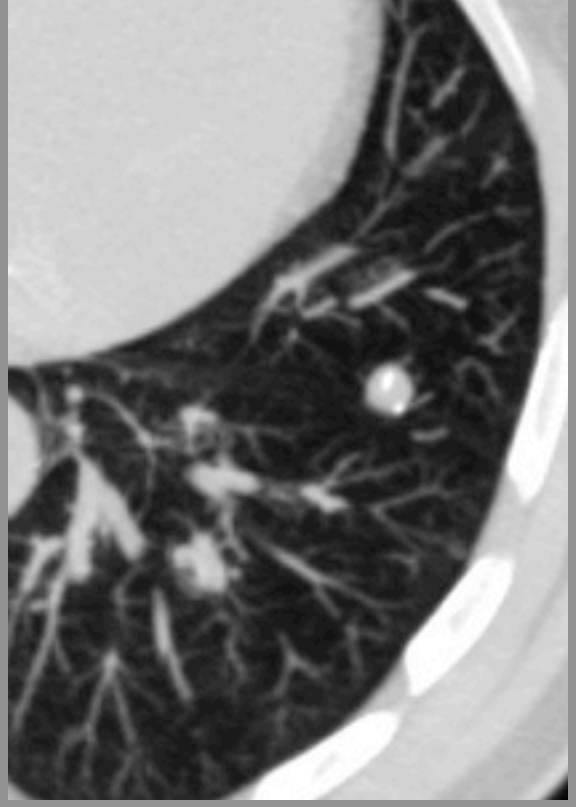
Hiraki T Cancer 2006

- 128 patients 342 tumors 25 primary 24 patients
  317 metas 104 patients
  colo-rectal 32
  lung 19
- TTT : multi-tine electrodes : 142 tumeurs
  perfused electrodes : 200 tumeurs
- Follow up 12 months (6-47 months)
- 2 factors
  - Tumoral size > 2 cm
  - Perfused electrode




LPI
SANS DECOLLEMENT

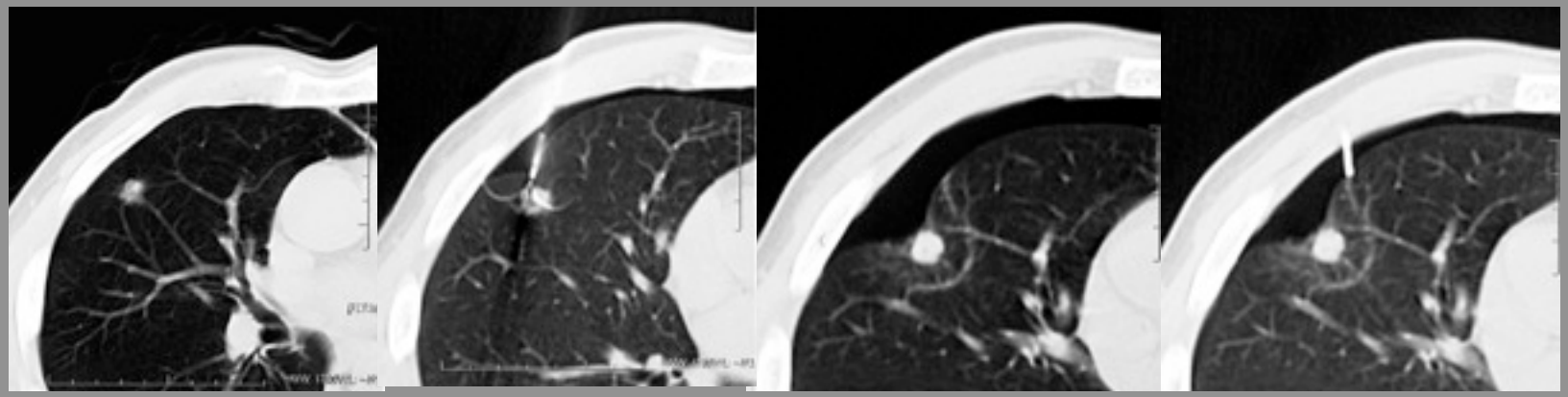




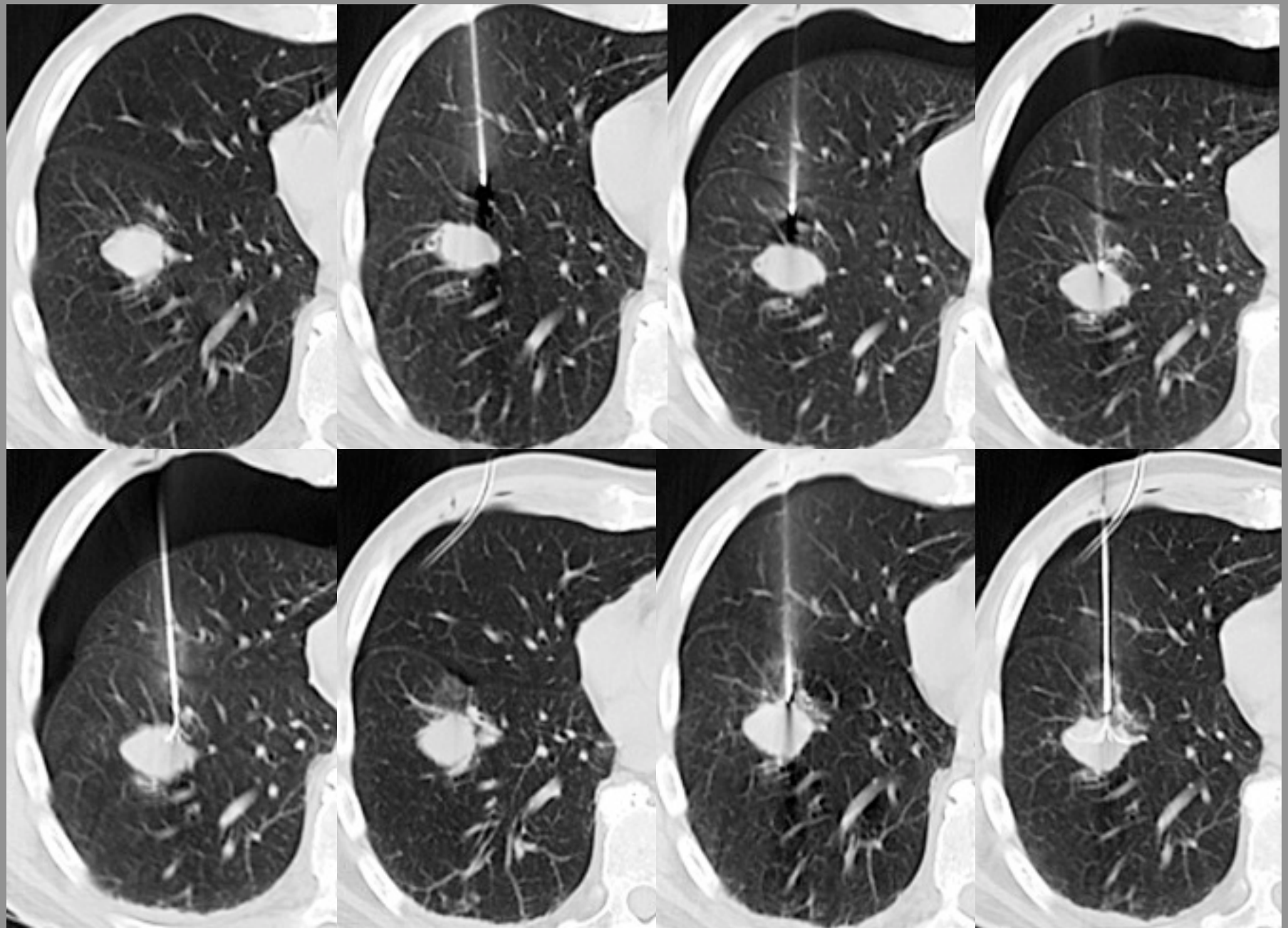
COMPLICATIONS

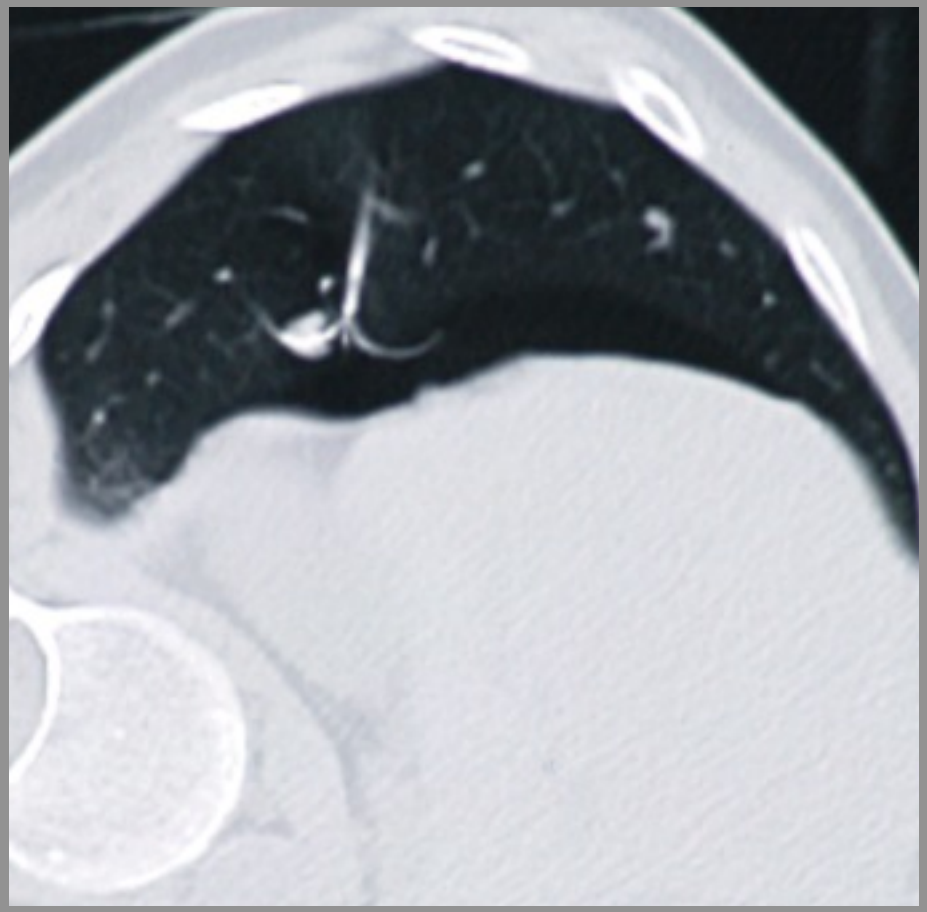
Pneumothorax

- aspiration ap procédure
- aspiration ou drain pdt la procédure
- avantage des électrodes déployables

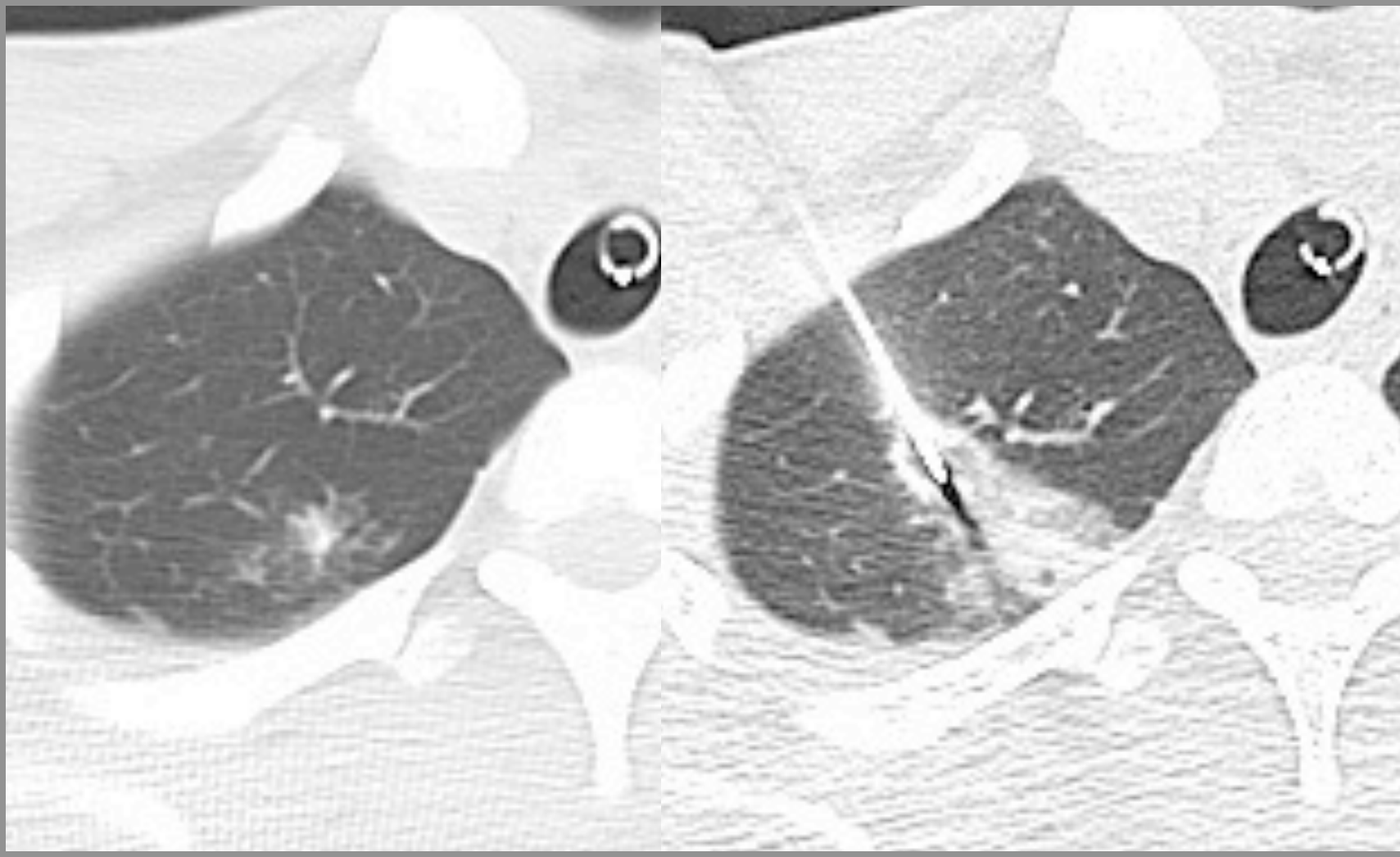


Anticancer Res. Jan-Feb 2004 Steinke and coll.
493 procedures 30% Pneumothor. 10% drainage





Difficultés de positionnement : Hémorragie

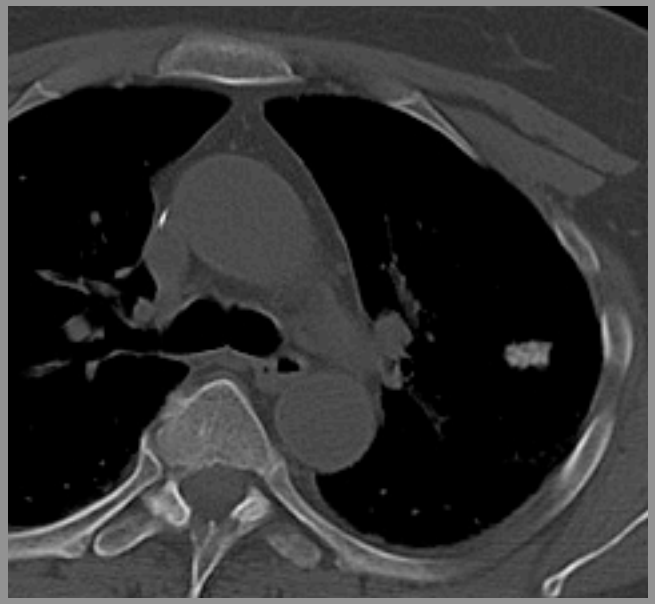


Difficultés de positionnement :

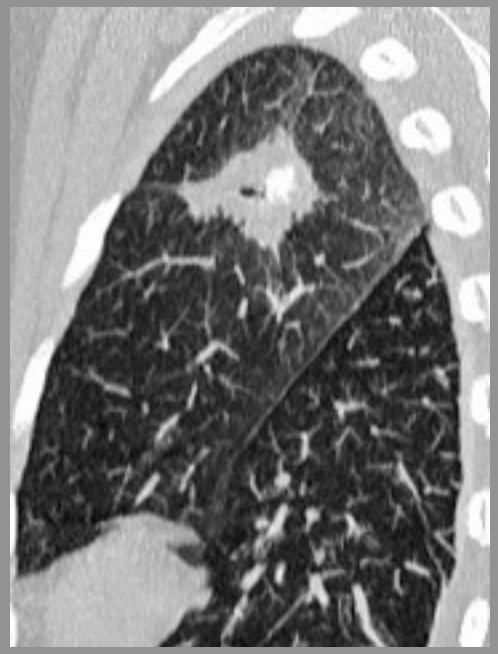
- tumeur calcifiée (méta ostéosarcome, côlon)
- tumeur fibreuse (méta côlon)

Si électrode déployable : chauffer en 2 temps

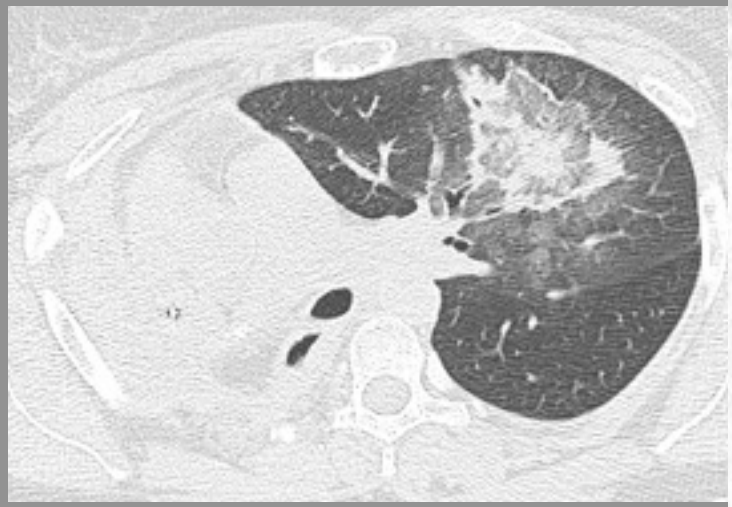
- 1 sans déployer complètement l'électrode
- 2 en la déployant complètement

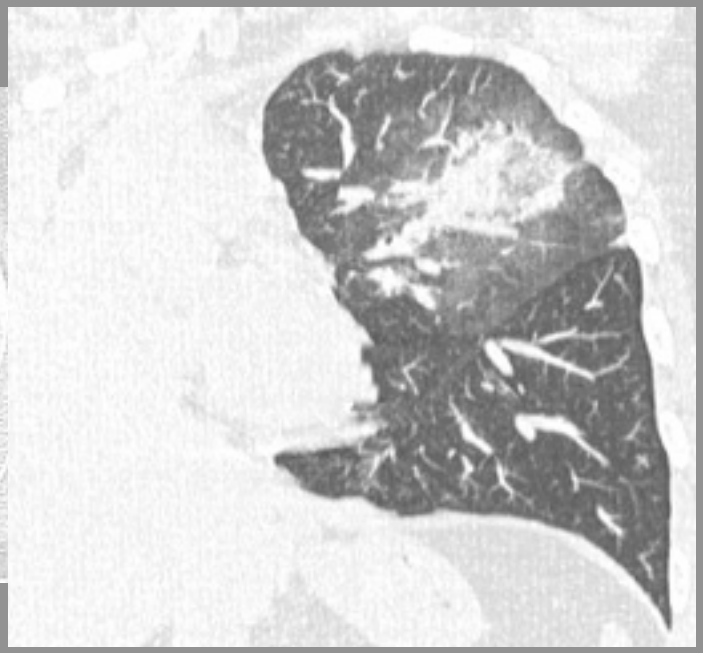




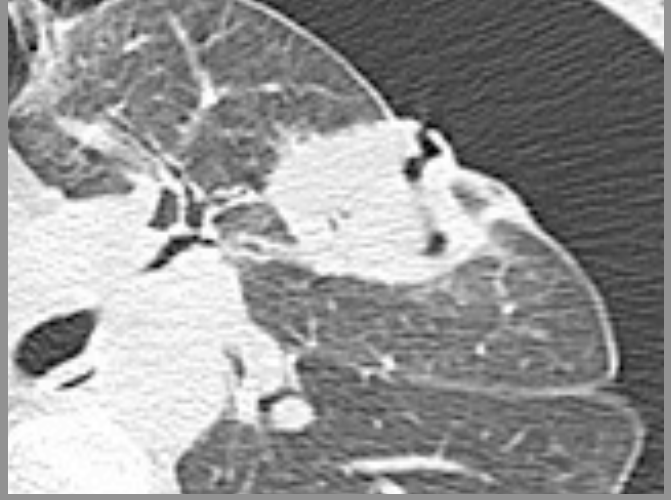


Peut-on traiter un poumon unique?

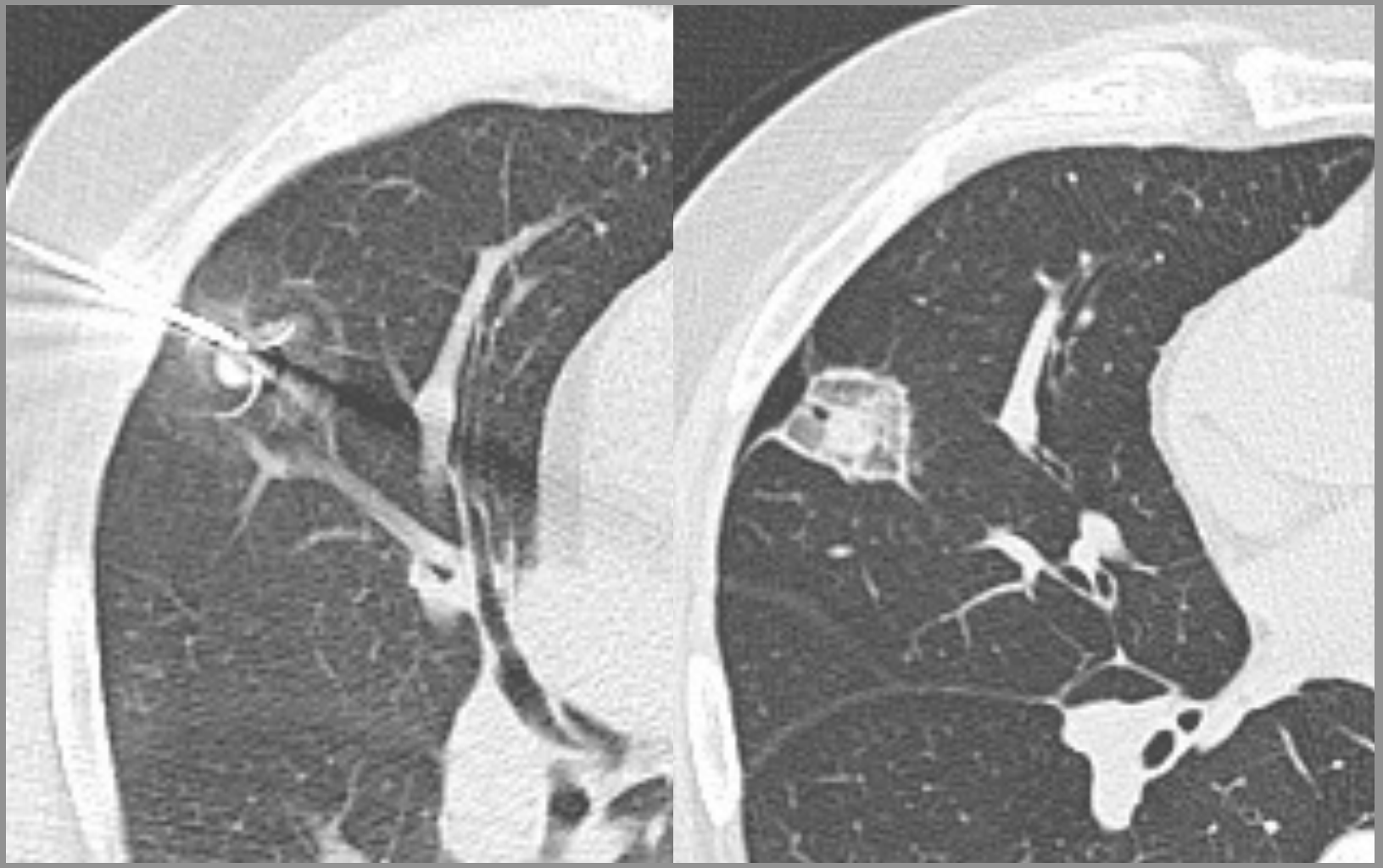


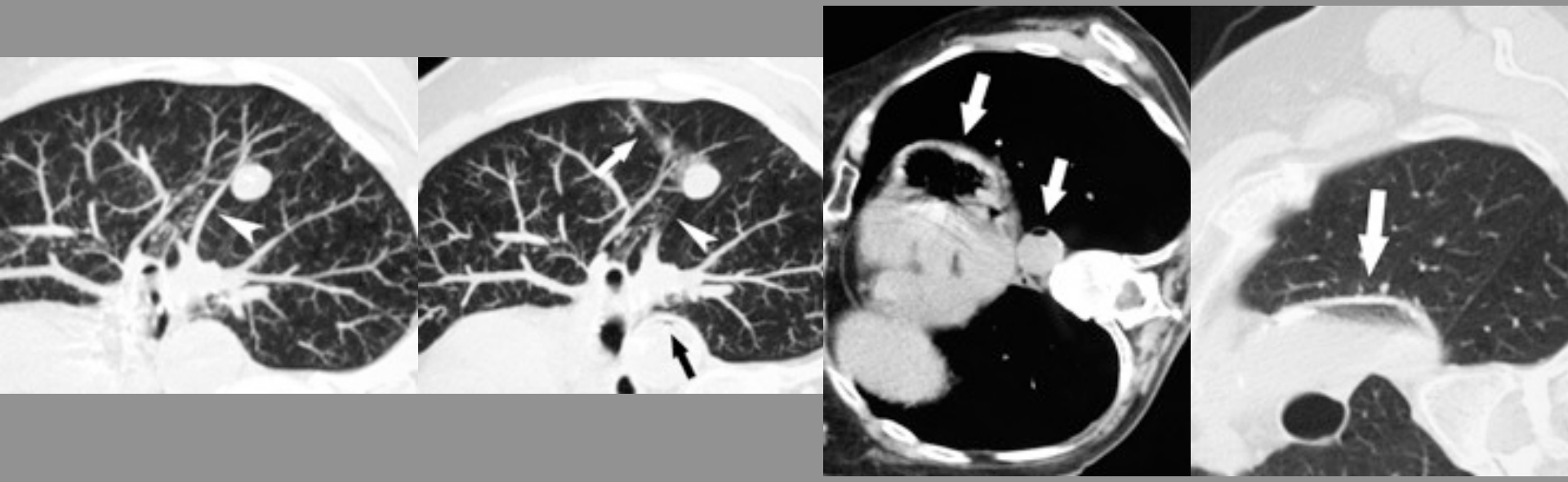


2 mois



Ap 2 semaines de drainage



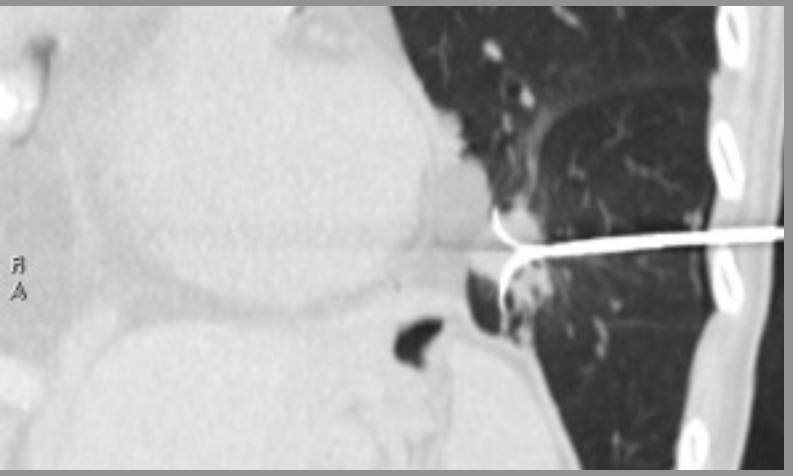


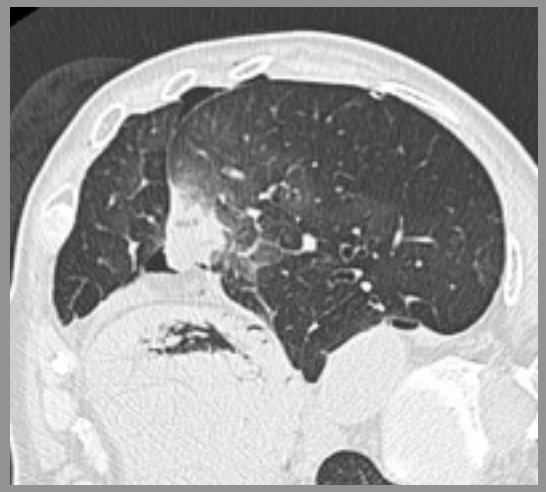
Nonfatal Systemic Air Embolism During Percutaneous Radiofrequency Ablation of a Pulmonary Metastasis

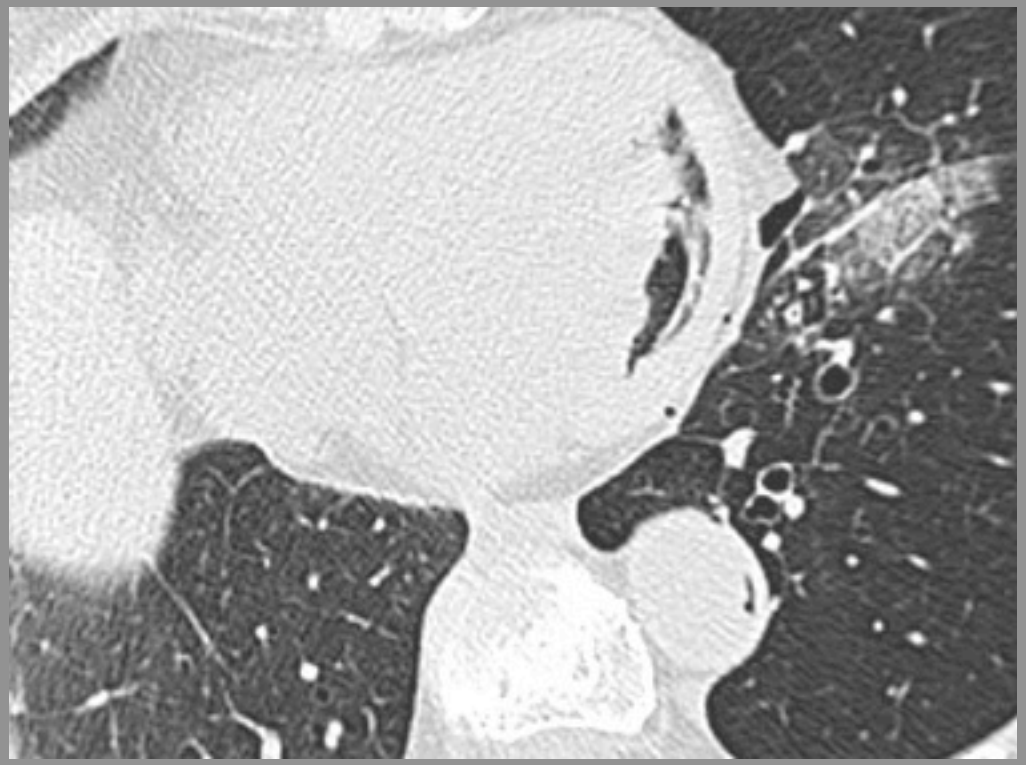
Benoit Ghaye, Pierre-Julien Bruyère and Robert F. Dondelinger AJR 2006

AVC aigu post RF Jin AJR Avril 04

Micro-embols cérébraux asymptomatiques pdt RF dépistés par écho Yamamoto AJR Dec 04







Patiente 72 ans

AdénoK bronchique lob sup Dt Chirurgie 2005

2007 loc lobaire inf G

Radiothérapie

Poursuite évolutive

RF

Material

- 244 patients (27-81 years) / 2 cancer centers
  - **147 men, 97 women, Age : 62±14 years (27-85)**
  - **First 64 patients were non surgical candidates**

    (de Baere T, Radiology 2006)
  - **Last 180 reviewed on multidisciplinary tumor board meeting**

- 397 tumors 4 - 70 mm (m=17 ± 9.5)
  - **Métastases : 197 patients (81%) - (343 tumors)**
    - **60 colon, 32 rectum, 28 kidney, 23 sarcoma, 7 breast, 6 thyroid, 4 pancreas, 35 misc.**
  - **NSCLC : 47 patients (19%) - (52 tumors)**
    - **15 epidermoie 28 adenoK, 4 others**

  - Unilateral 187 patients (77%), bilateral 57 patients (23%)
  - Number of tumeur / Patient
    - n = 1 (57%), n = 2 (25%), n = 3 (13%), n = 3 (5%), n = 5 or + (6%)

Methods

- Imaging follow-up
  - CT @ 2, 4, 6, 9 and 12 months and then to the medical oncologist
    - 1 months CT is baseline
      - Any stability or regression = complete ablation
      - Any increase in size = tumor progression
  - Last 38 patients underwent PET/CT when positive before ablation

Expected side effect

- Pneumothorax : 60%

1 - Surveillance 28%

2 - Aspiration under CT 30% (18% successful)

5F needle cath with side holes
Yueh needle **(Cook, Bjaeverskov, DK)**

3 - Drainage 12%

Pleurocath 8F **(Plastimed, Saint leu la foret, FR)**
Wayne pneumothorax 10.2 F **(Cook, Bjaeverskov, DK)**

+ Pleur-Evac (dry suction control)

4- Thoracoscopy 0.6%

5- Thoracotomie / resection 0.3%

Early Complications

- Death 0.5% (ventricular fibrillation)
- Pleural effusion 5% (Minimal:4%, Mild:1%)
- Alveolar hemorraghe 14% (Minimal:11%, Mild:3%)

Minimal : no treatment
Mild : 1 preclude RF

- Cutaneous burn 1%

After discharged from the hospital

- **No symptom** 66 %
- **At least one symptom** 34 %
  - Pain / pleural Effusion 23%
  - Hemoptysis 5%
  - Pneumothorax 2%
  - Pneumopathy 3%
  - Respiratory insufficiency 0.5%

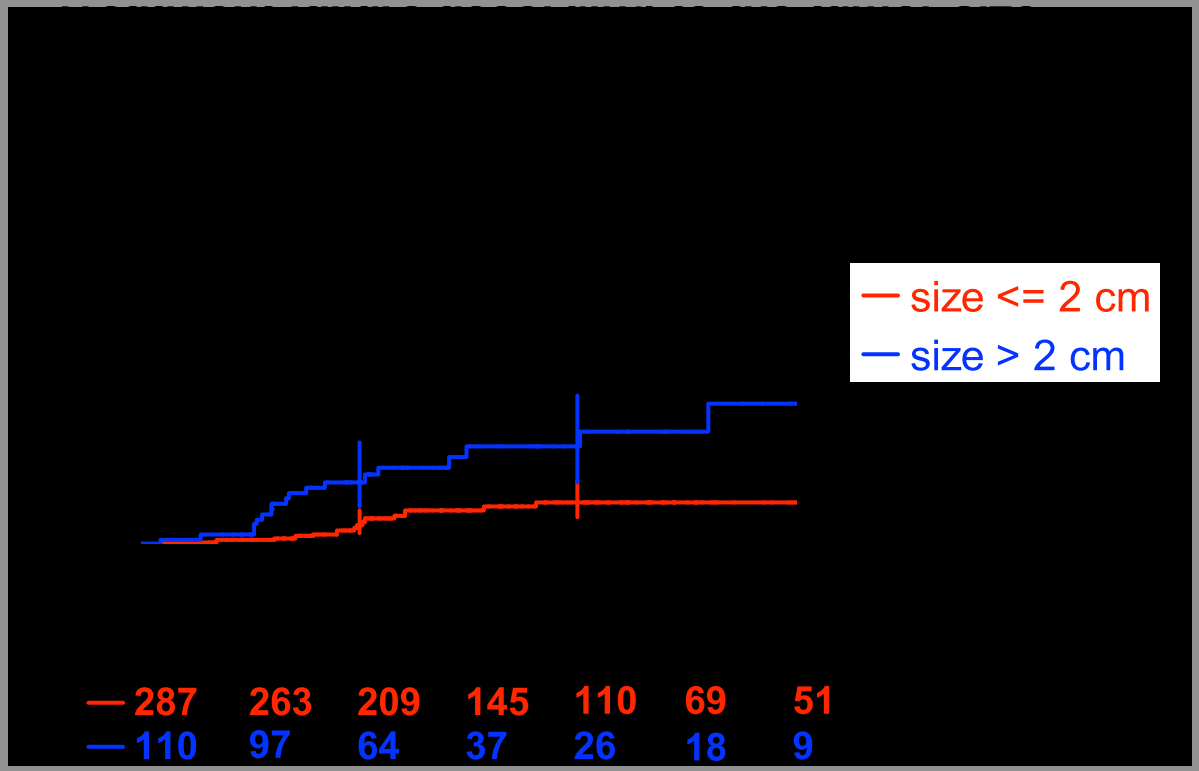
- **7 patients readmitted (No ICU readmission)**
  - **1 day / pleurocenthesis** (2 patients)
  - **8 days / pneumopathy** (RF in previously irradiated territory)
  - **10 days / pneumothorax** (2 patients) (1 pleuroscopy),
  - **34 days / septicemia**

Incomplete local ablation

Per tumor : **6.1%** (4-9) @1 year, **11.2%** (8-15) @ 2 years

tumor ≤ 2cm : **3.7%** (2-7) @1 year, **8.2%** (5-13) @ 2 years

tumor >2cm : **12.4%** (7-21) @1 year, **19.4%** (12-30) @ 2 years



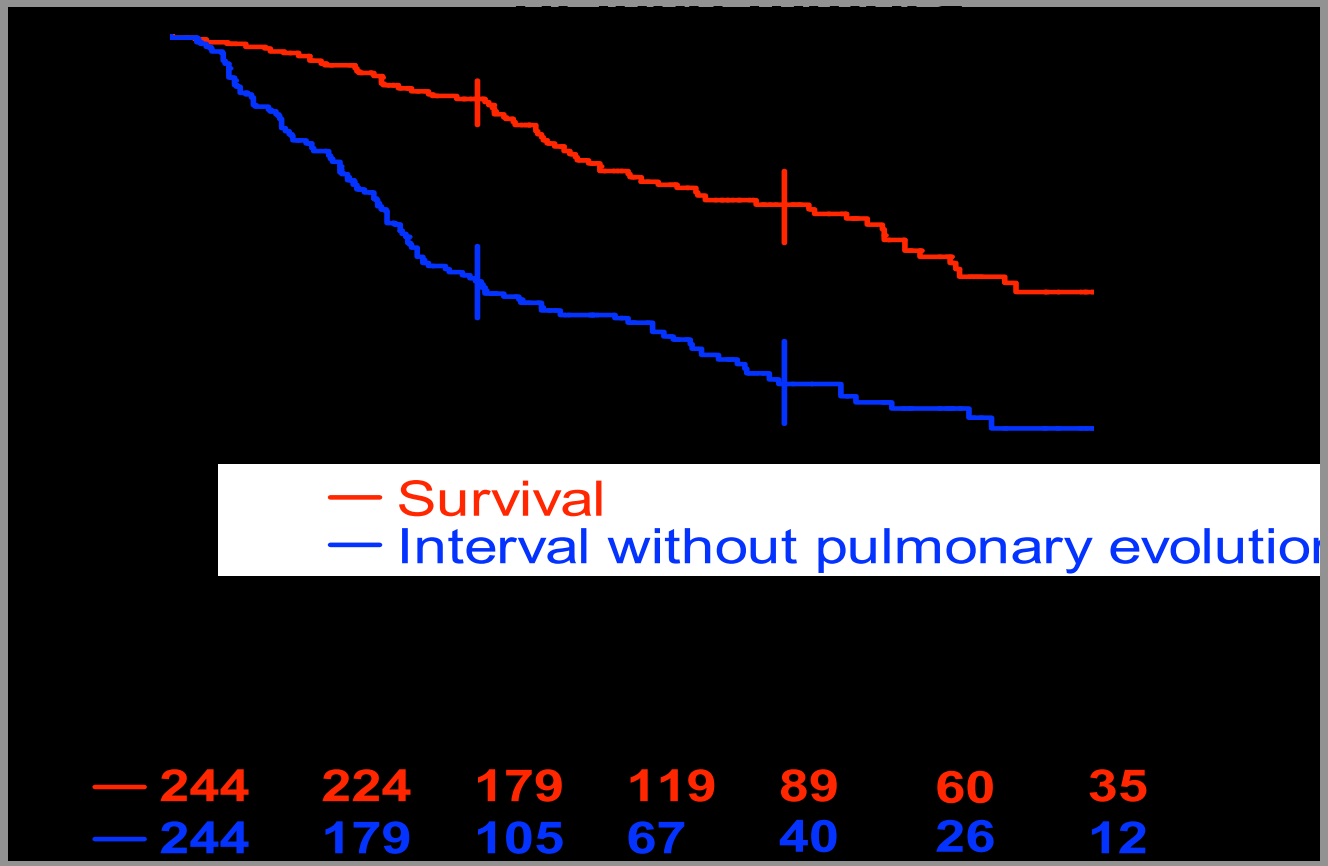
Survival

Survival : med =25 months

88.7% (84-92) @ 1 year, 70.3% (63-76) @ 2 years

Patients without pulmonary evolution (RF site or distant)

57.5% (51-64) @ 1 year, 38.8% (32-47) @ 2 years



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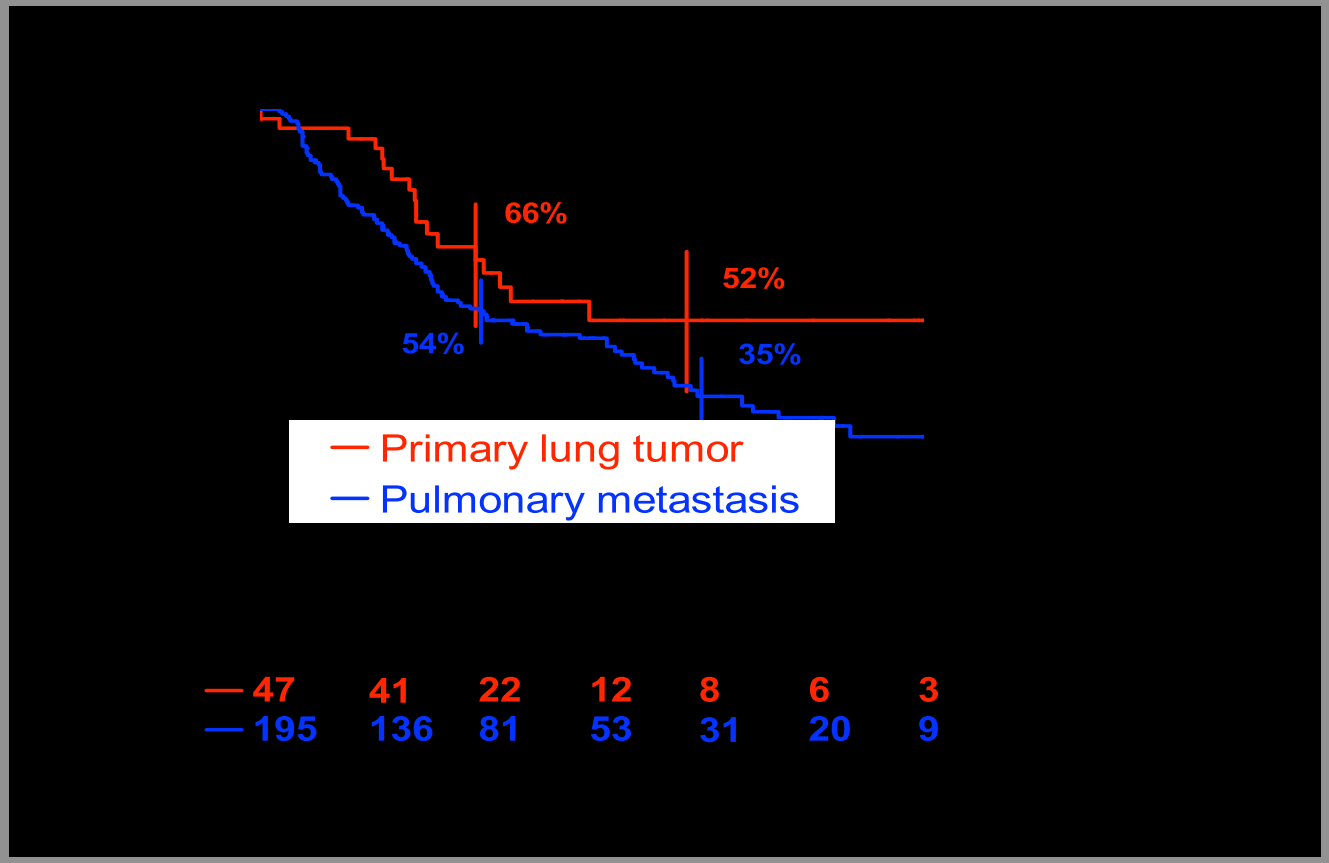
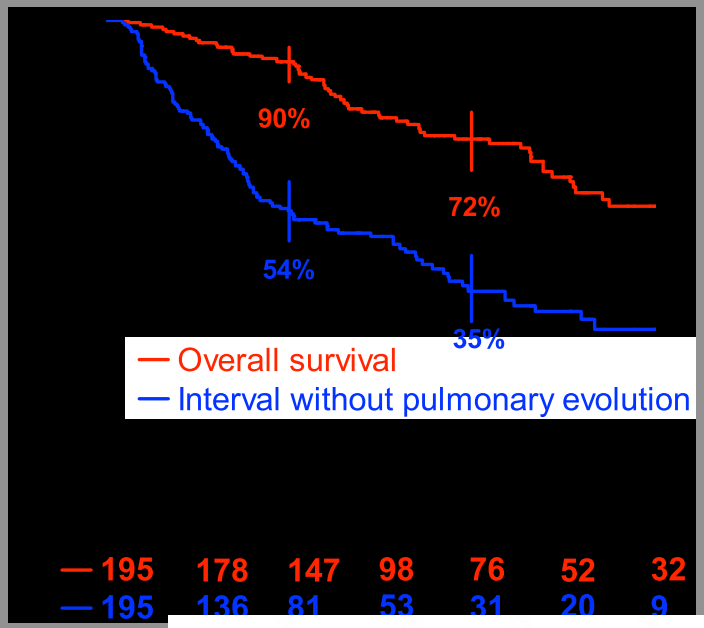
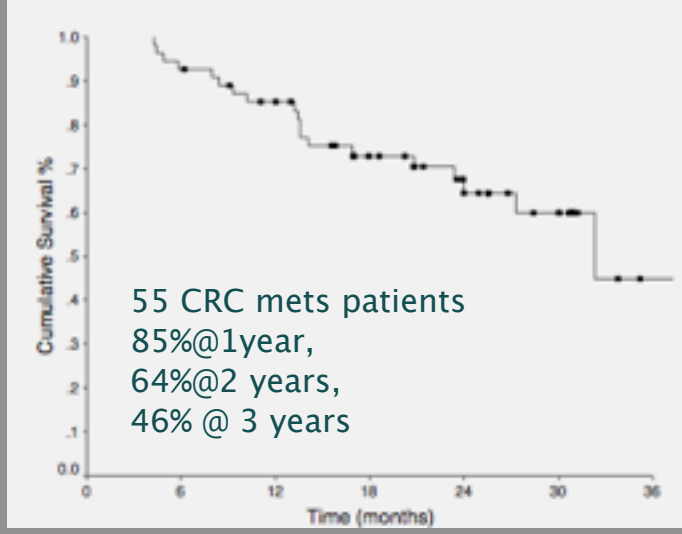
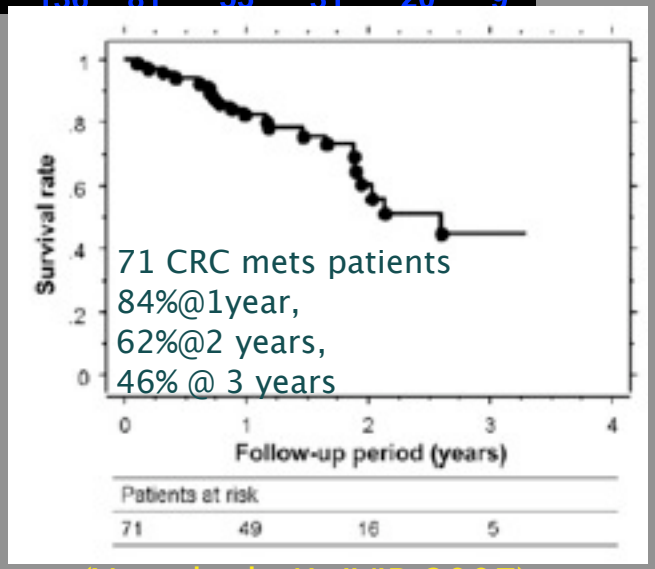


Survival

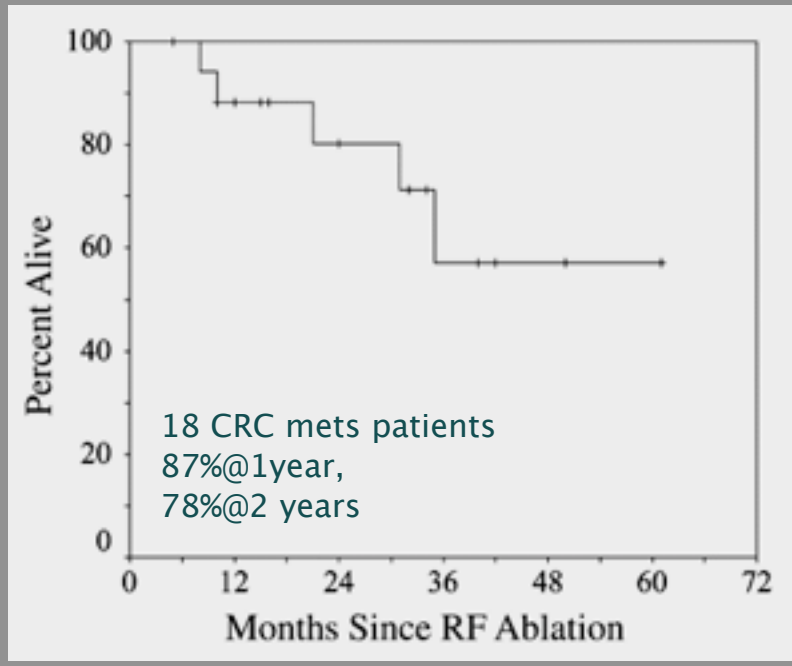




(Yan TD, Ann Surg Oncol 2007)



(Yamakado K, JVIR 2007)



(Simon CJ, Radiology 2007)

Conclusion

- RF bien tolere
- Survie a deux ans 70%
- RF 50% survie sans recidive@ 2 ans T primitive