

# Imagerie diagnostic du cancer bronchique: Bilan initial

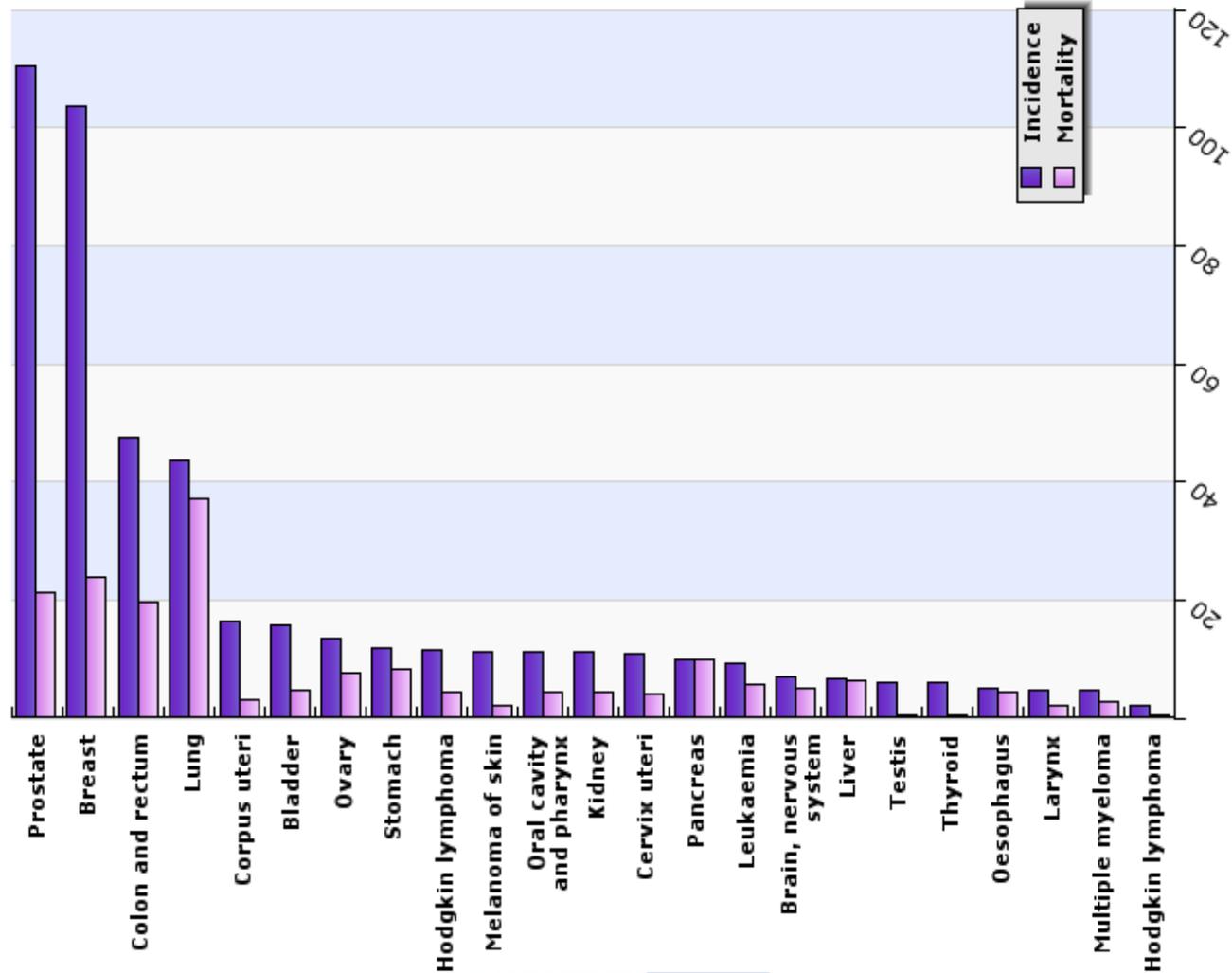
Antoine KHALIL

Marie-France CARETTE



# Introduction

Le cancer bronchique est la première cause de mortalité par cancer en Europe avec une survie à 5 ans <15%



Cancer bronchique

Incidence 43.7 /100 000

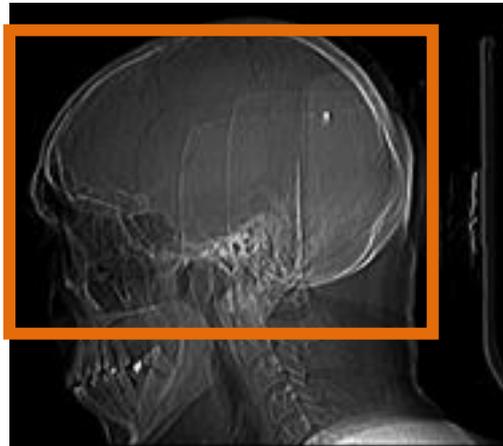
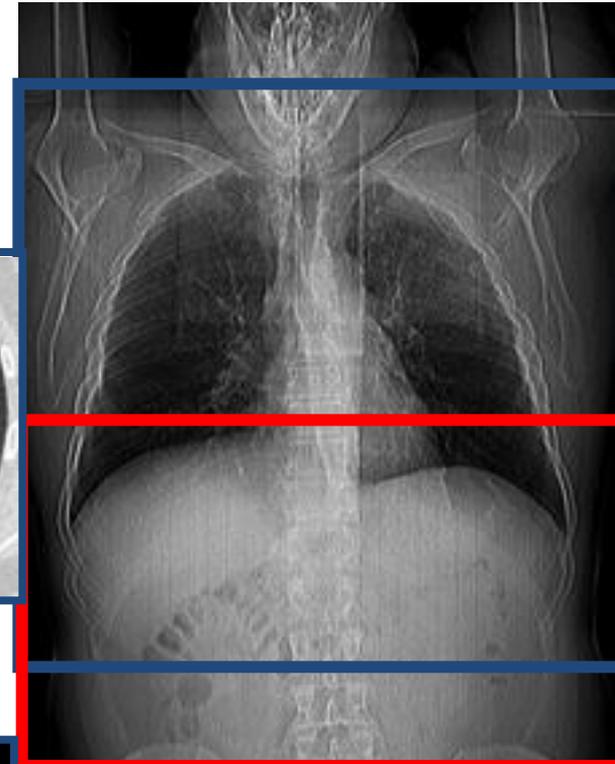
Mortalité: 37.0/100 000

# Introduction

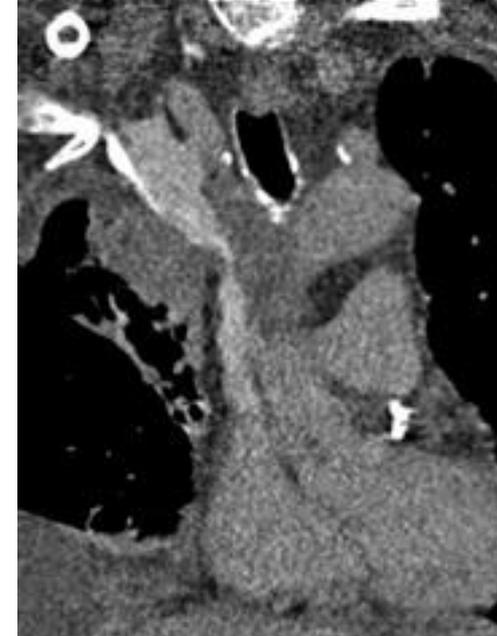
- Classification TNM
  - Définir quand le patient est éligible pour la chirurgie:
    - Oui: montrer au chirurgien une vue détaillée de la tumeur et de son extension loco régionale.
    - Non: Définir un autre approche thérapeutique
      - Chimiothérapie ou radiothérapie
      - Chimiothérapie ou radiothérapie avant une chirurgie
  - Prédire la survie des patients (moyenne et le 5-ans)
- Le suivi durant le traitement

# TDM

- Thorax incluant les glandes surrénales
- Coupes fines
- Avec injection d'Iode
- Passage sur l'encéphale

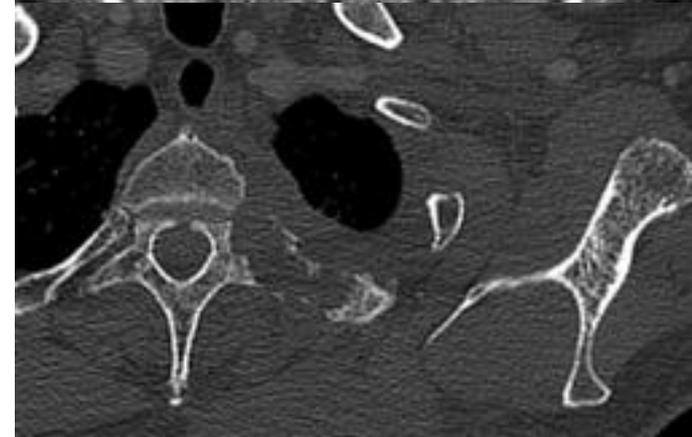
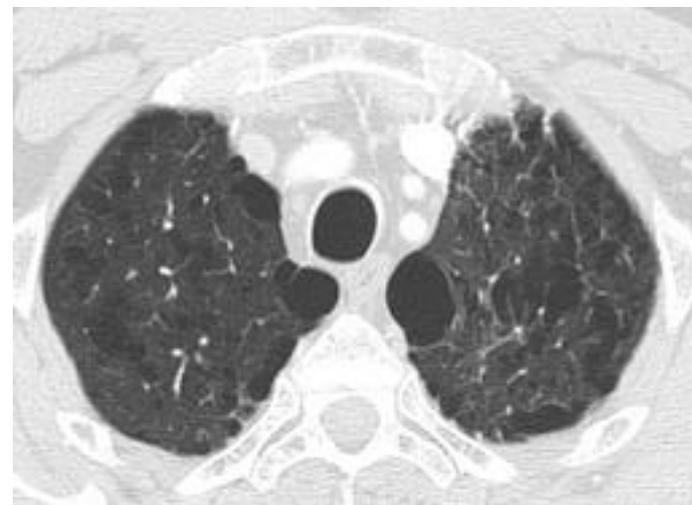


- Acquisitions particulières:
  - Syndrome VCS
    - Injection bi brachiale
    - Ou acquisition tardive (60 sec)
  - Envahissement oesophagien
    - Ingestion de gel avec iode
  - Envahissement cardiaque
    - Acquisition avec asservissement ECG
    - => IRM



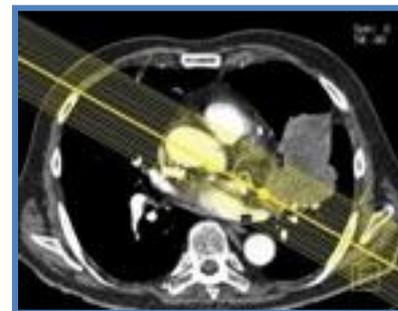
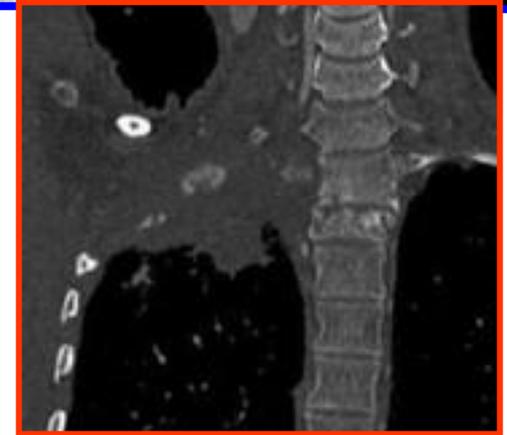
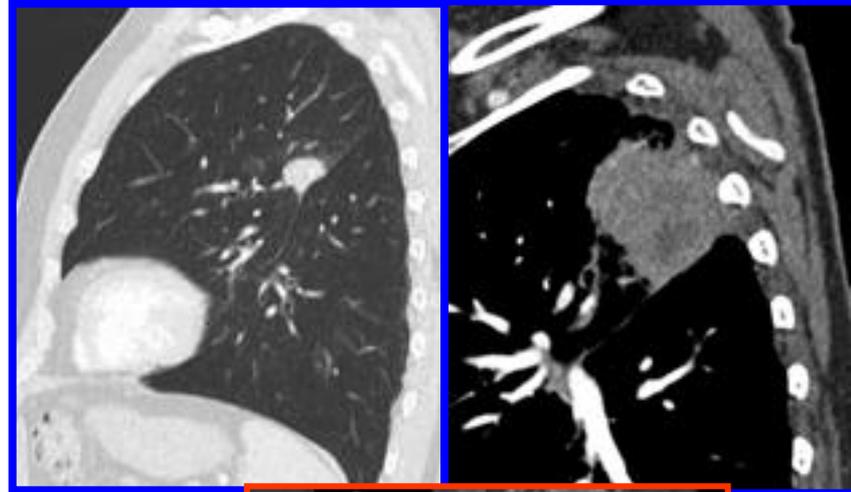
# TDM

- Visualisation des images:
  - Quelle fenêtre?
- Parenchymateuse
- Médiastinale
- Osseuse



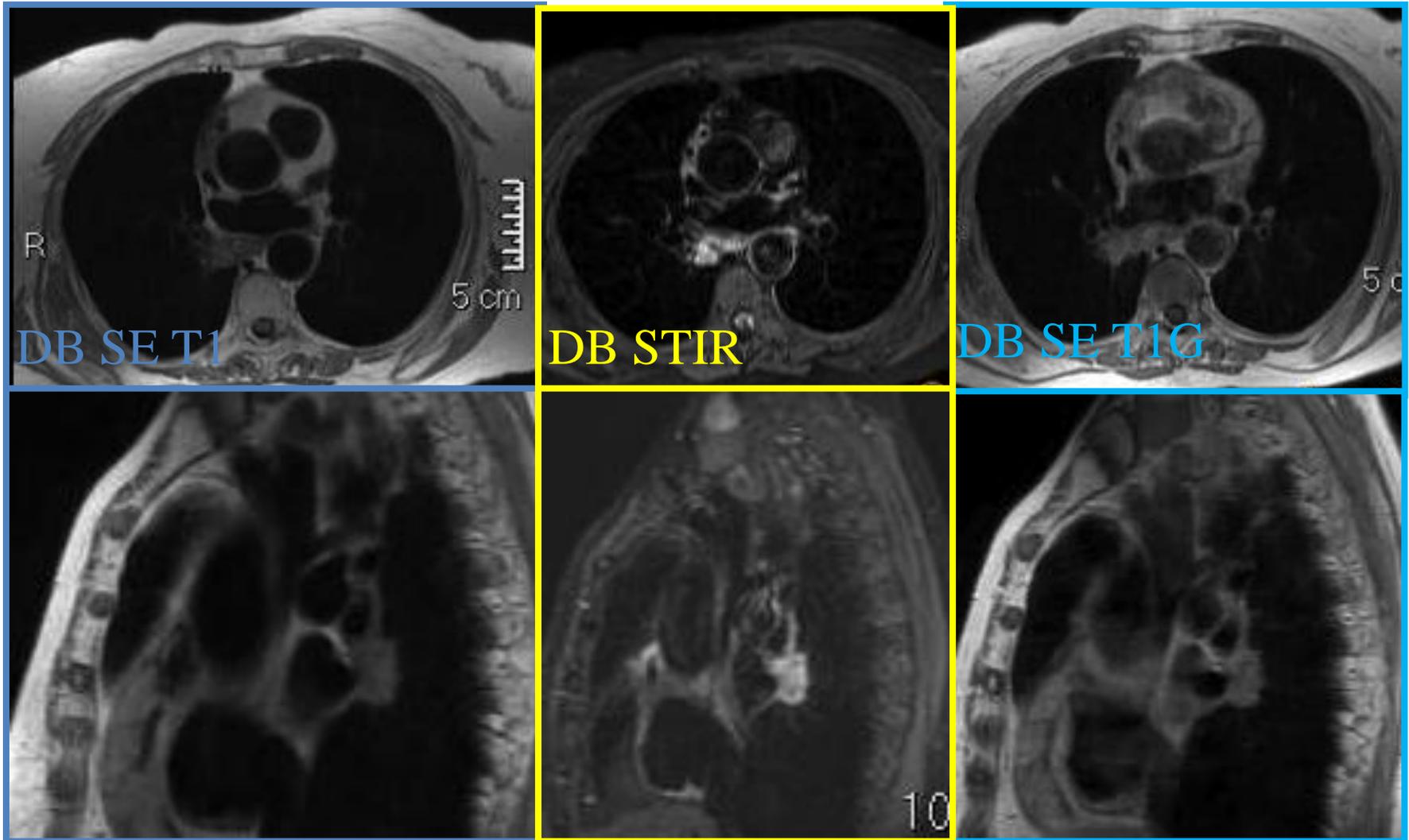
# TDM

- Visualisation des images:
  - Quel plan?
- Plan sagittal
- Plan frontal
- Autres



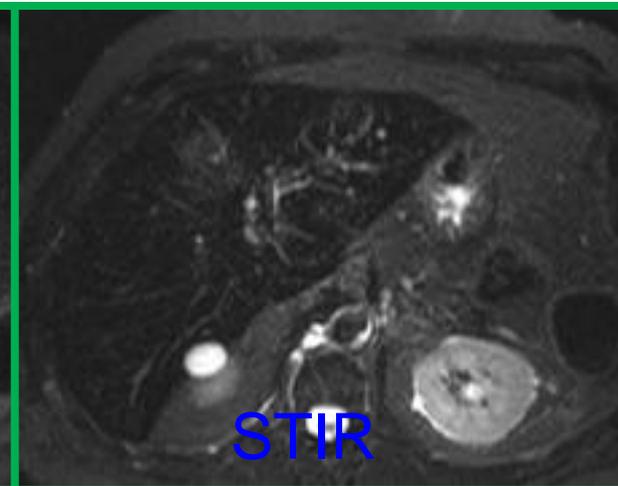
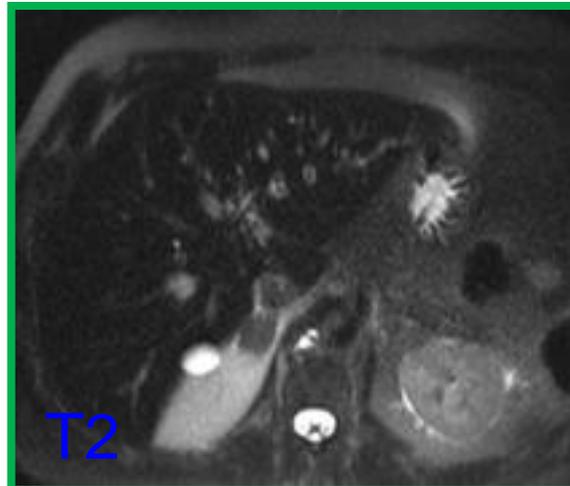
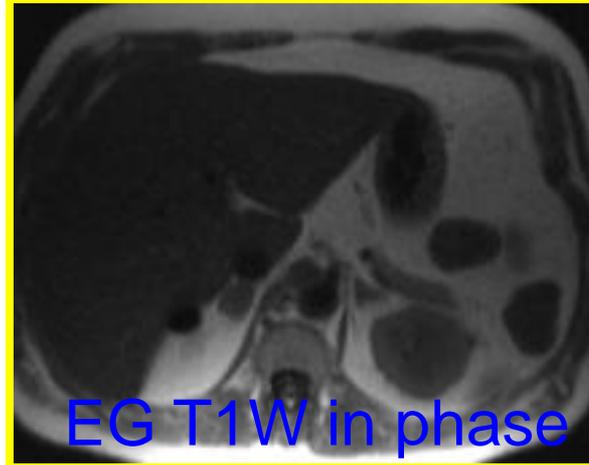
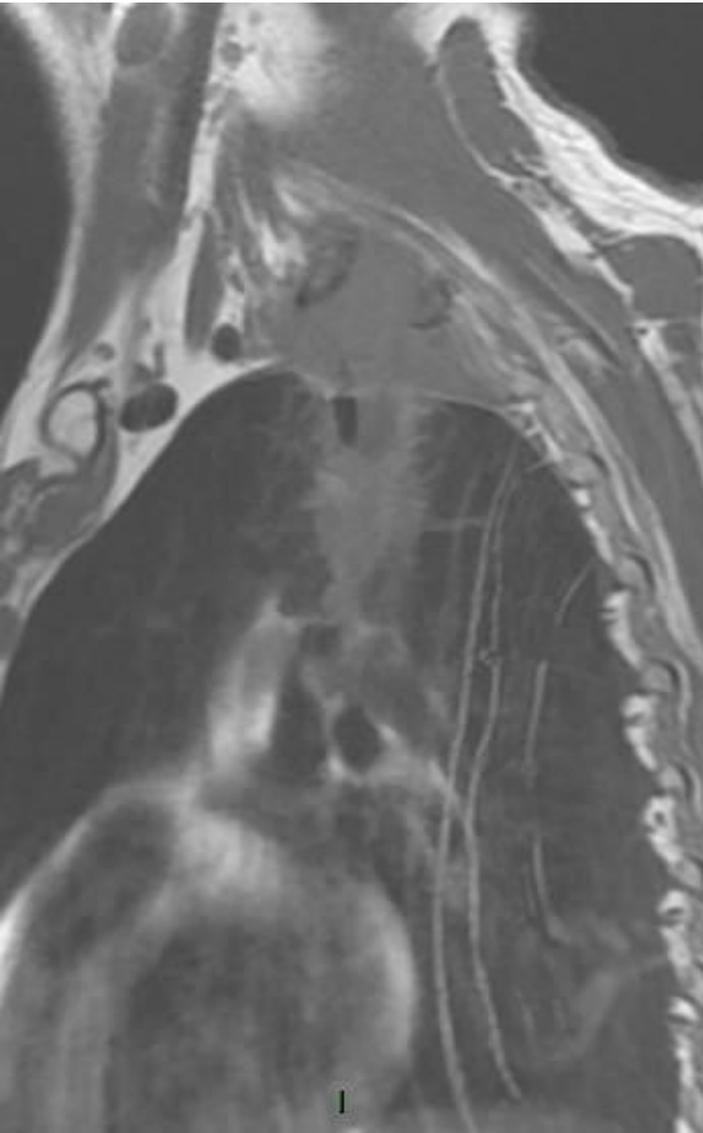
# IRM

## Morphologique / Anatomiques



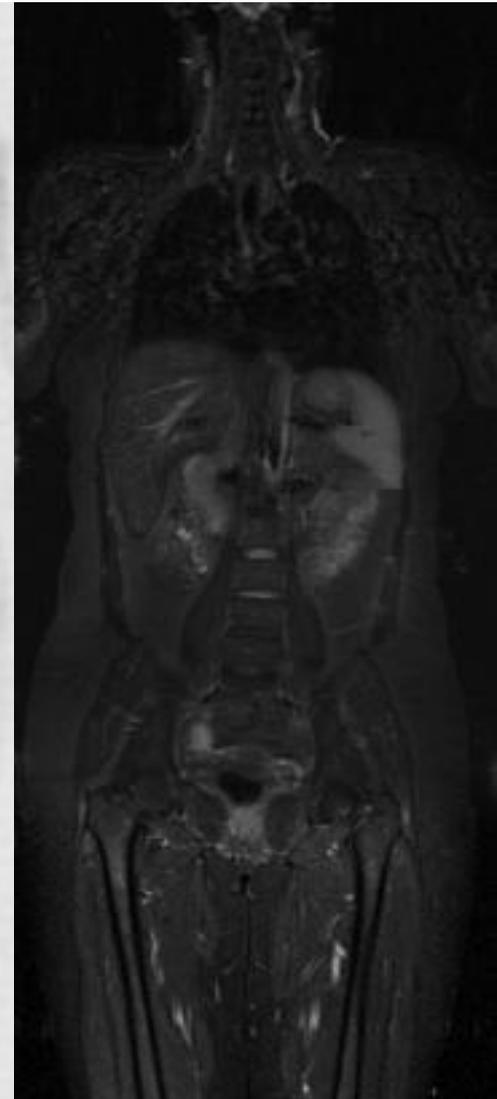
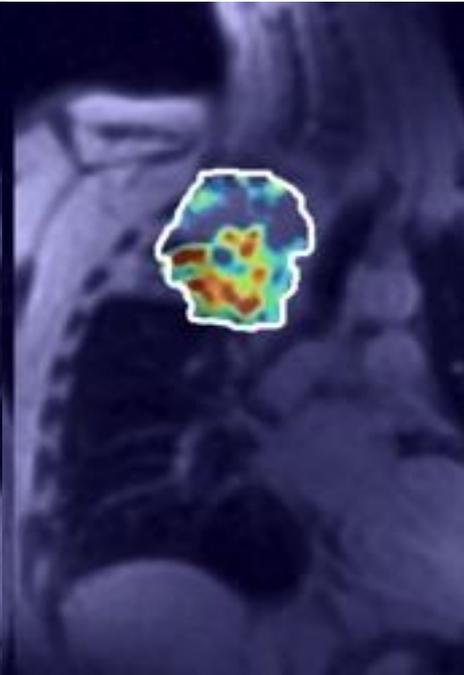
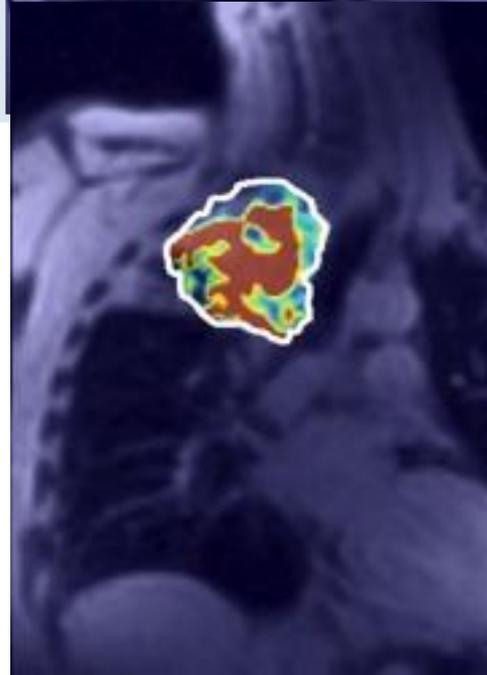
# IRM

## Morphologique / Anatomiques



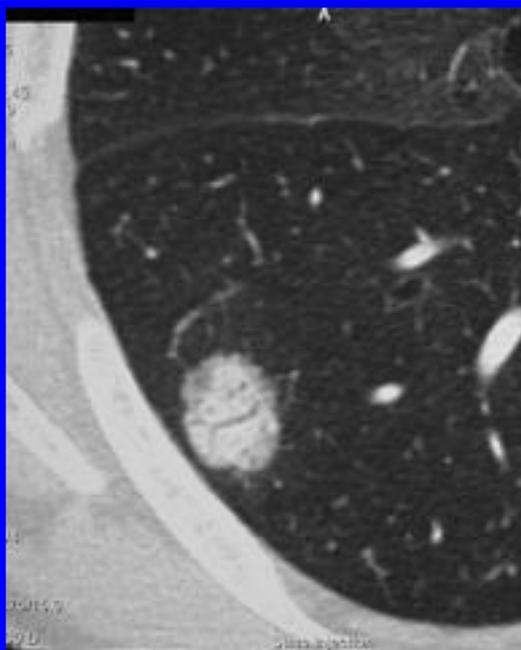
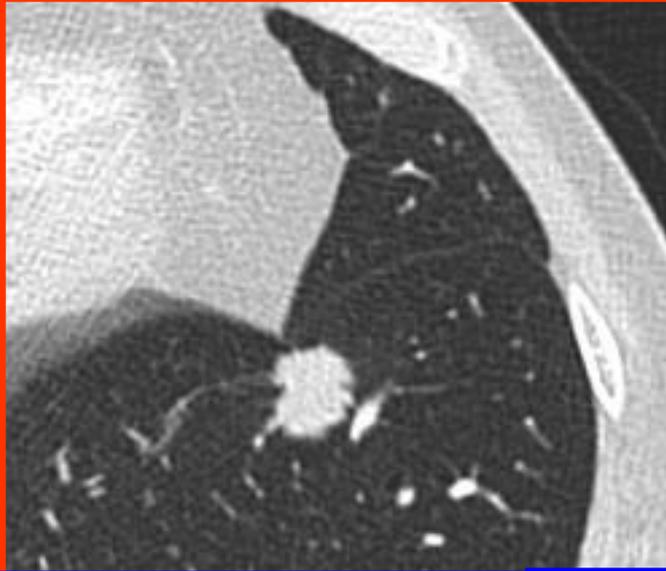
# IRM

## Fonctionnelle



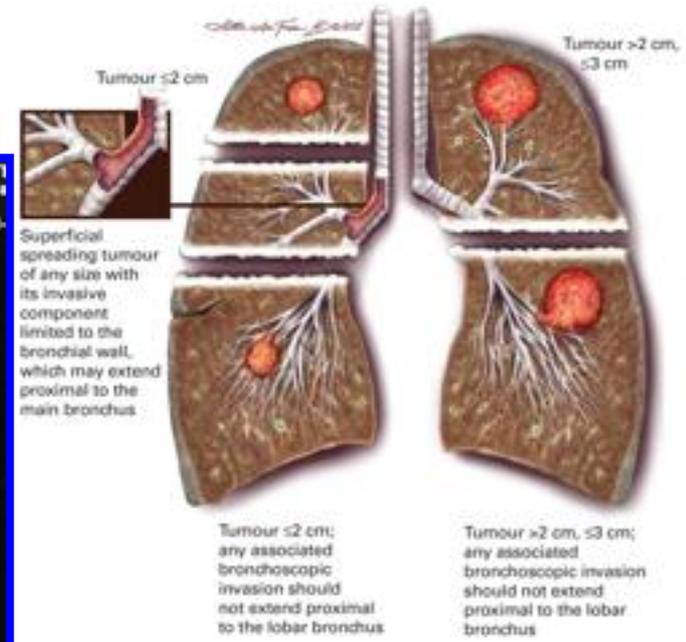


# T1



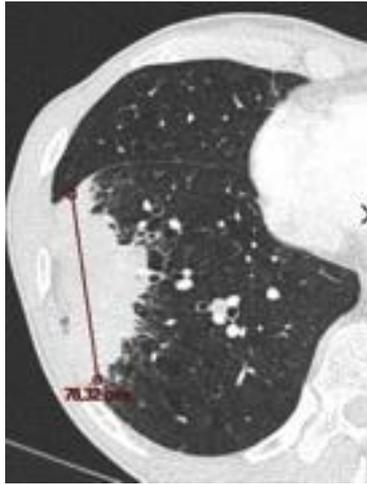
	Survie	
	Médiane	5 ans
Nodule $\leq$ 2cm (T1a)	Inconnue	77%
Nodule $>$ 2cm et $\leq$ 3cm (T1b)	113 M	71%

T1a T1b

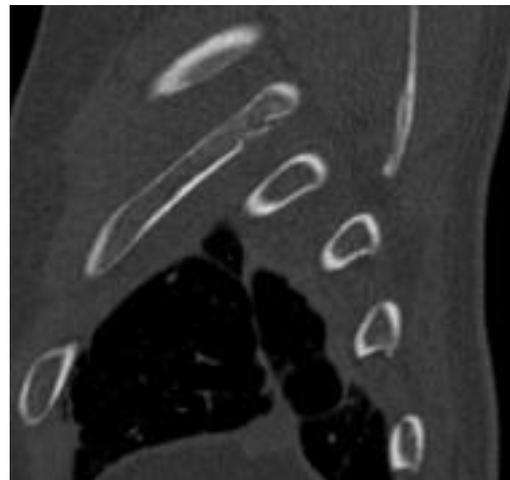
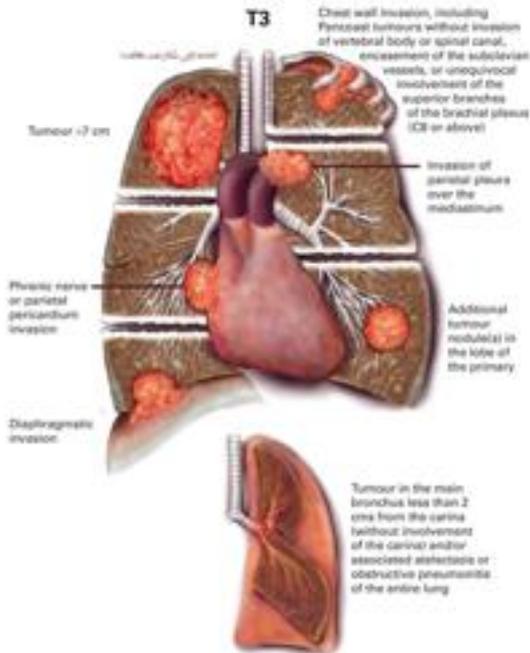




# T3

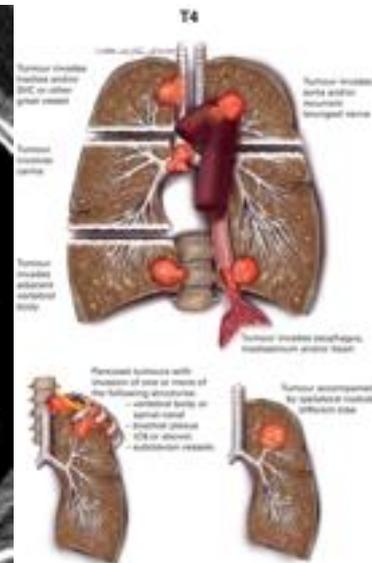
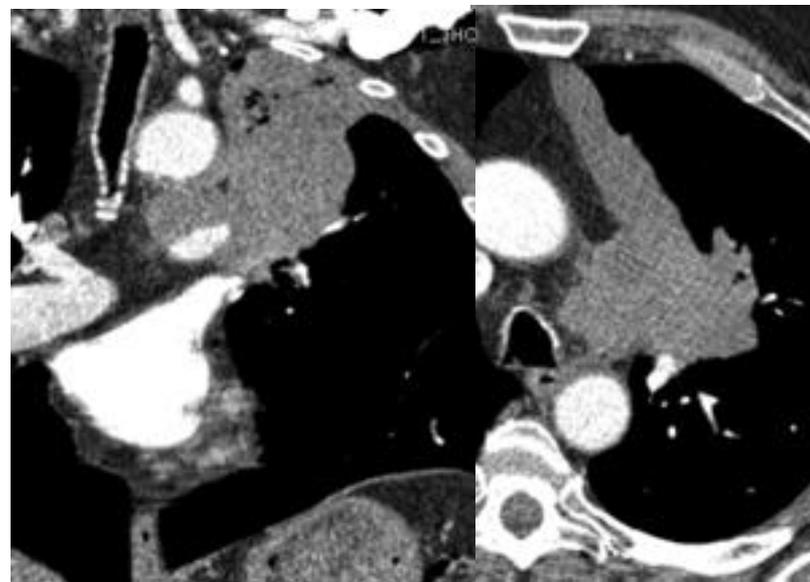
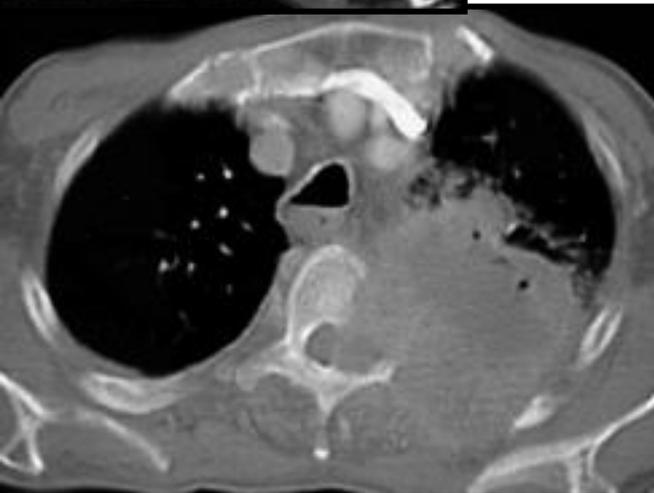
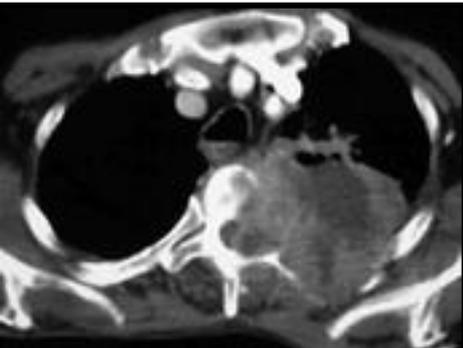


	Survie	
	médiane	5 ans
Masse > 7 cm en grand diamètre	29 M	35%
Envahissement d'au moins une de ces structures - Parois (Pancoast-Tobias), diaphragme, nerf phrénique, plèvre médiastinale, ou péricarde pariétal	36 M	41%
Tumeur dans la bronche souche < 2cm de la carène		
Atélectasie ou pneumonie obstructive d'un poumon	48 M	45%
Tumeur satellite dans le même lobe		



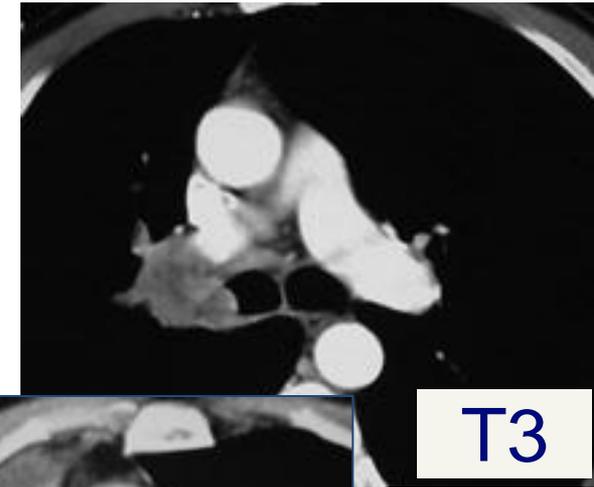
# T4

	Survie	
	Médiane	5 ans
Nodule(s) tumoral dans le poumon homolatéral mais pas dans le même lobe que la tumeur initiale	18 M	25%
Envahissement d'une de ces structures: -Médiastin, coeur, gros vaisseaux, trachée, oesophage, nerf laryngé récurrent, carène, corps vertébral	13 M	15%

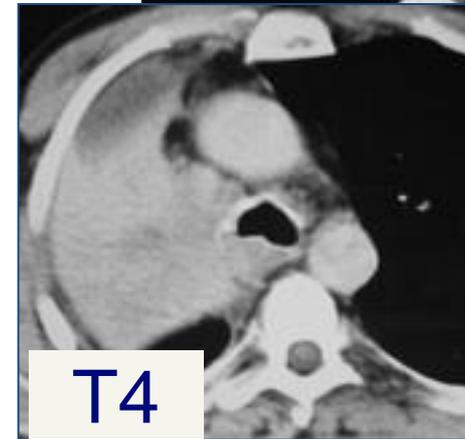


# T : Bronche

- Localisation / envahissement:
  - Bronche / Carène
  - Périphérique ou lobaire: T1
  - Bronche souche  $\geq$  2cm de la carène: T2
  - Bronche souche  $<$  2cm de la carène: T3
  - Envahissement de la carène: T4
- Atélectasie:
  - Lobaire ou bilobaire : T2
  - Poumon: T3



T3



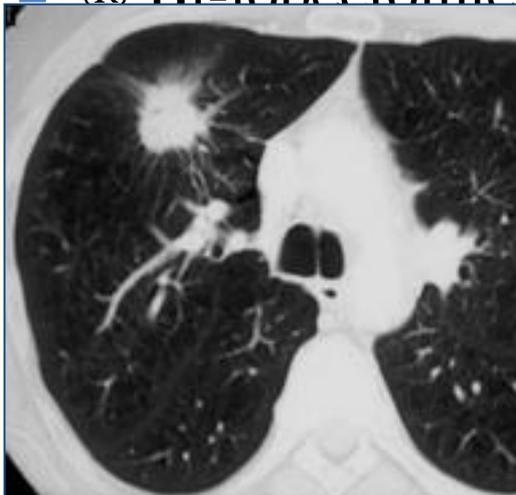
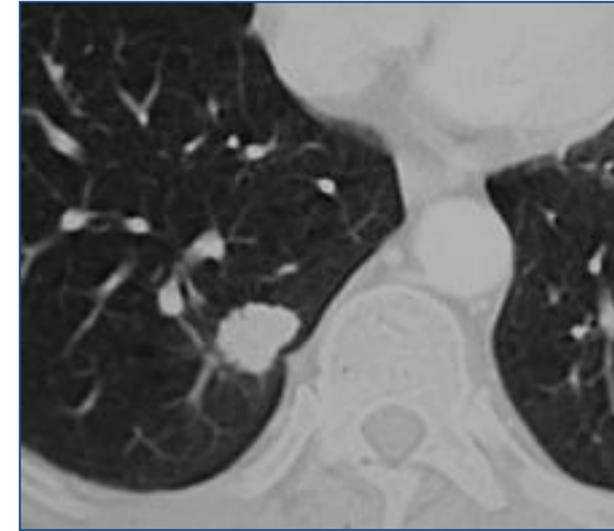
T4

Le T3 (bronche) a un meilleur pronostic que le T3 (envahissement extrapulmonaire)  
Le T4 (envahissement trachéal et métastase pulmoanire)  $>$  T4 (envahissement extra pulmonaire, plèvre)

Meilleur: Bronche / Paroi

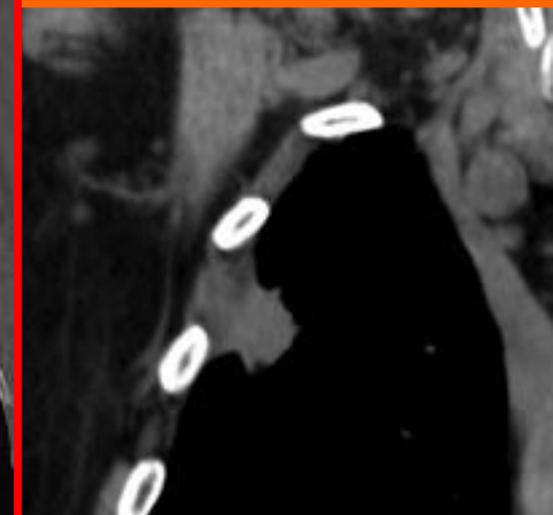
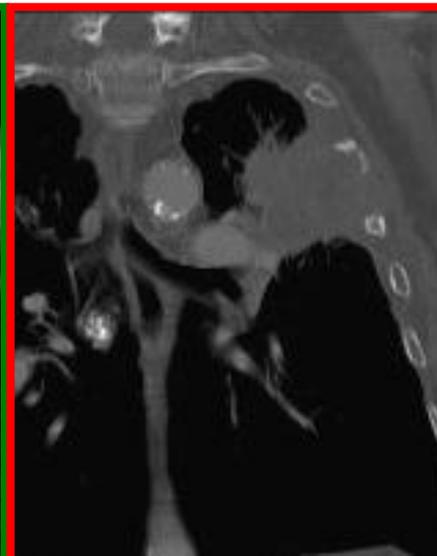
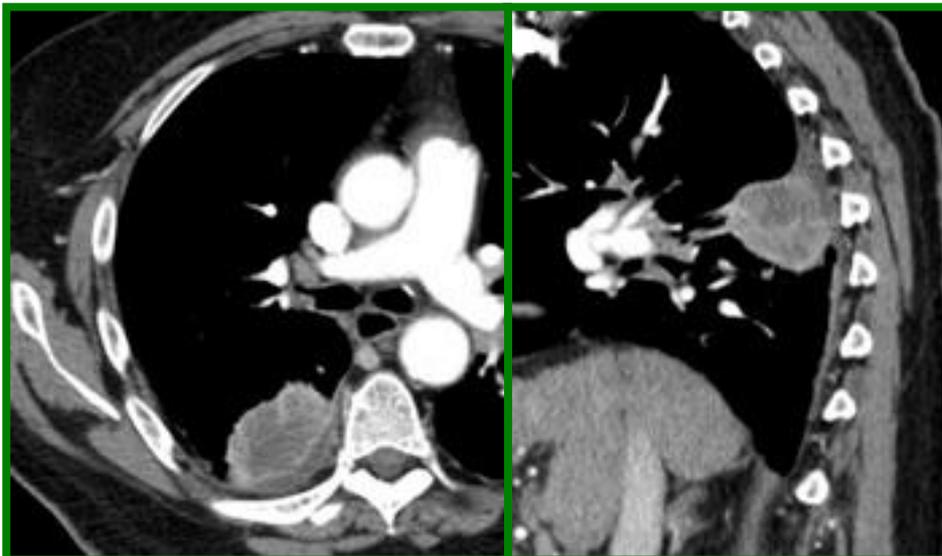
# T: Plèvre / T2

- Nodule < 3cm
  - Envahissement de la plèvre viscérale
  - Raccord pleural par fin liseré
- Envahissement de la scissure
  - Coupes fines +++
  - Franchissement
  - Irrégularité sur versant opposé
  - ® Bi-lobectomie

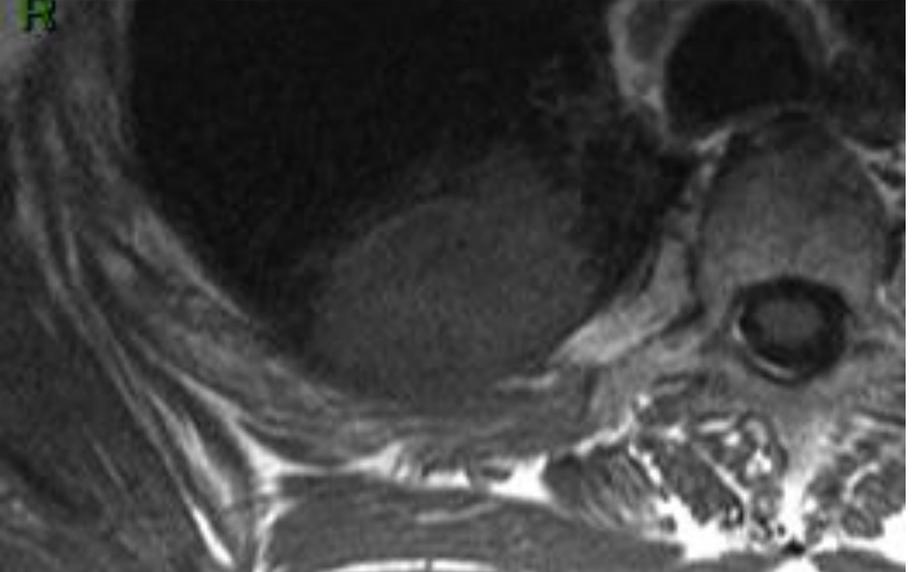
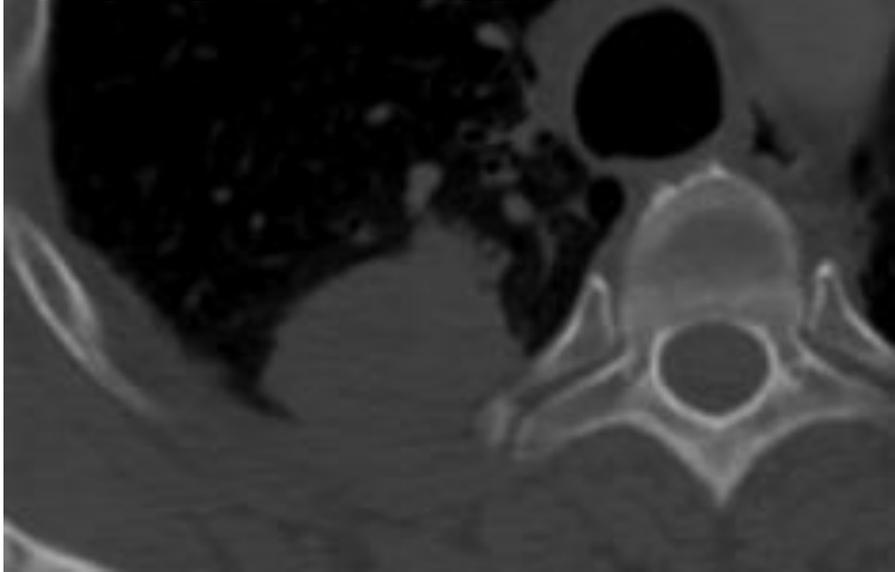
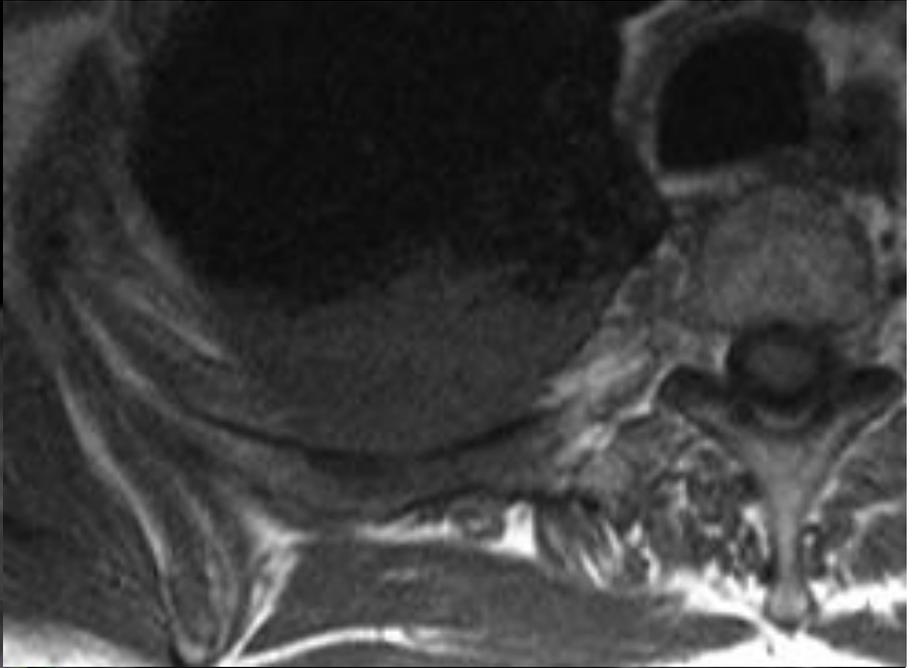
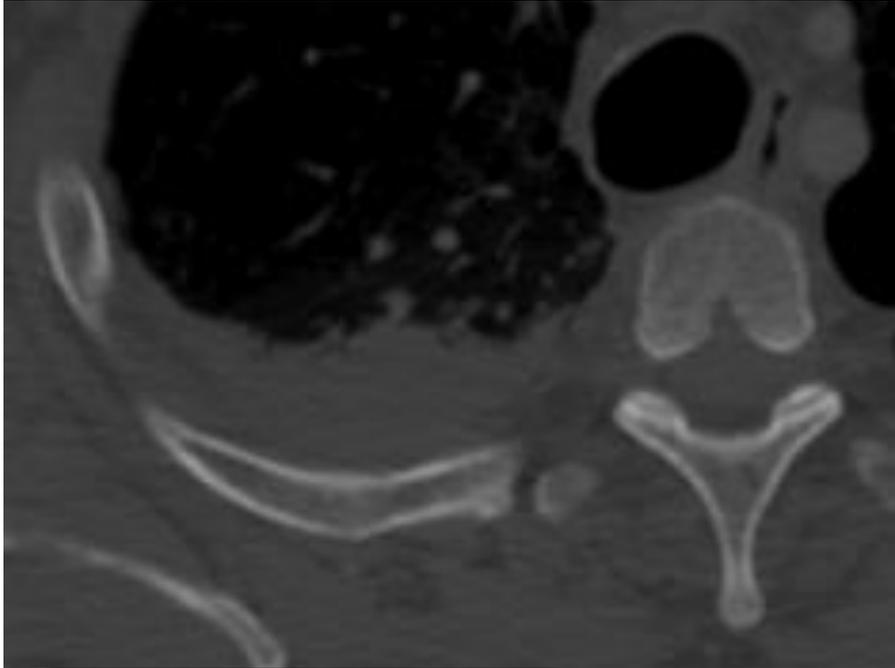


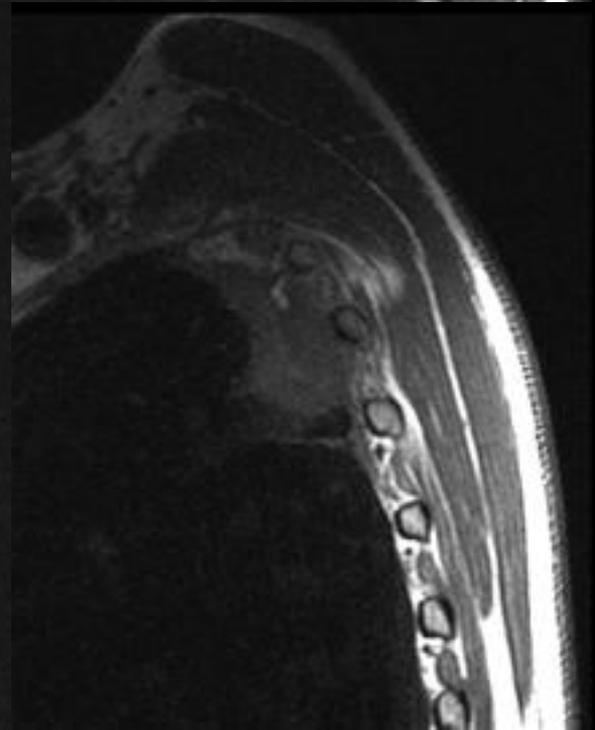
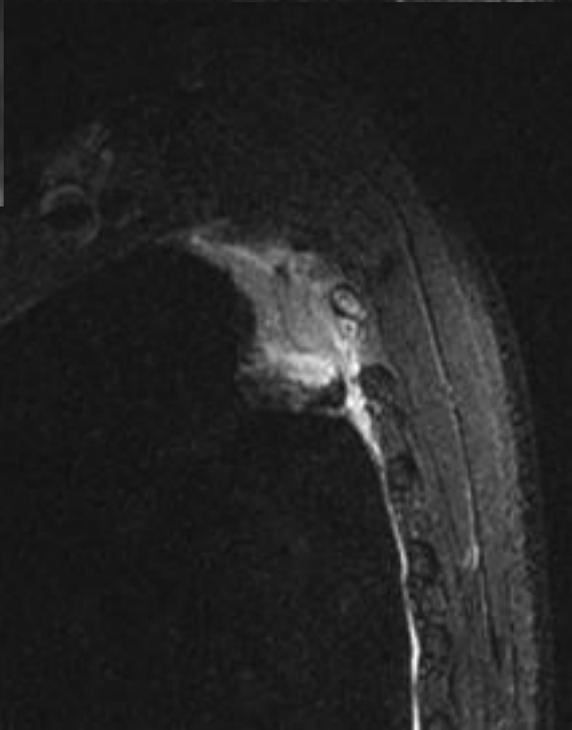
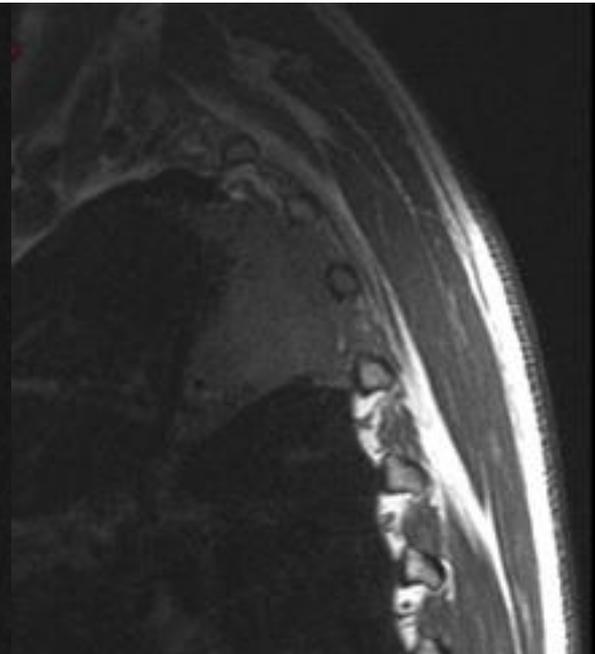
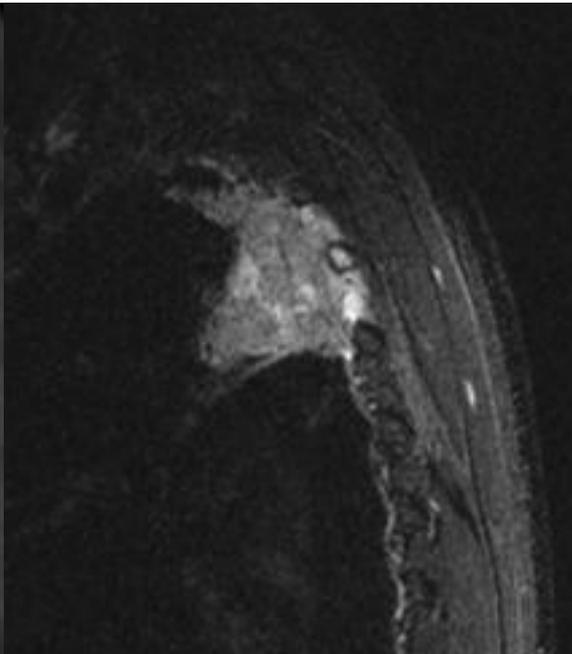
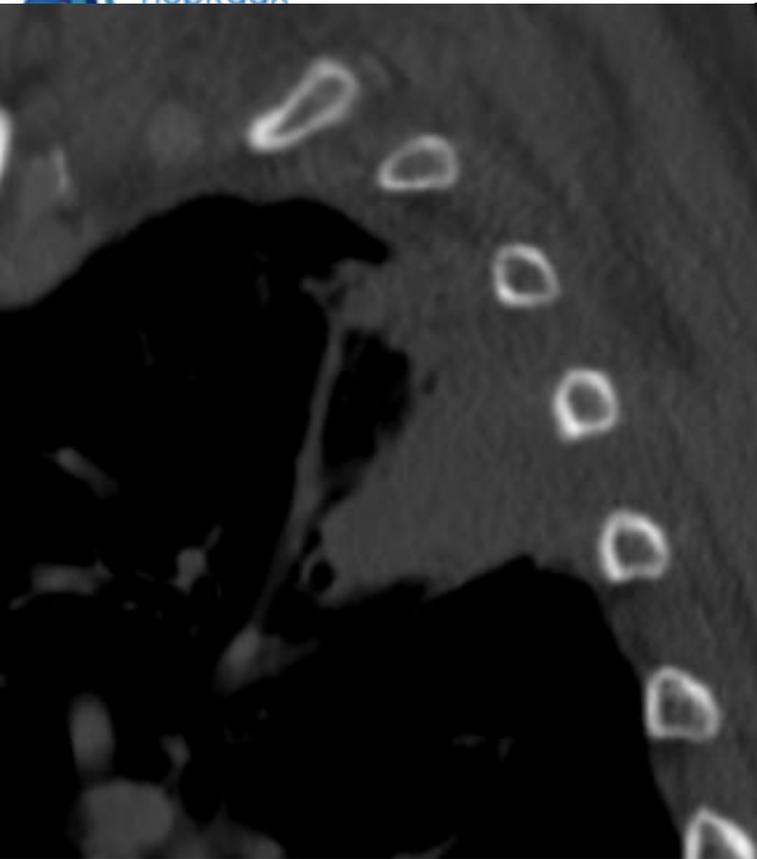
# T: Paroi / T3

- Signes TDM de l'envahissement pariétal:
  - > 3 cm
  - Angle obtus entre la tumeur et la paroi
  - Epaissement pleural
  - Disparition de la graisse extrapleurale
  - Masse extra pleurale



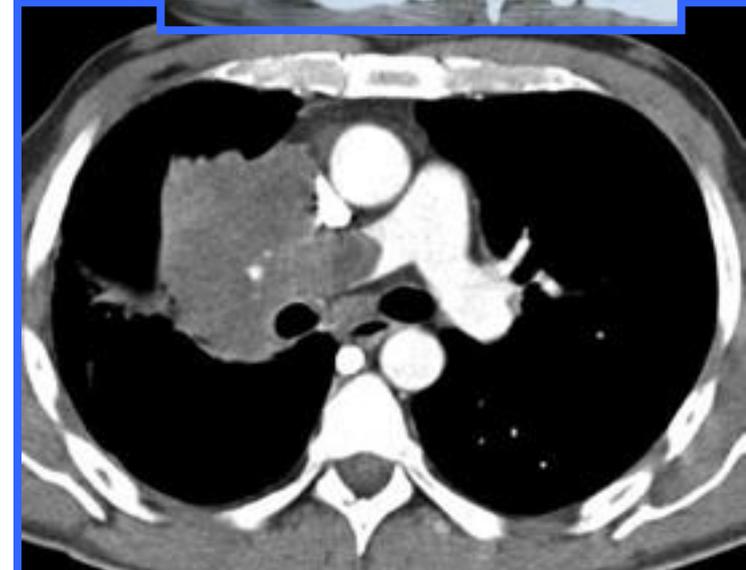
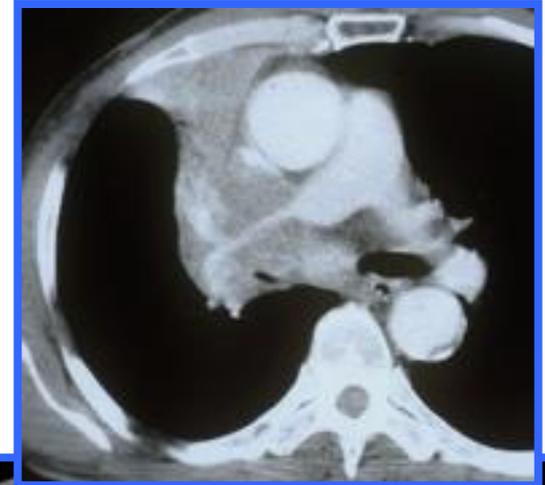
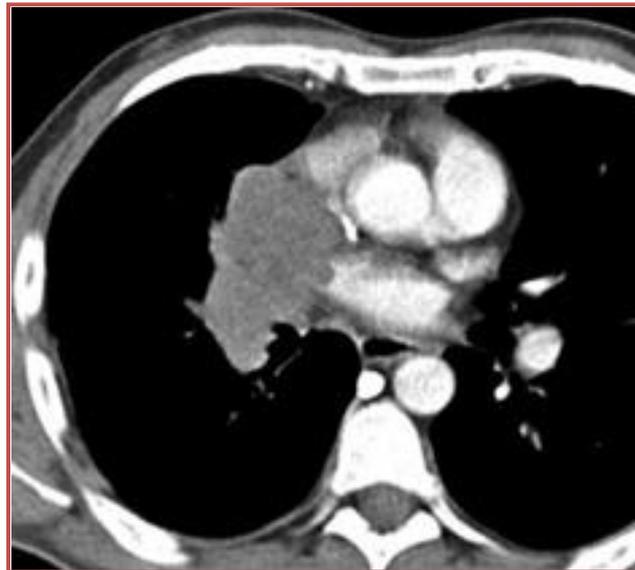
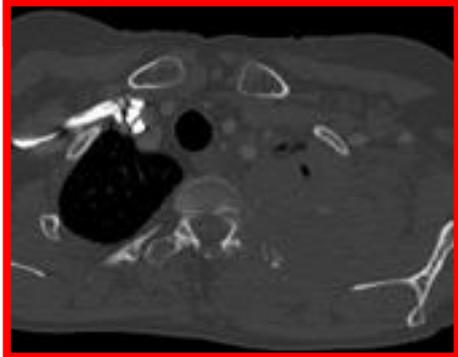
# T: Paroi / T3





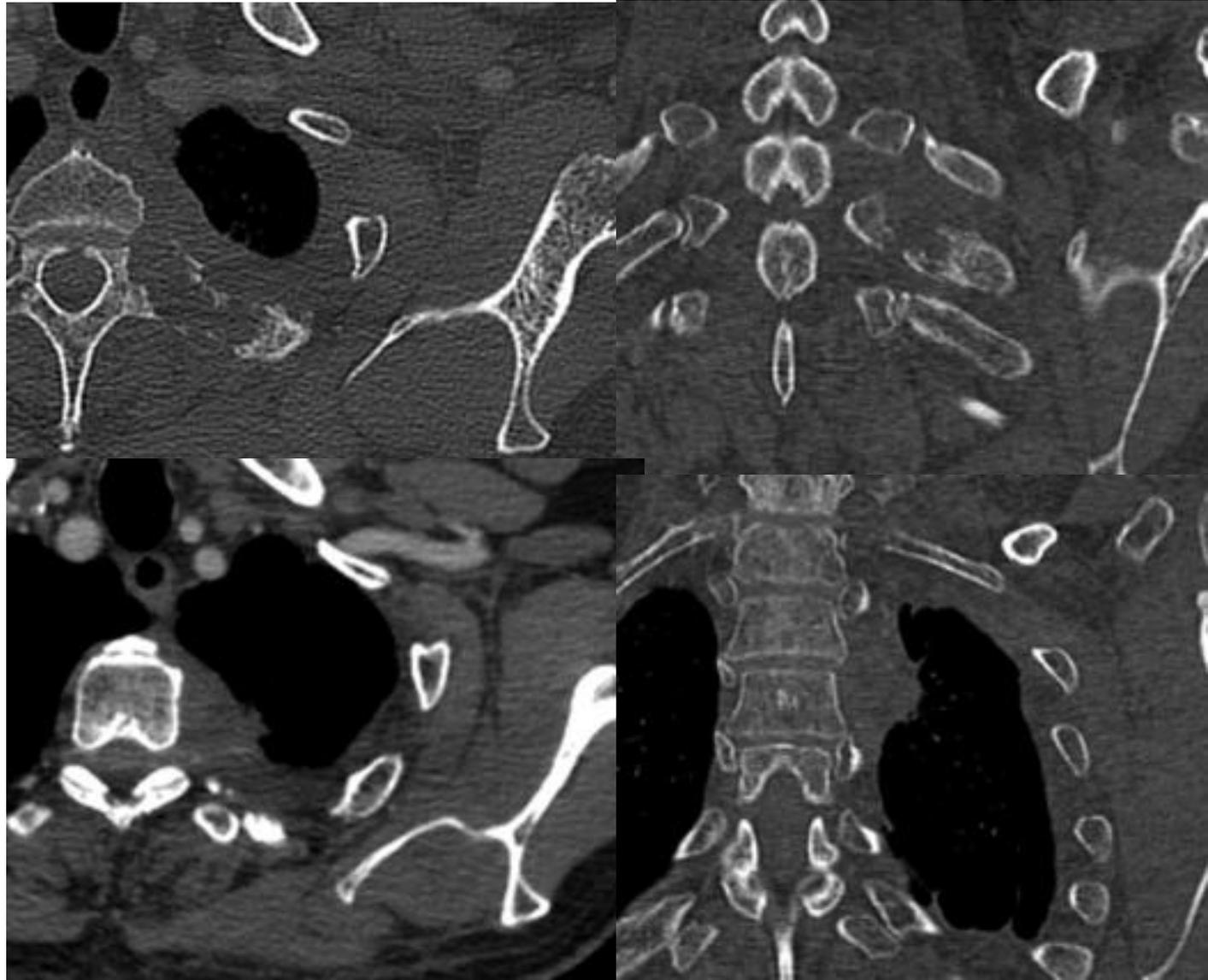
# T: Médiastin / T4 techniquement non opérable

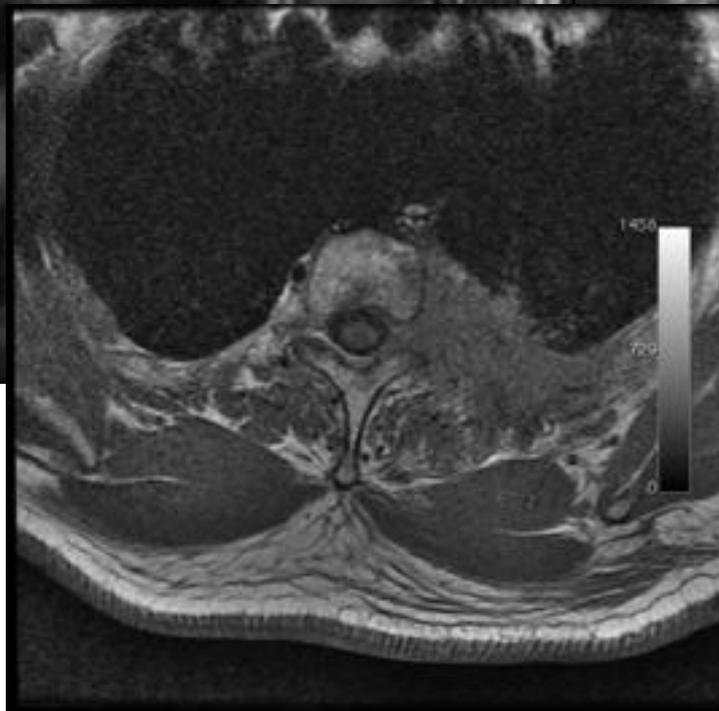
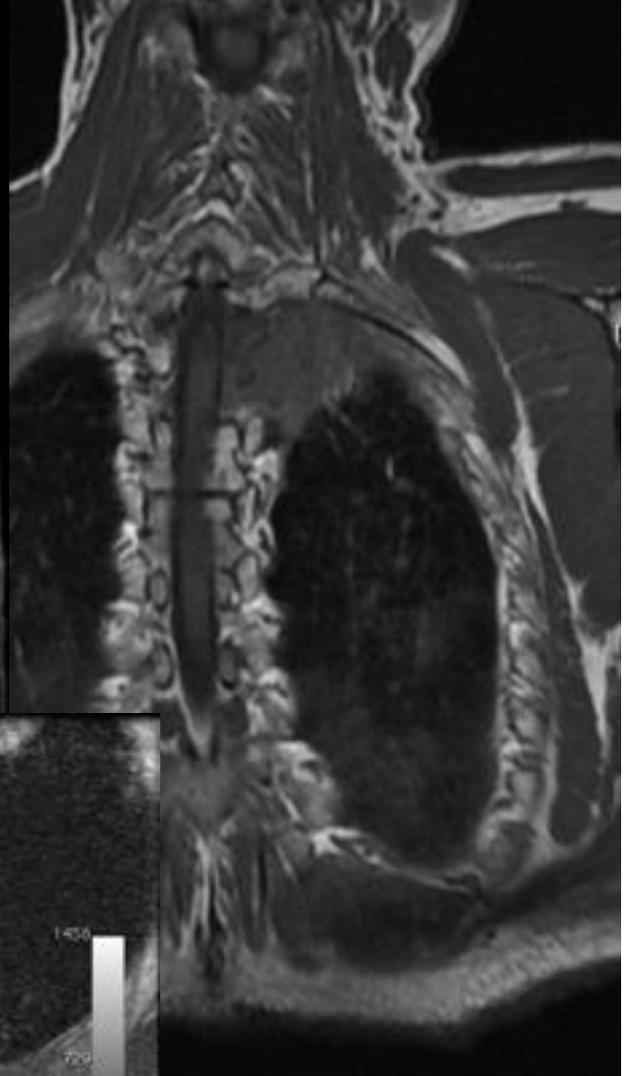
- Encastrement et distorsion des structures vasculaires
- Lyse du corps vertébral
- Contact tumeur / vaisseau  $> 180^\circ$



# T: Médiastin / T4 techniquement non opérable

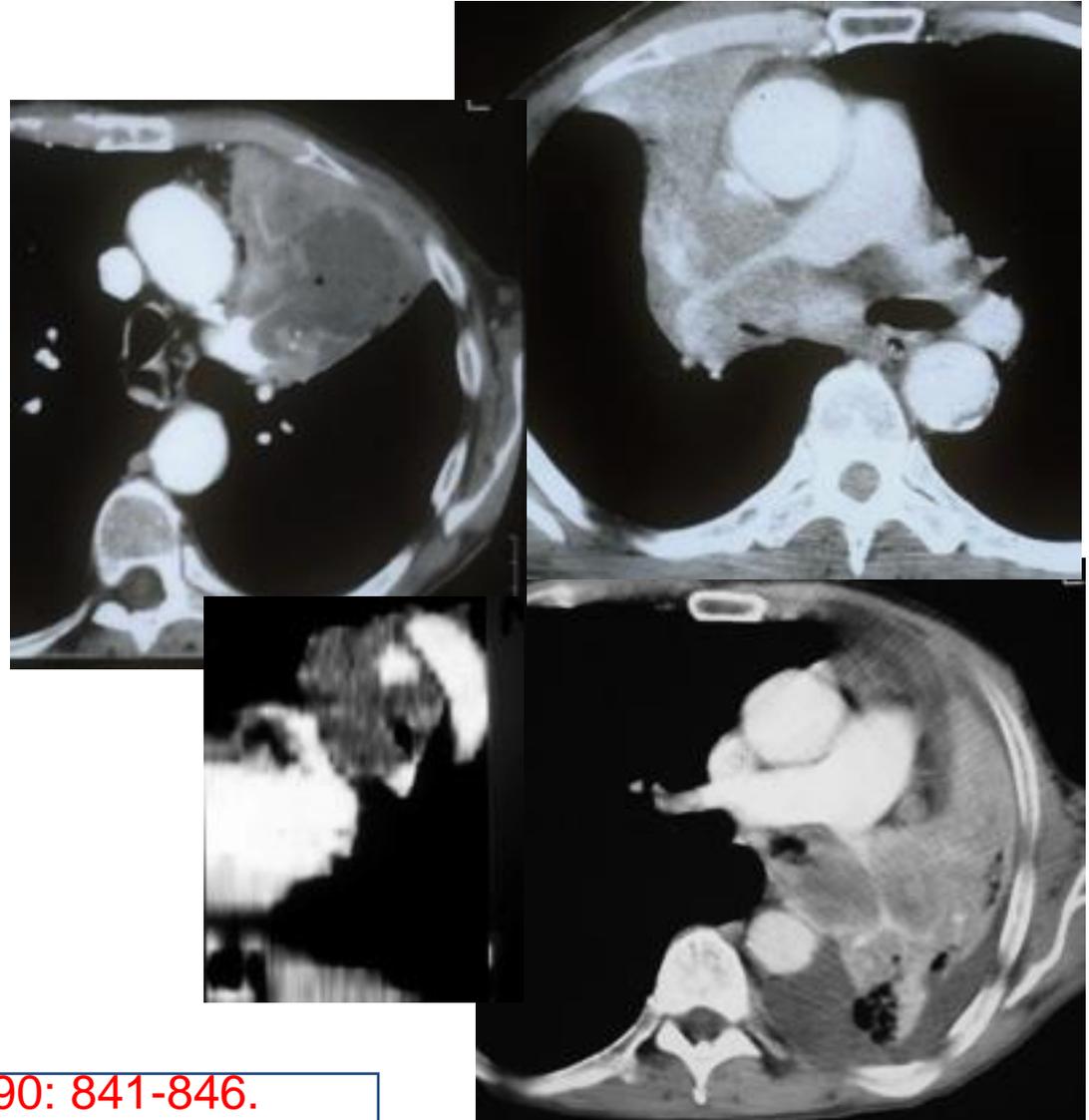
Pre surgical CT-scan of this Pancoast or superior sulcus tumor



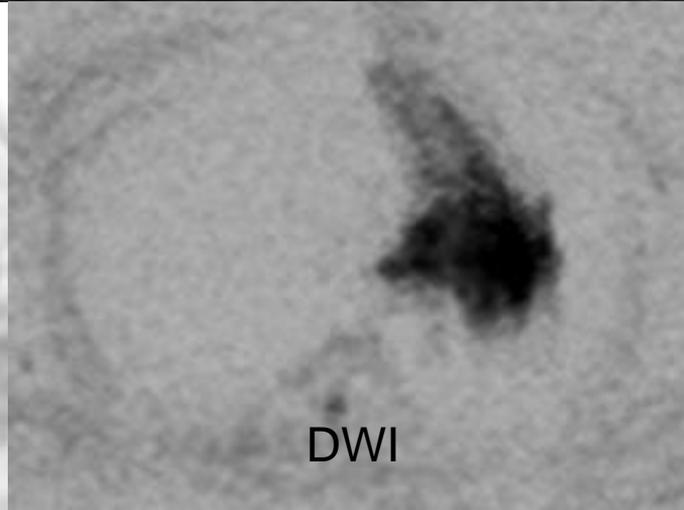
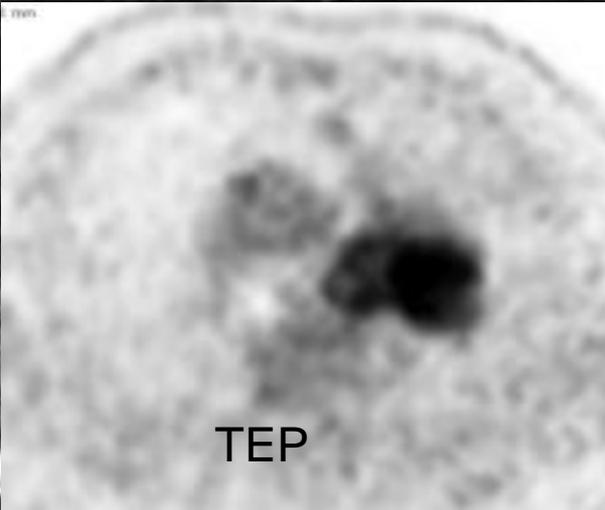
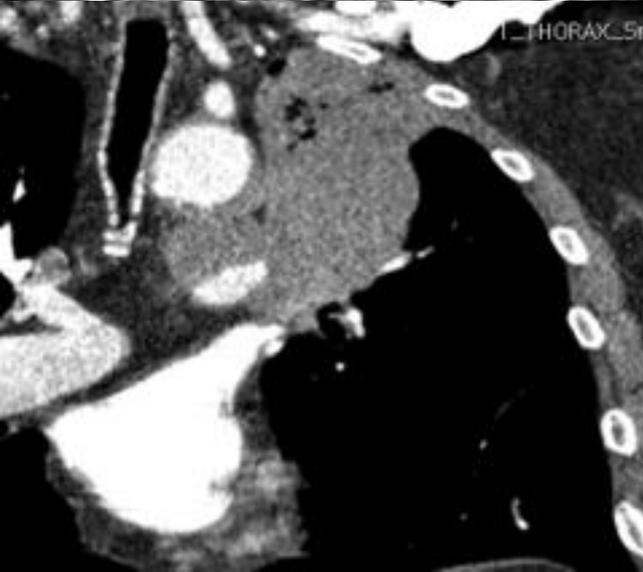
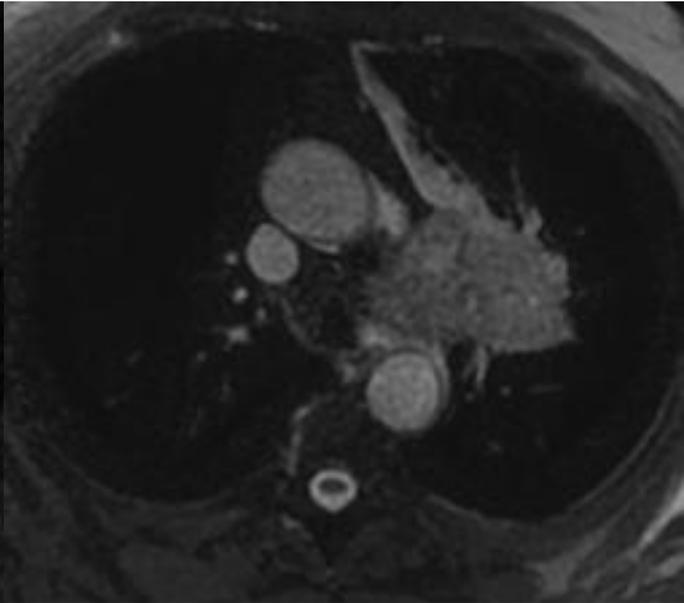
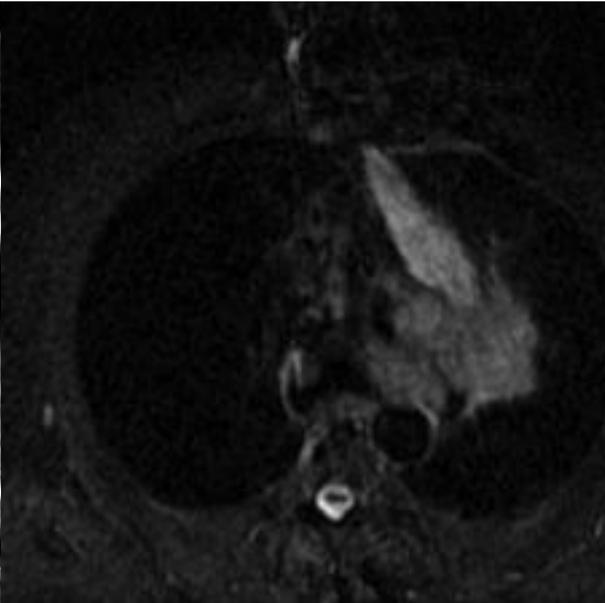


# T: Médiastin / T4 techniquement non opérable

- Contact circonférentiel autour du vaisseau  
= envahissement
- $>90^\circ$ 
  - VPP : 56%
  - Sensibilité: 40%
- $>180^\circ$ 
  - VPP : 100%
  - Sensibilité: 28%



# T: Médiastin / T4 techniquement non opérable



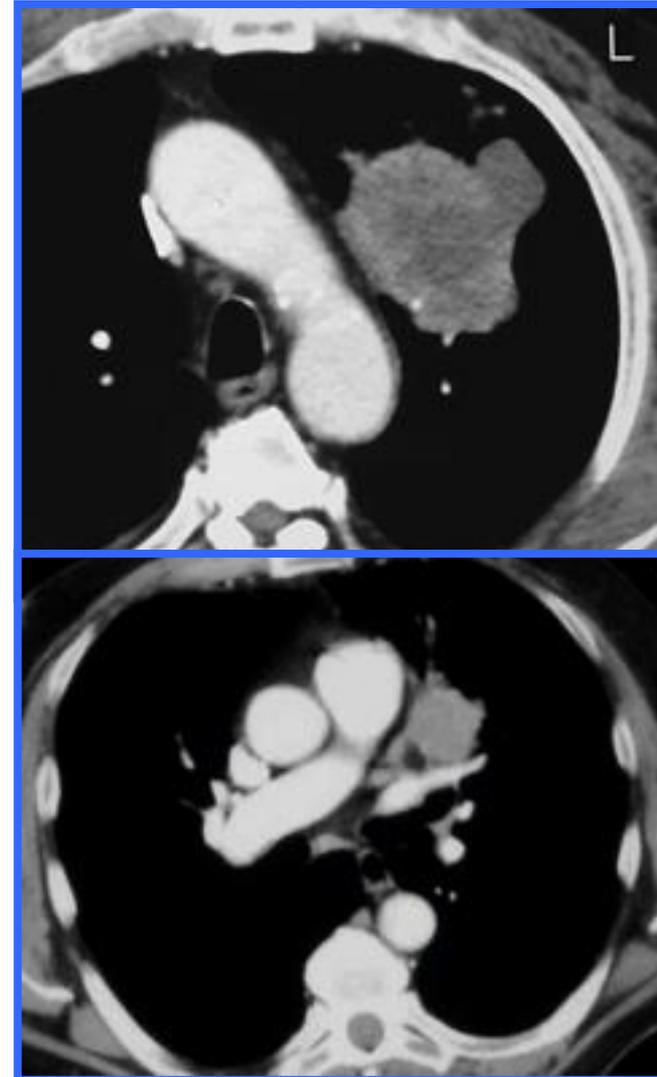
TEP

DWI

# T: Médiastin / T4 techniquement opérable

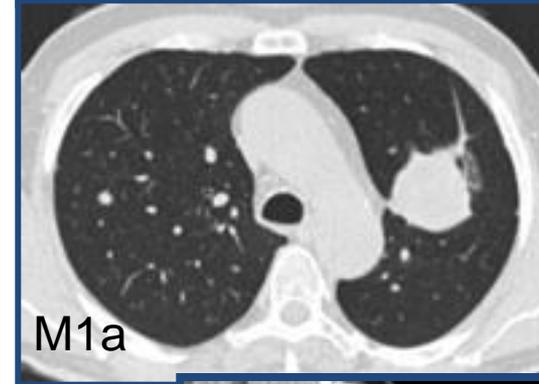
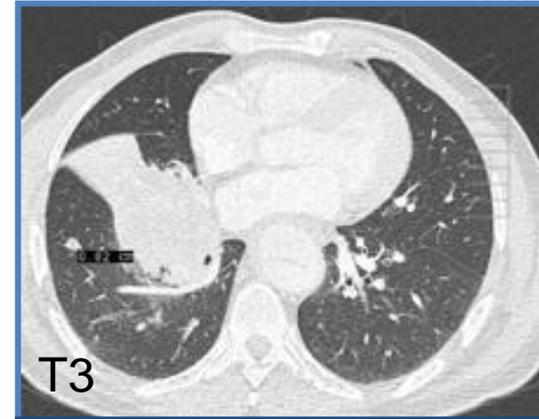
- $< 3$  cm contact
  - 50% des tumeurs avec un contact  $> 3$  cm sont extirpable
- $< 90^\circ$  contact avec le vaisseau
- Visibilité de la graisse médiastinale entre la tumeur et une structure médiastinale.

Glazer HS et al. Radiology 1989; 173:37-42  
McLoud TC. Radiology 1989; 173:15-16  
Herman SJ et al. Radiology 1994; 190: 841-846



# T limite avec le M

- Nodule
  - même lobe: T3
  - Lobe différent :
    - T4 (même histologie)
    - Histologie différente: Cancer synchrone
- Epanchement pleural
  - Malin: M1a
  - Cytologie positive
  - Epanchement pleural exsudatif en rapport avec l'atélectasie.



(1) OKUMURA et al. J Thorac Cardiovasc Surg, 2001, 122, 24-28

(2) VANSTEENKISTE et al Lung Cancer, 2001, 34, 169-175

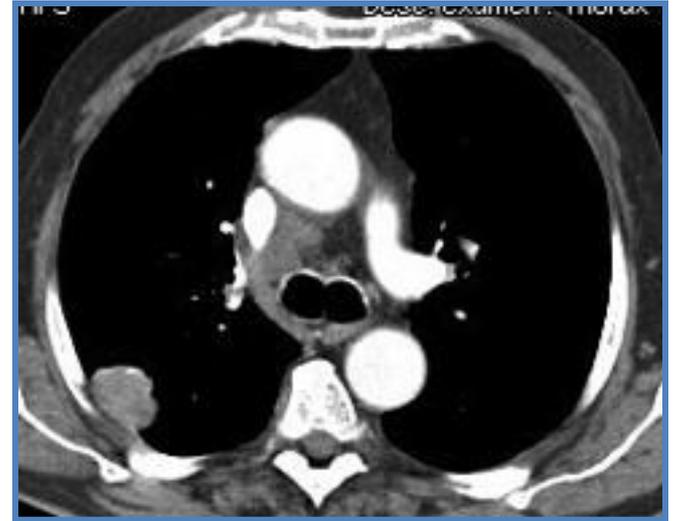
# Classification TNM

## T

Tumeur initiale	T1a	T1b	T2a	T2b	T3	T4
Taille	≤ 2cm	>2cm et ≤ 3cm	>3cm et ≤ 5cm	>5cm et ≤ 7cm	>7cm	N'importe
Localisation endobronchique	Absence d'extension plus proximale qu'une bronche lobaire		Bronche principale (≥ 2cm de la carène)		Bronche principale (<2cm de la carène)	
Envahissement local	Entourée par du parenchyme ou plèvre viscérale		Plèvre viscérale	Paroi thoracique/diaphragme/plèvre médiastinale/péricarde pariétal		Médiastin/trachée/cœur/gros vaisseaux/oesophage/corps vertébral/ carène
Autre			Atélectasie/pneumonie obstructive s'étendant vers la région hilare n'intéressant pas l'ensemble du poumon	Atélectasie/pneumonie obstructive d'un poumon/ nodule dans le même lobe		Nodule dans un autre lobe du poumon homolatéral

- **Le N:**
- Homolatéral:
- Hile: N1
- Médiastin: N2
- Controlatéral
- Hile ou médiastin: N3
- Sus claviculaire: N3

N2 > 10 mm (petit axe)



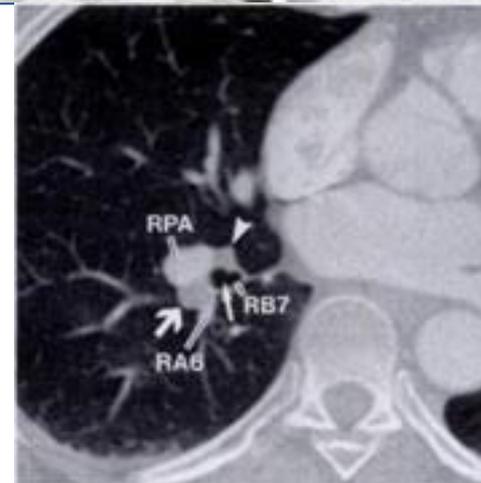
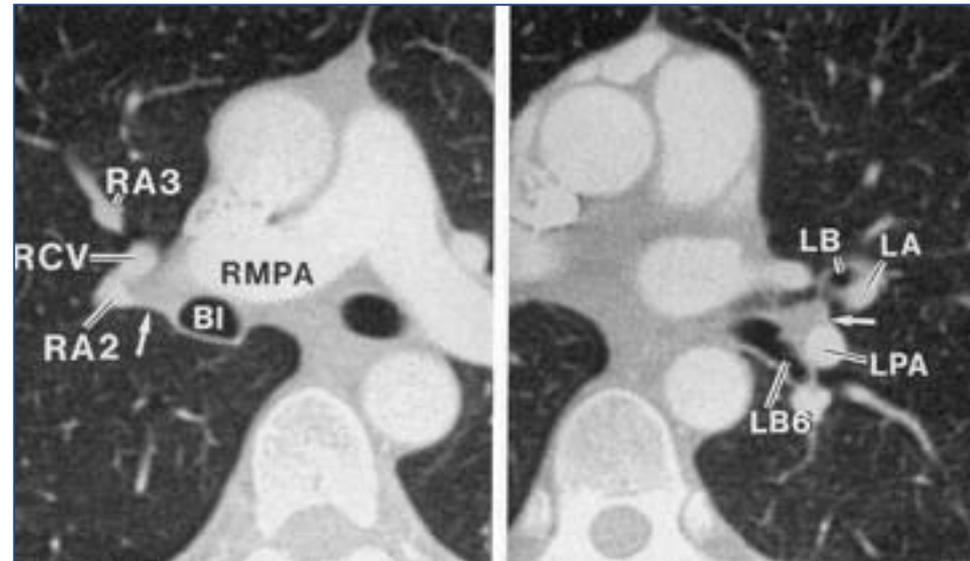
# N1

## Adénopathie hilair homolatéral

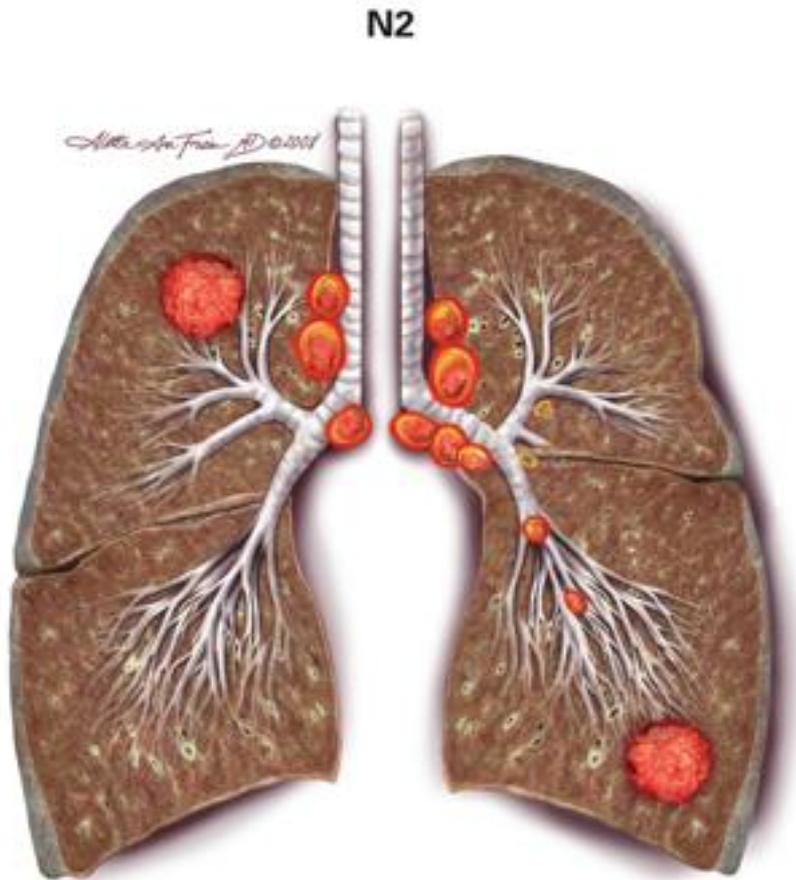
- Coussinets cellulo-adipeux
- Interstices hilaires concaves
- Adénopathies :
- Interstices convexes
- Interface hile - interstitium pulmonaire
- **Signe**

	(+)	(-)	
– GG normaux	10	183	193
– GG anormaux	54	3	57

- Se : 87% et Sp : 88%.

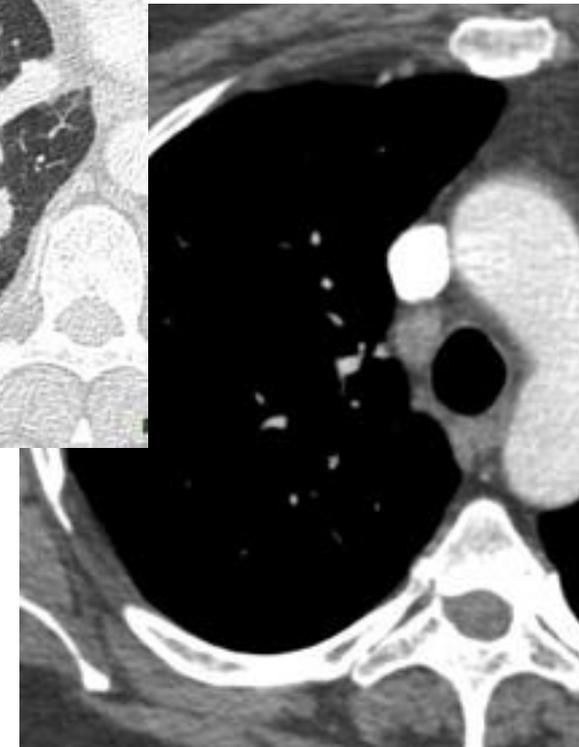


## Adénopathie médiastinale homolatérale

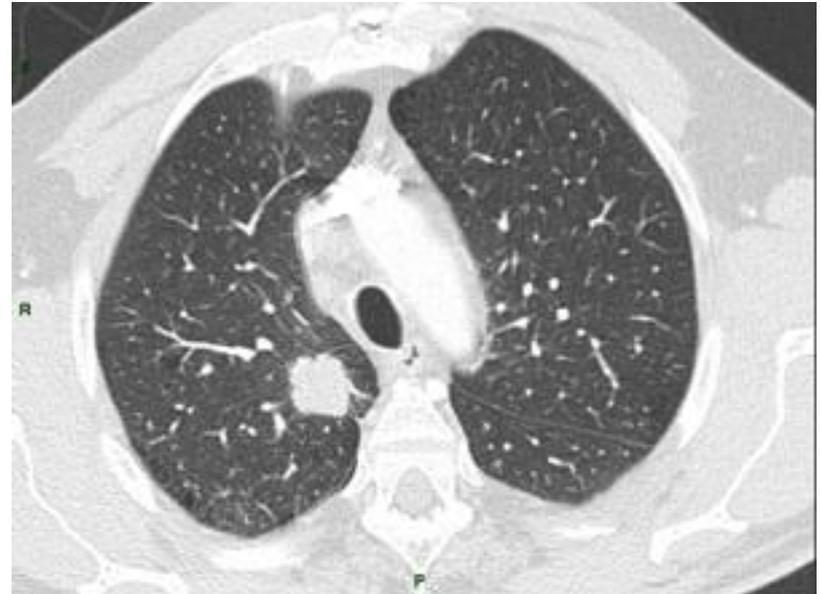
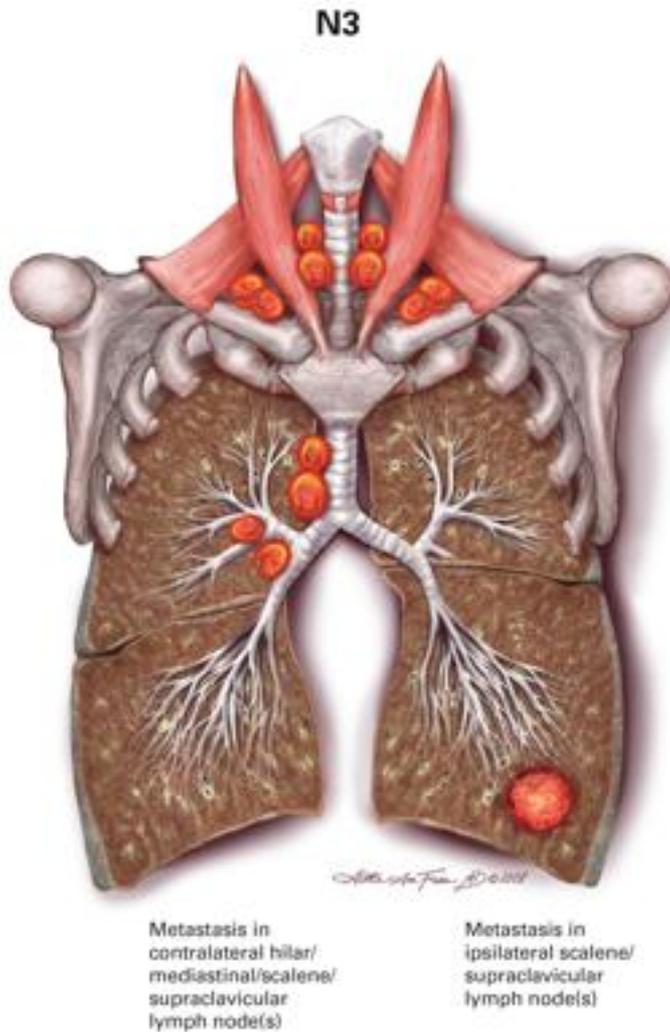


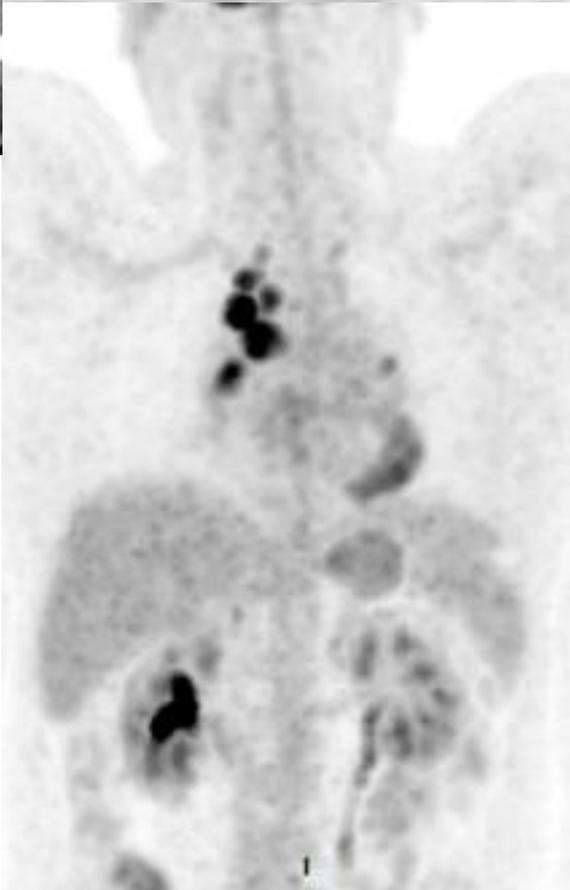
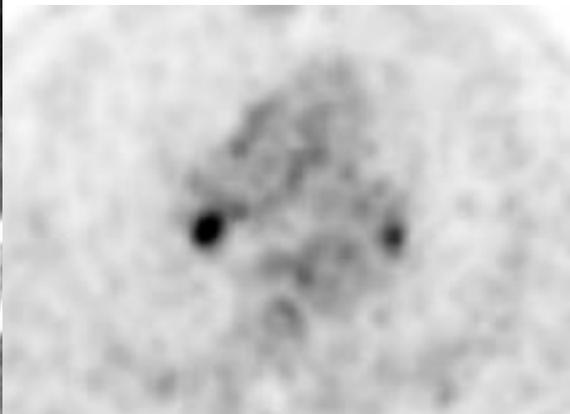
Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s), including "skip" metastasis without N1 involvement

Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s) associated with N1 disease



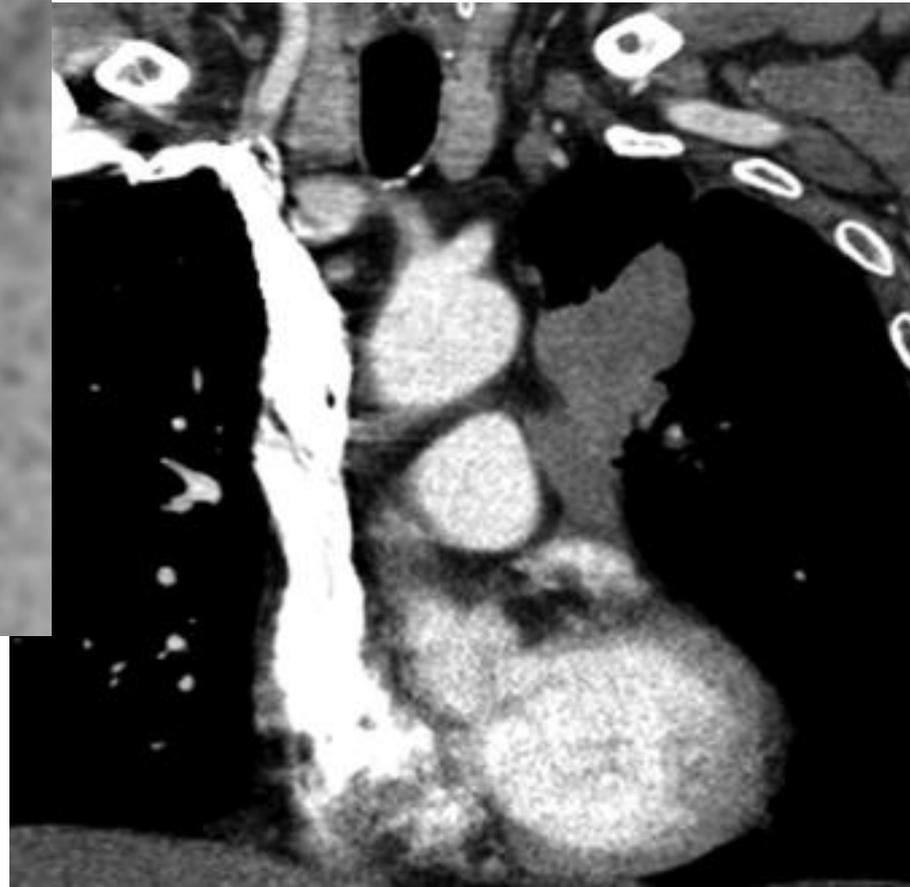
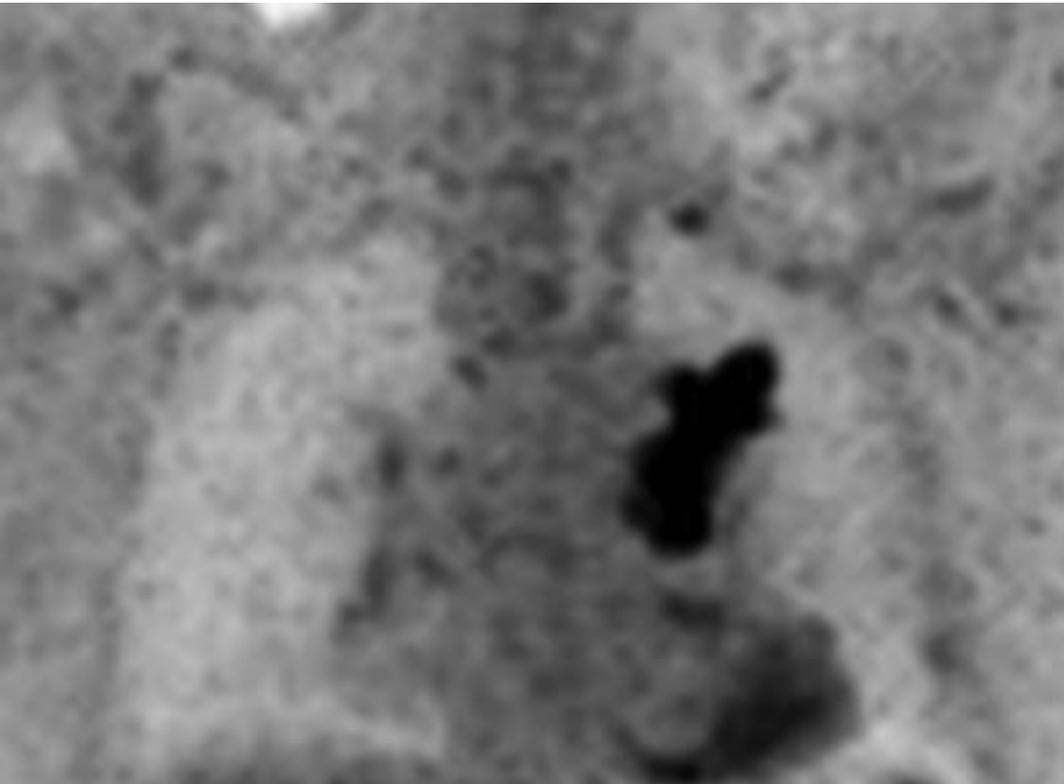
## Sus clavulaire ou contro latérale



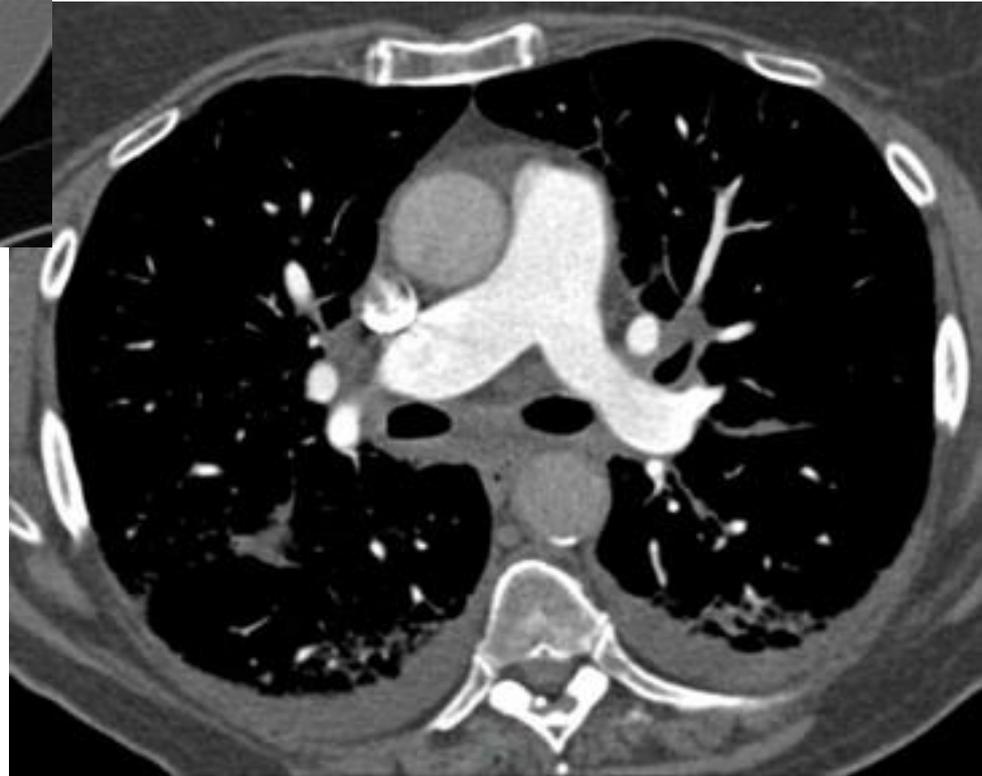
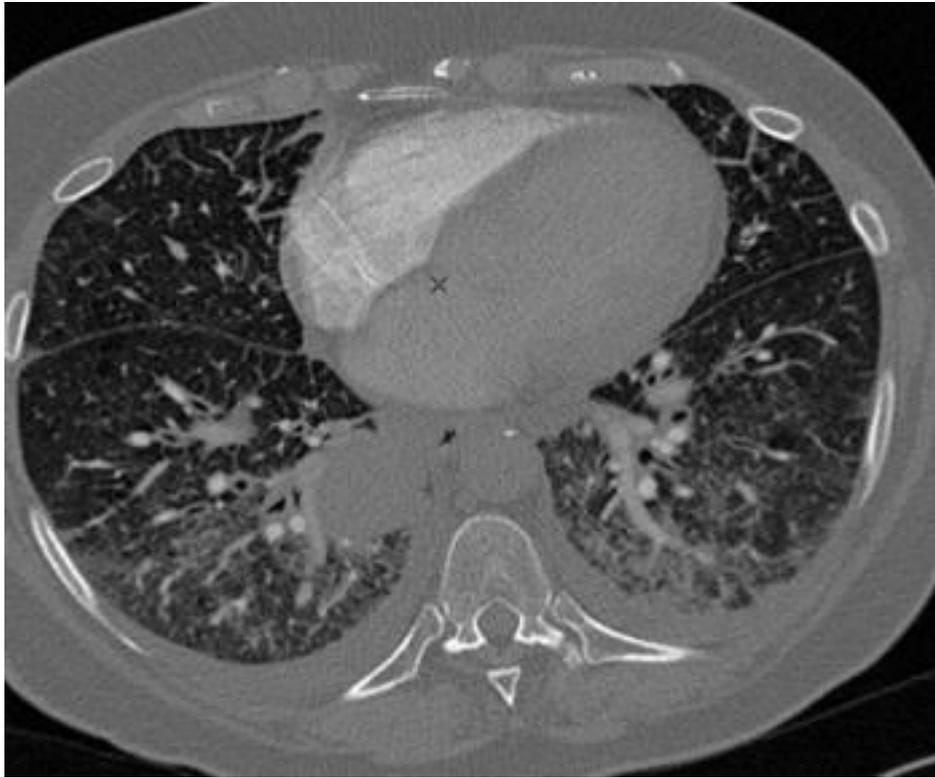


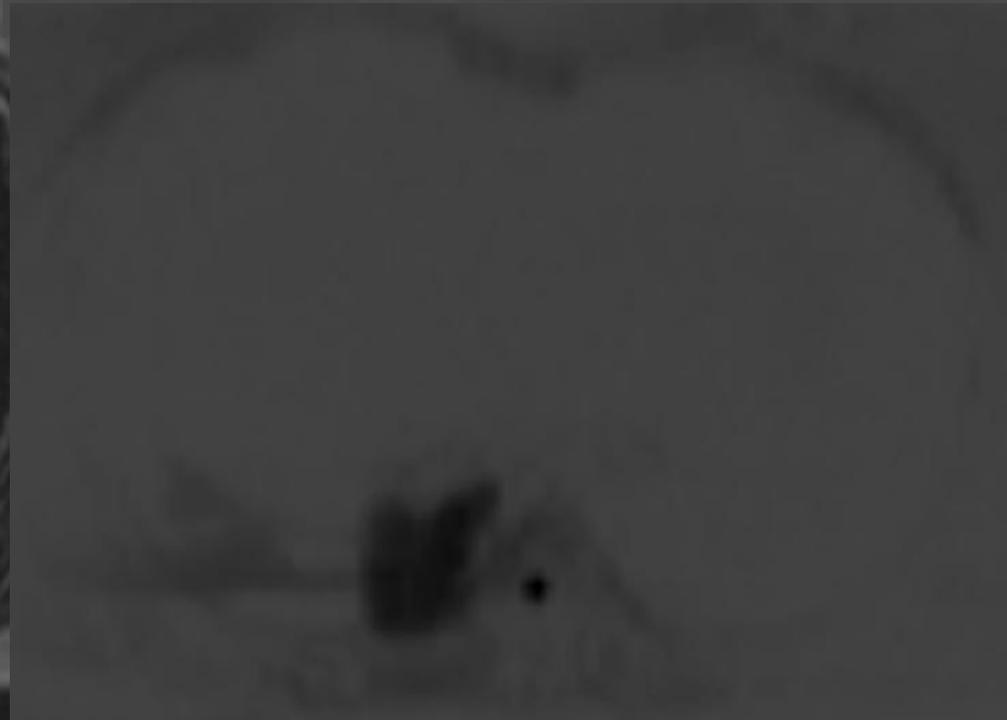
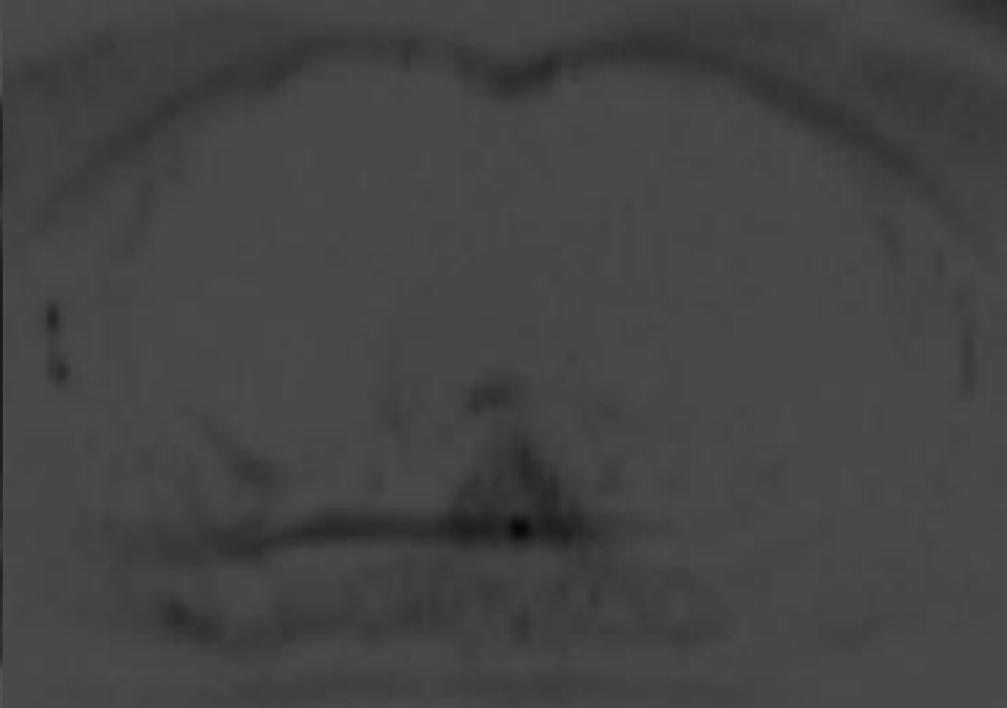
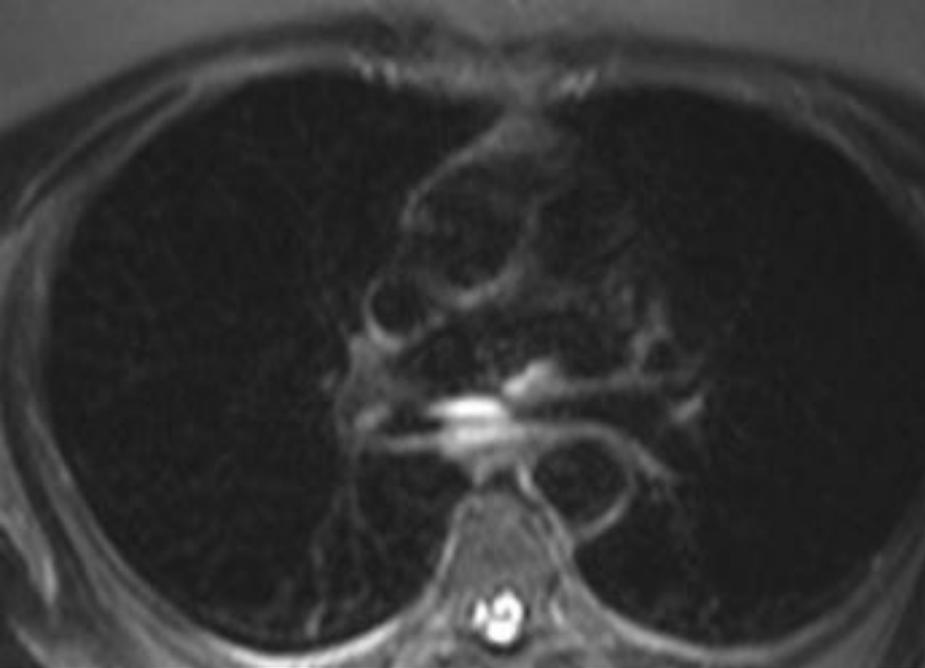
N3

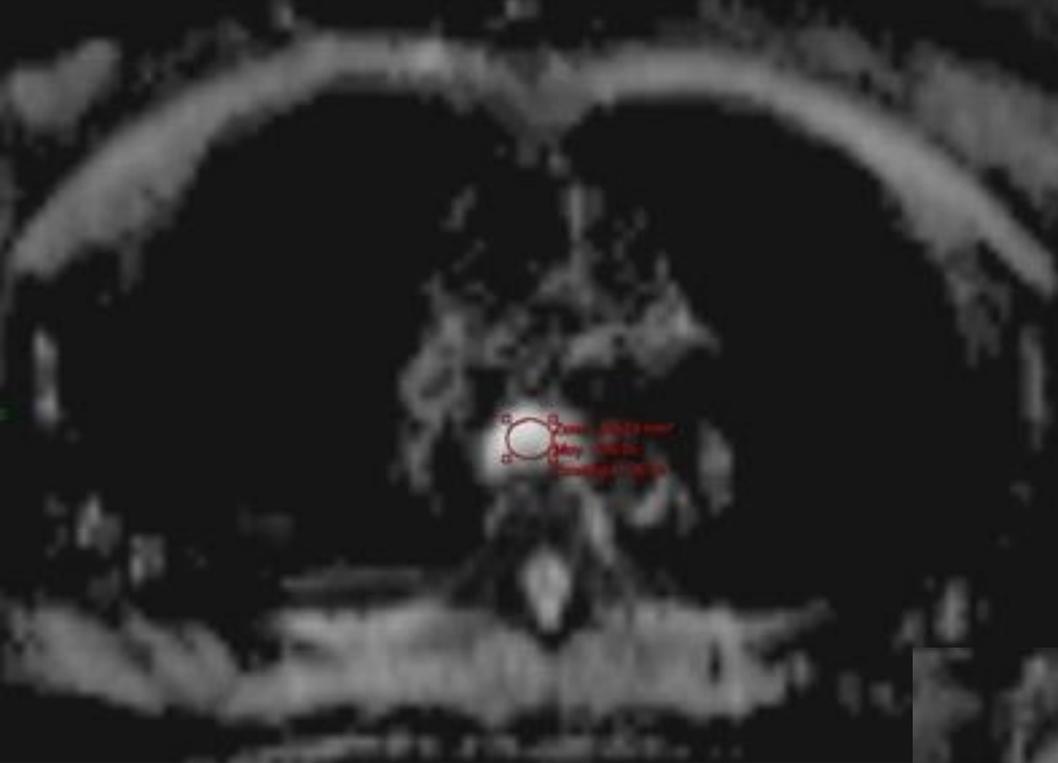
# Sus clavulaire ou contro latérale



T





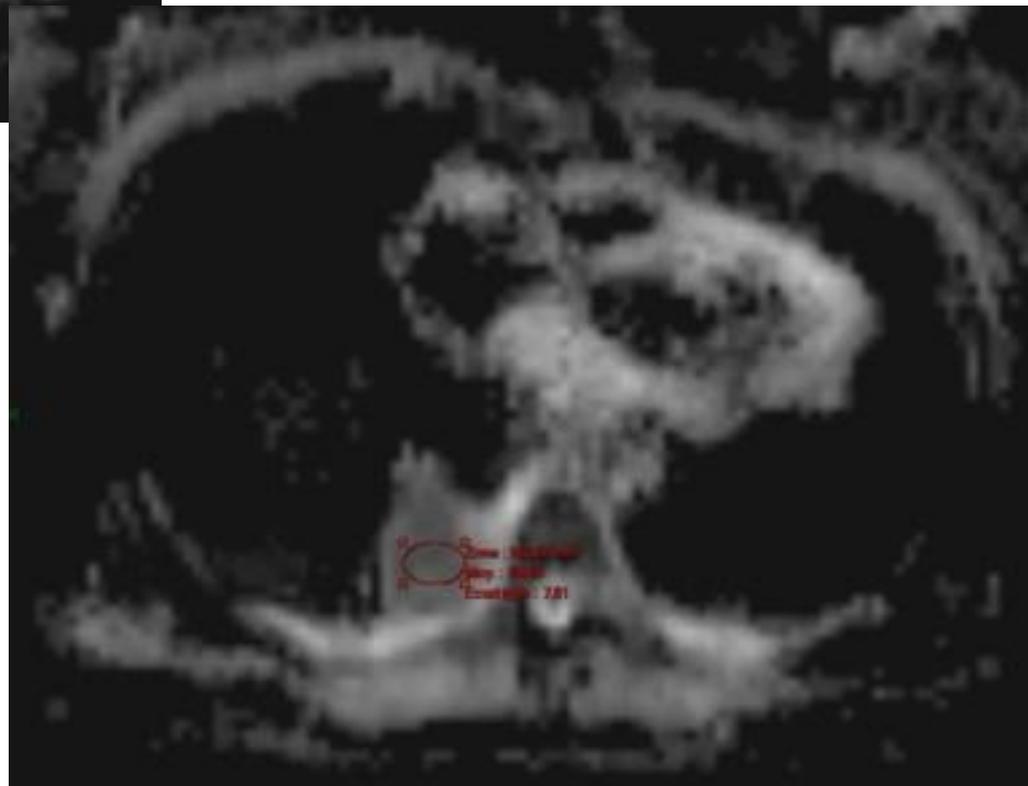


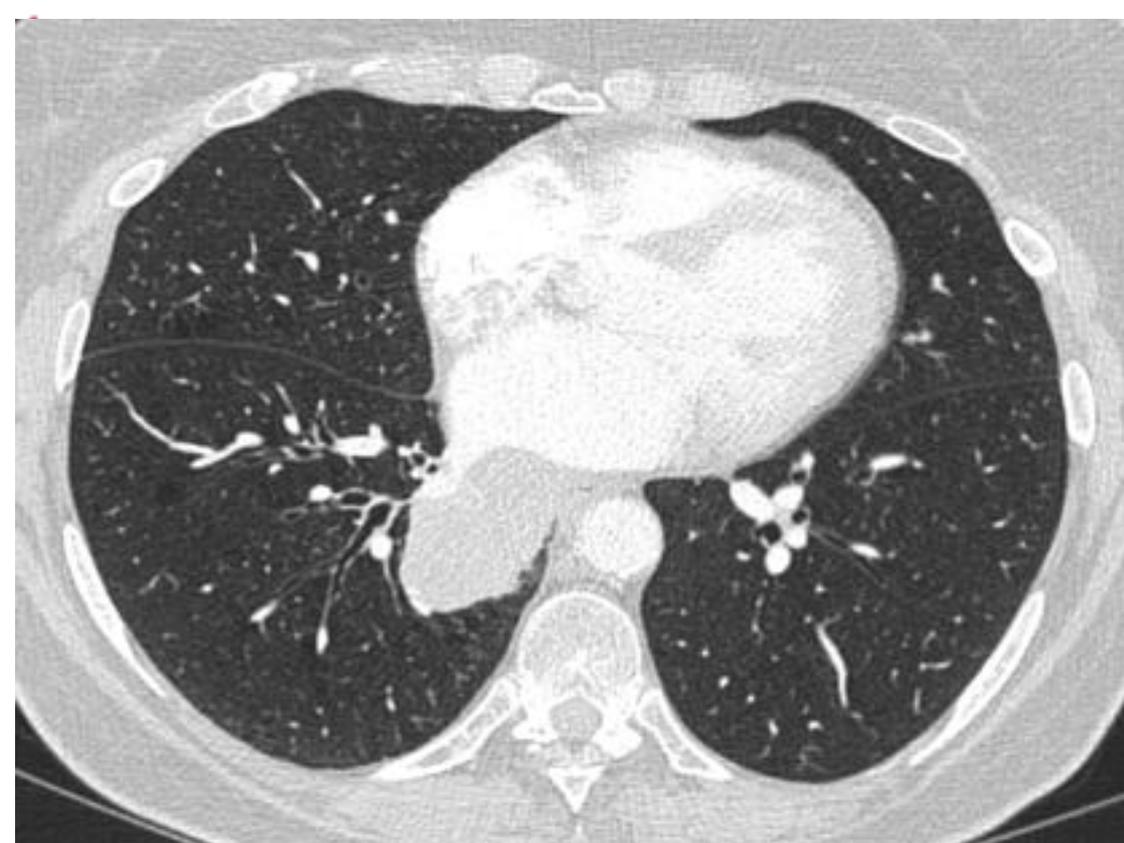
Adénopathie:

ADC-moy:  $2,4 \cdot 10^{-3} \text{mm}^2/\text{sec}$

Masse tumorale

ADC-moy:  $0,9 \cdot 10^{-3} \text{mm}^2/\text{sec}$



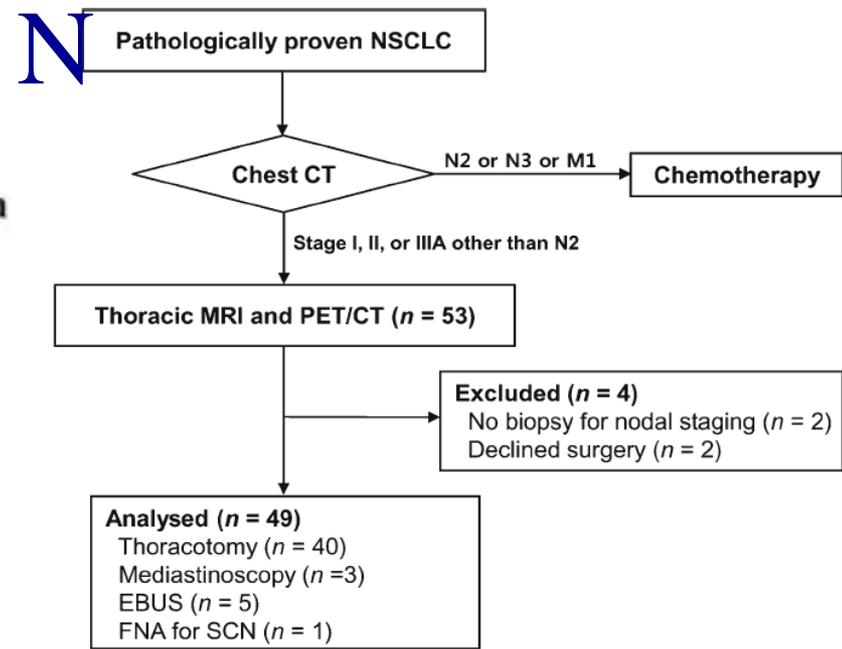


# IRM et cancer bronchique

## A proposal for combined MRI and PET/CT interpretation criteria for preoperative nodal staging in non-small-cell lung cancer

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O Jung Kwon • Ho Yun Lee • Byung-Tae Kim •  
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**Fig. 1** Flow chart for patient enrolment. *NSCLC* non-small cell lung cancer, *EBUS* endobronchial ultrasound, *FNA* fine-needle aspiration, *SCN* supraclavicular node

**Table 3** Comparison of diagnostic performance rates of PET/CT and combined MRI and PET/CT for nodal staging on a per-nodal station basis

Investigation	Sensitivity	Specificity	Accuracy	Positive predictive value	Negative predictive value
PET/CT	46 (18/39)	96 (161/167)	87 (179/206)	75 (18/24)	88 (161/182)
Combined MRI and PET/CT	Inclusive criteria	69 (27/39) <sup>a</sup>	93 (156/167)	71 (27/38)	93 (156/168)
	Exclusive criteria	44 (17/39)	99 (166/167) <sup>b</sup>	89 (183/206) <sup>a</sup>	94 (17/18)

Numbers *in parentheses* are numbers of nodal stations

<sup>a</sup> Significantly different from the other methods of interpretation (McNemar's test,  $P < 0.05$ )

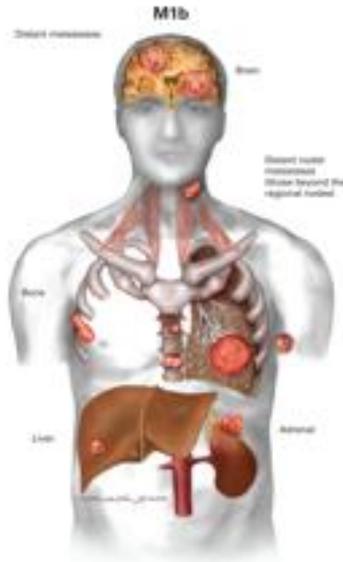
<sup>b</sup> Significantly different from when inclusive criteria were applied (McNemar's test,  $P < 0.05$ )

# M

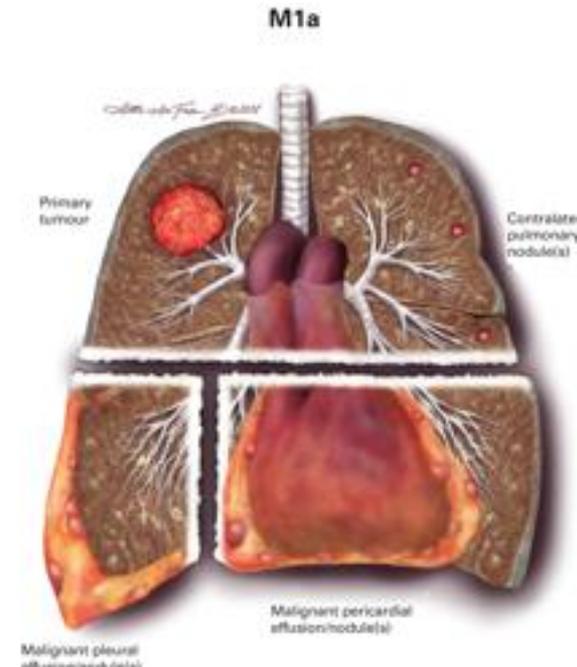
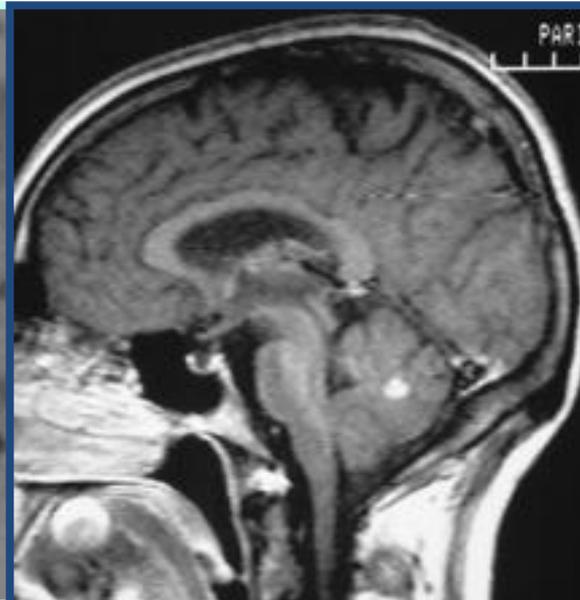
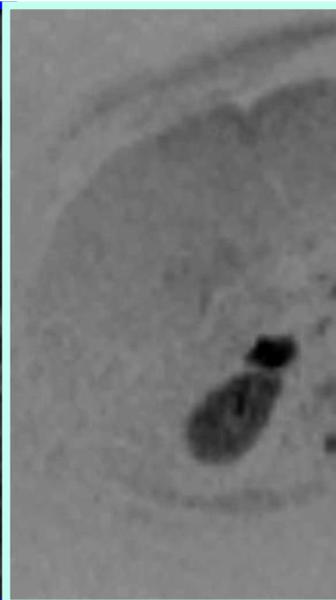
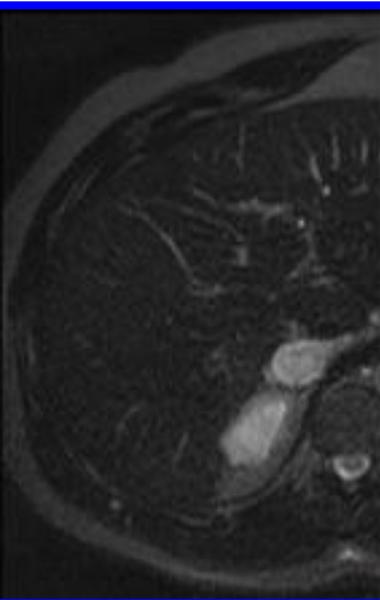
- Le M:
- Nodule pulmonaire controlatéral
- Atteinte pleurale controlatérale
- Foie
- Les surrénales
- Os
- Cerveau

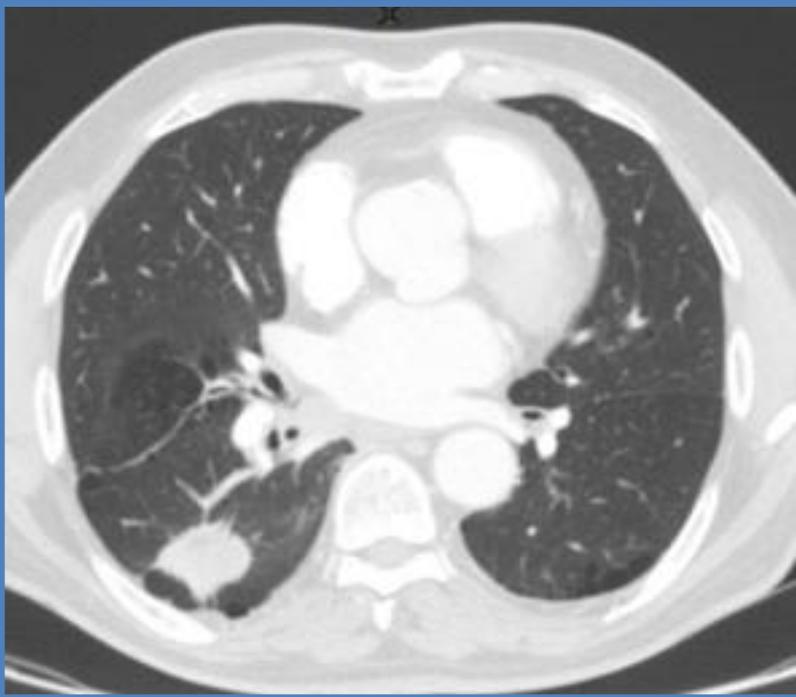
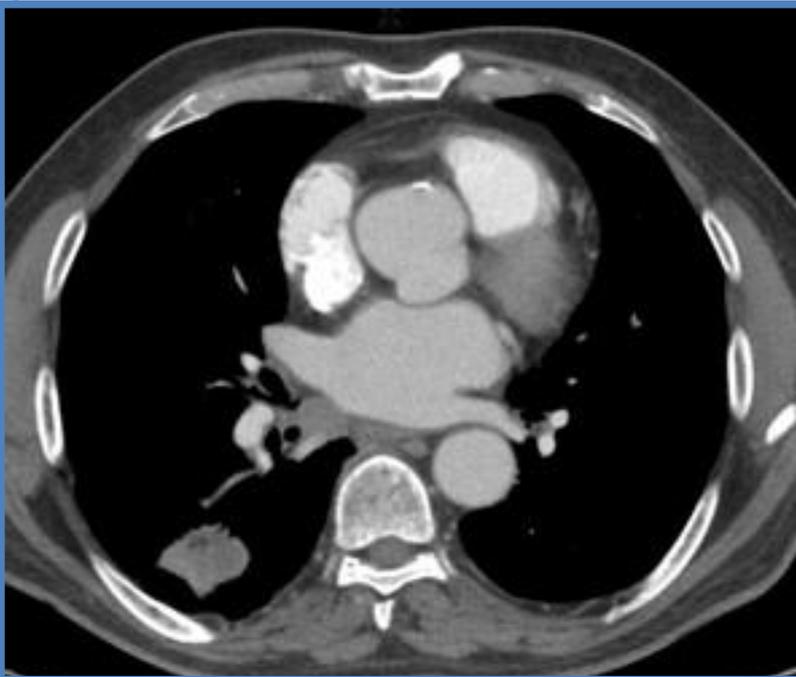


# Métastases

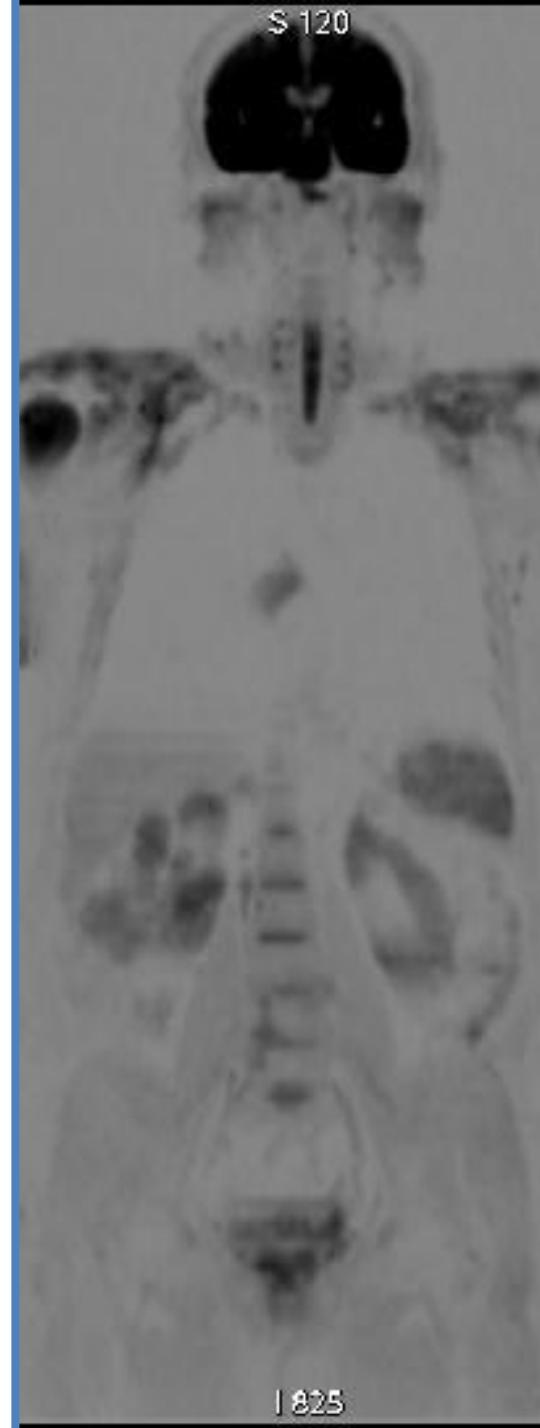


		Survival	
		I	
		Median	5-year
Pas de métastase	M0		
Métastase péricardique	M1a	8 M	2%
Métastase pleurale	M1a	8 M	2%
Nodule(s) pulmonaire conto latérale	M1a	10 M	3%
Métastase à distance	M1b	6 M	1%



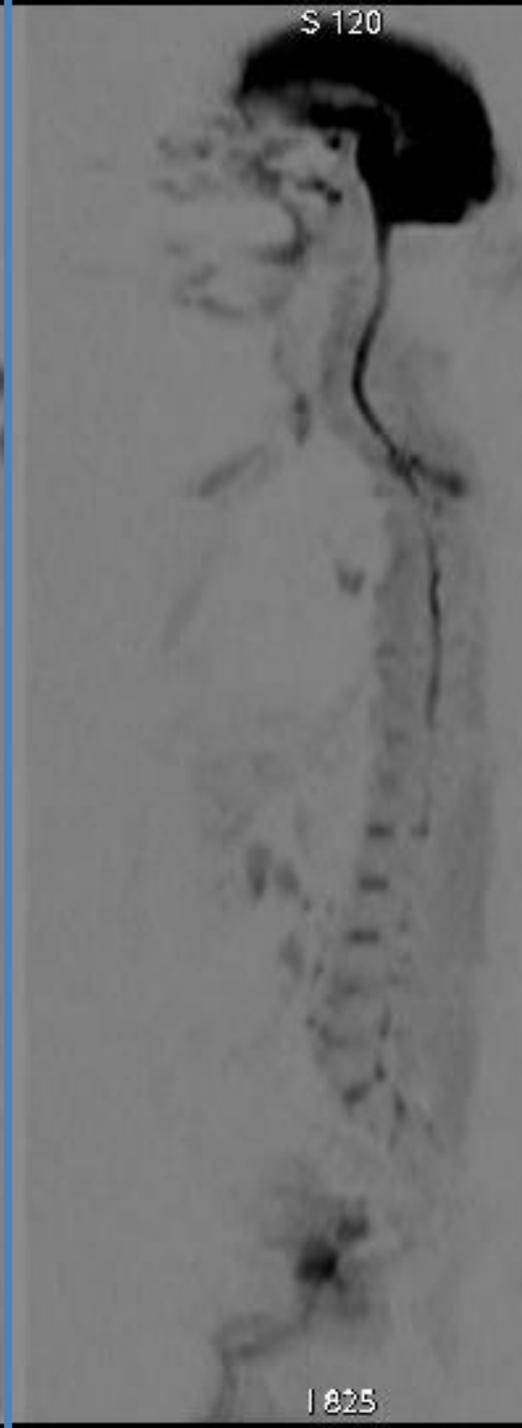


S 120



1825

S 120

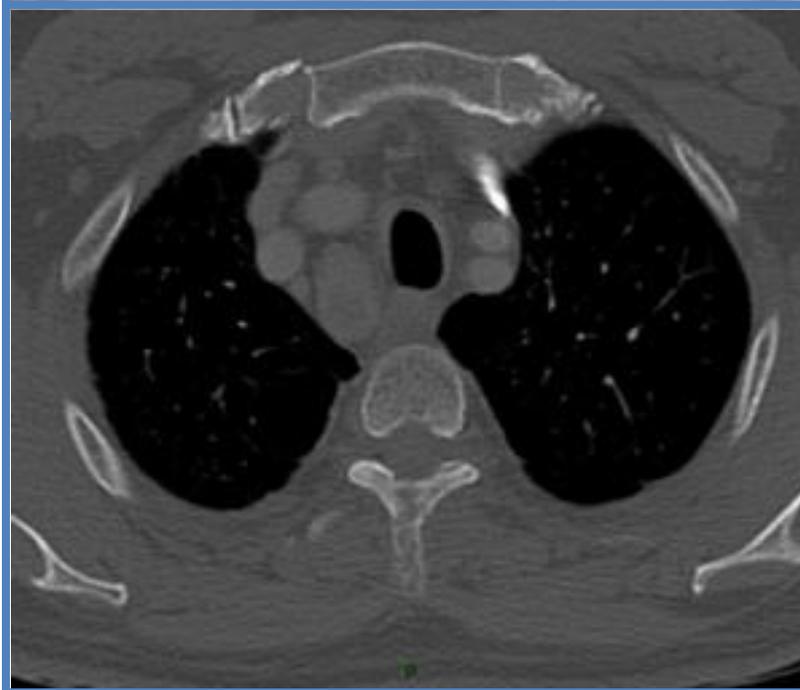
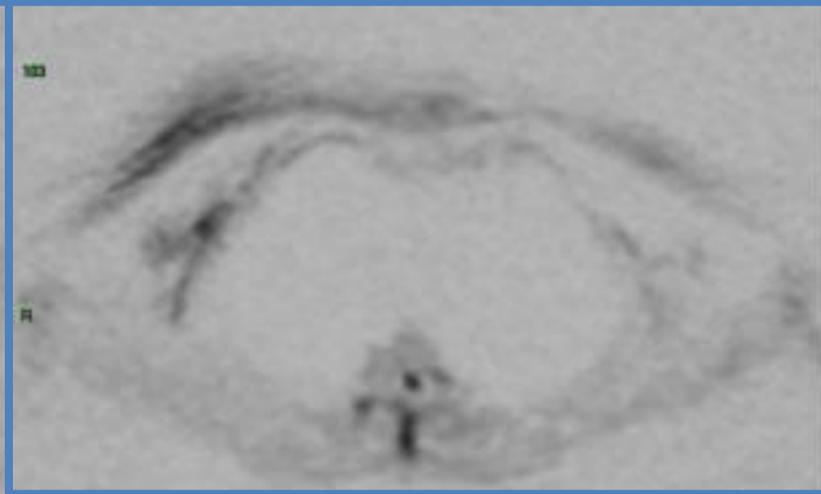
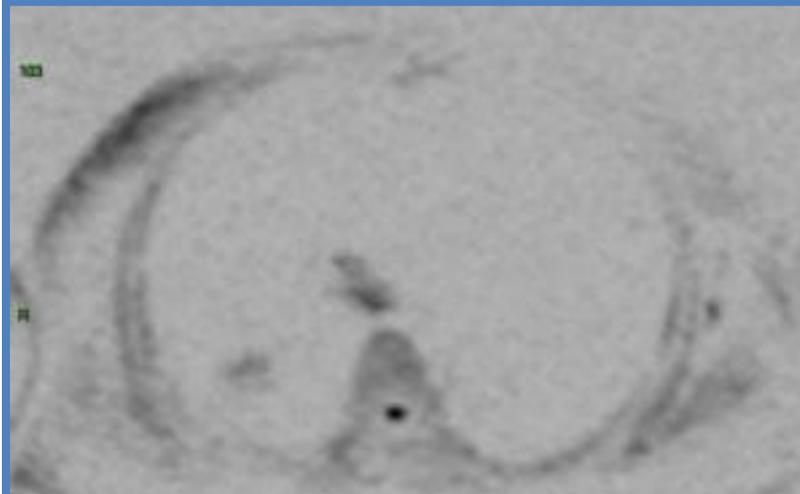


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IRA

50005



# Conclusion

- TDM Thoracique / Surrénale / foie / cerveau
- IRM corps entier et dédiée
- TNM
- Proposer une autre exploration
- En cas de doute, proposer une chirurgie

# Merçi