IPERTENSIONE POLMONARE CRONICA

IL RUOLO DELLA TC E DELLA RM

Due tecniche che offrono contributi fondamentali spesso dirimenti

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UNITA' OPERATIVA DI RADIOLOGIA DIAGNOSTICA E INTERVENTISTICA
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Milano, 12 marzo 2010
IV CONGRESSO NAZIONALE DI ECOCARDIOCHIRURGIA

CTPH

IPERTENSIONE POLMONARE CRONICA TROMBOEMBOLICA

- NEL 4 % CIRCA DEI PAZIENTI ENTRO DUE ANNI DA UN EPISODIO DI TEP ACUTA
- PROGNOSI SEVERA SE NON TRATTATA

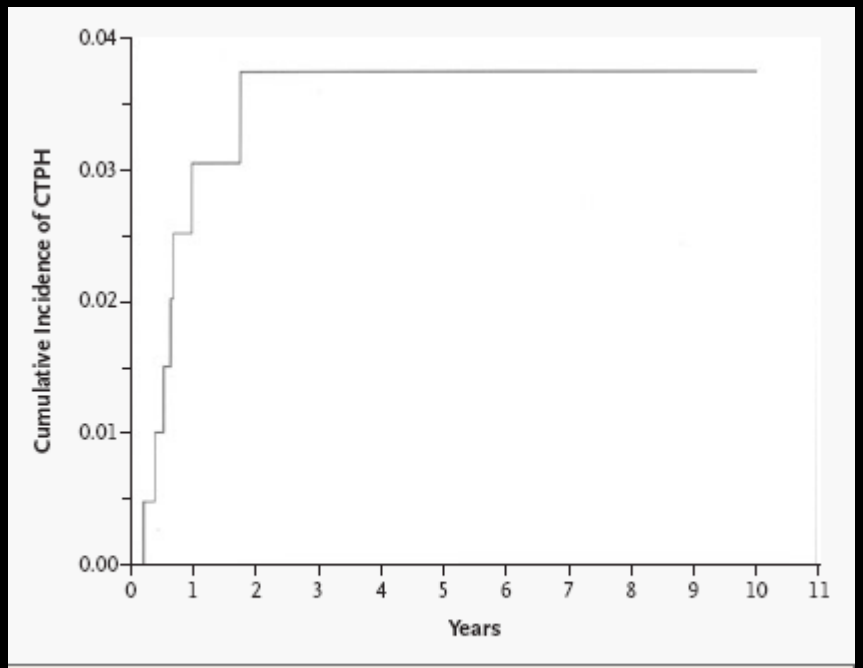


Figure 2. The Cumulative Incidence of CTPH after a First Episode of Pulmonary Embolism without Prior Deep-Vein Thrombosis.

PENGO V ET AL. N Engl J Med 2004;350: 2257-2264

RUOLO DELLA RADIOLOGIA

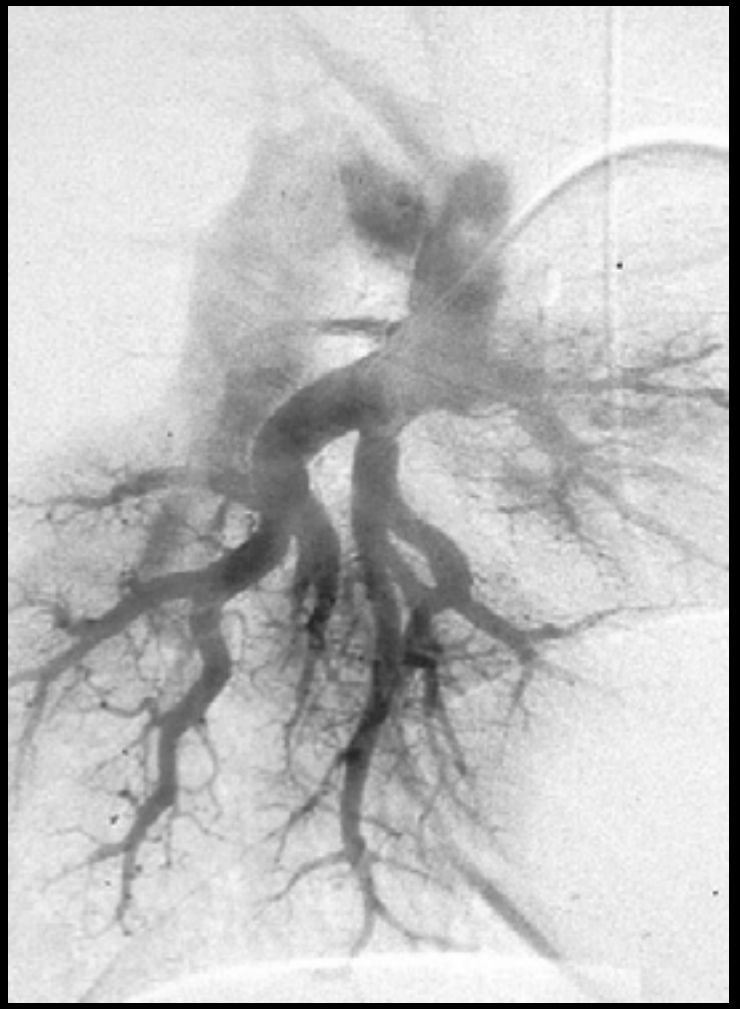
- CONFERMA DIAGNOSTICA
- SELEZIONE DEI CASI CHIRURGICI
- FOLLOW-UP

METODICHE D' IMAGING

- ANGIOGRAFIA SELETTIVA
- MDCT
- RISONANZA MAGNETICA

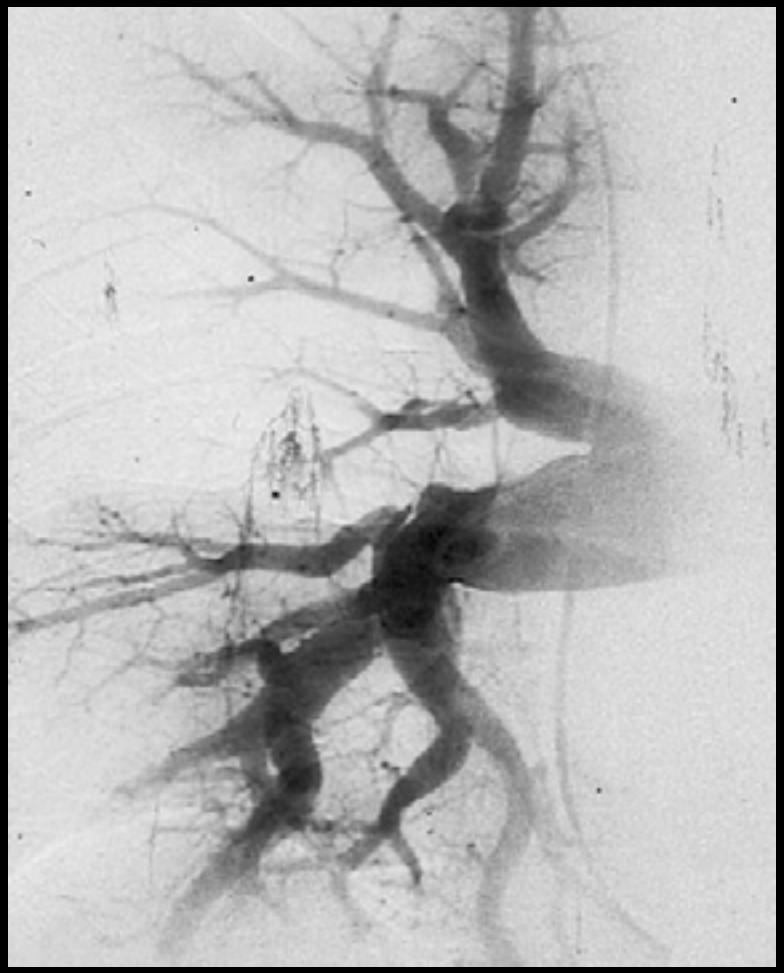
ANGIOGRAFIA
(con cateterismo cuore destro)

- DIAGNOSI di TEP CRONICA
- PRE - OPERATORIO

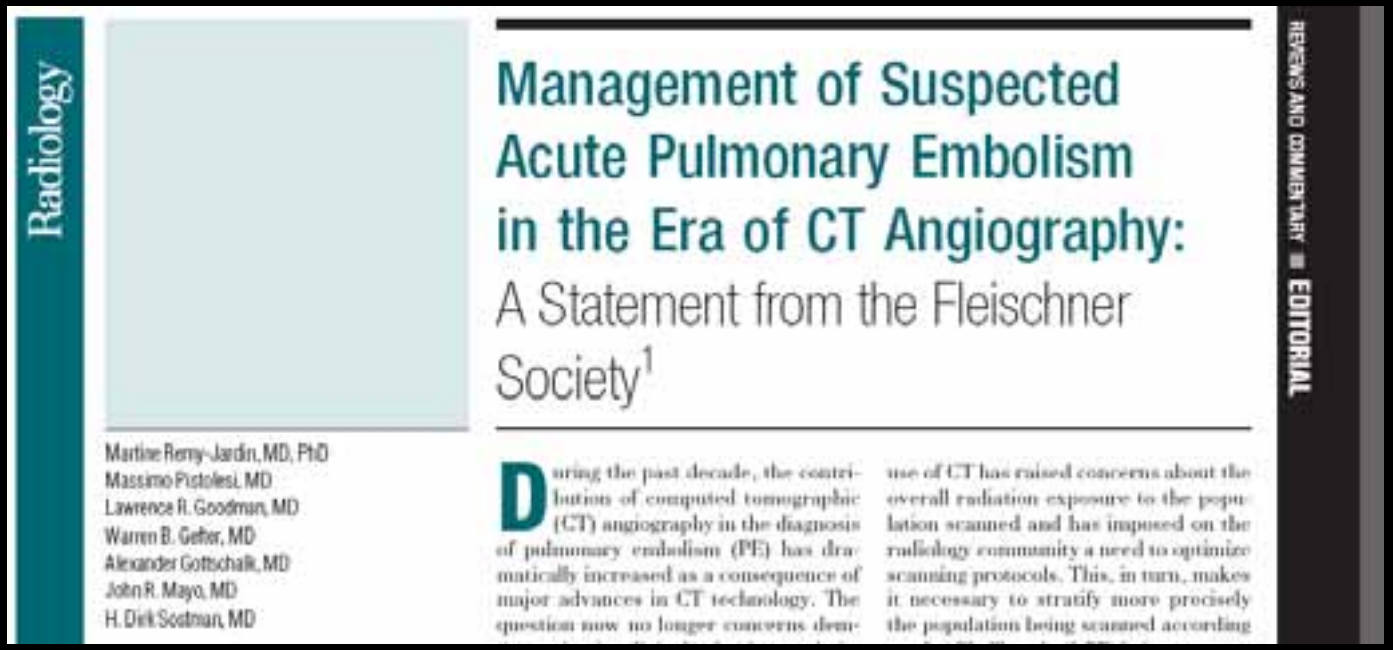


- INTERPRETAZIONE NON FACILE
- INVASIVITA’

In the future, pulmonary angiography probably will be performed only when an adequate surgical roadmap has not been provided by CT and magnetic resonance (MR) imaging



Coulden R. State-of-the-art imaging techniques in chronic thromboembolic pulmonary hypertension. Proc Am Thorac Soc 2006;3:577–583.



Radiology

REVIEWS AND COMMENTARY ■ EDITORIAL

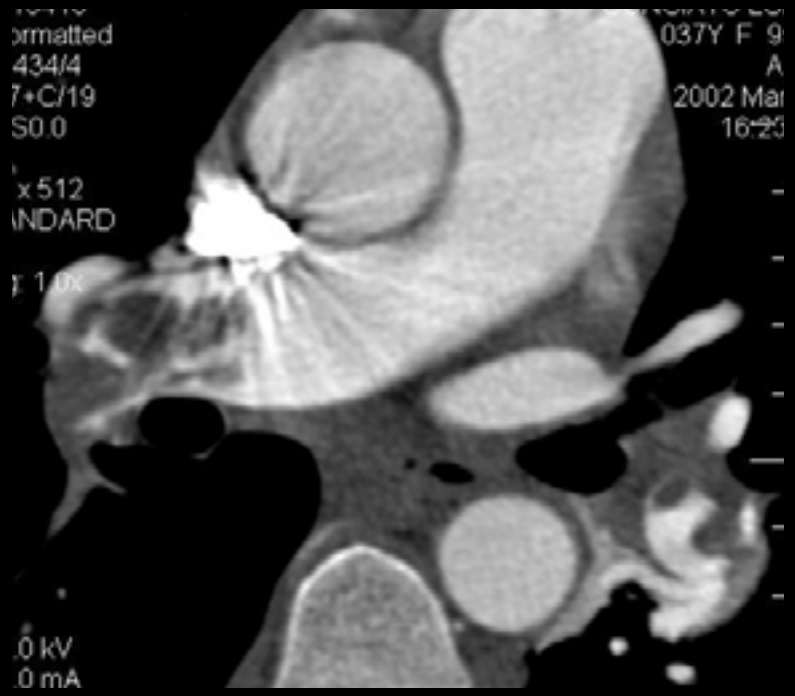
Management of Suspected Acute Pulmonary Embolism in the Era of CT Angiography: A Statement from the Fleischner Society[1]

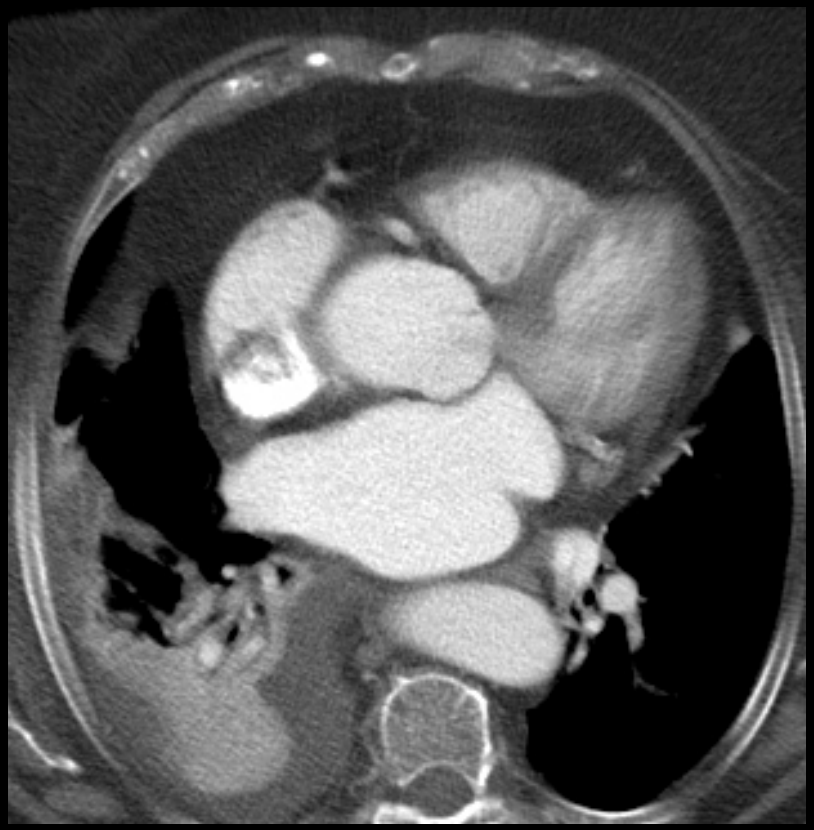
Martine Remy-Jardin, MD, PhD
Massimo Pistolesi, MD
Lawrence R. Goodman, MD
Warren B. Gefter, MD
Alexander Gottschalk, MD
John R. Mayo, MD
H. Dirk Sostman, MD

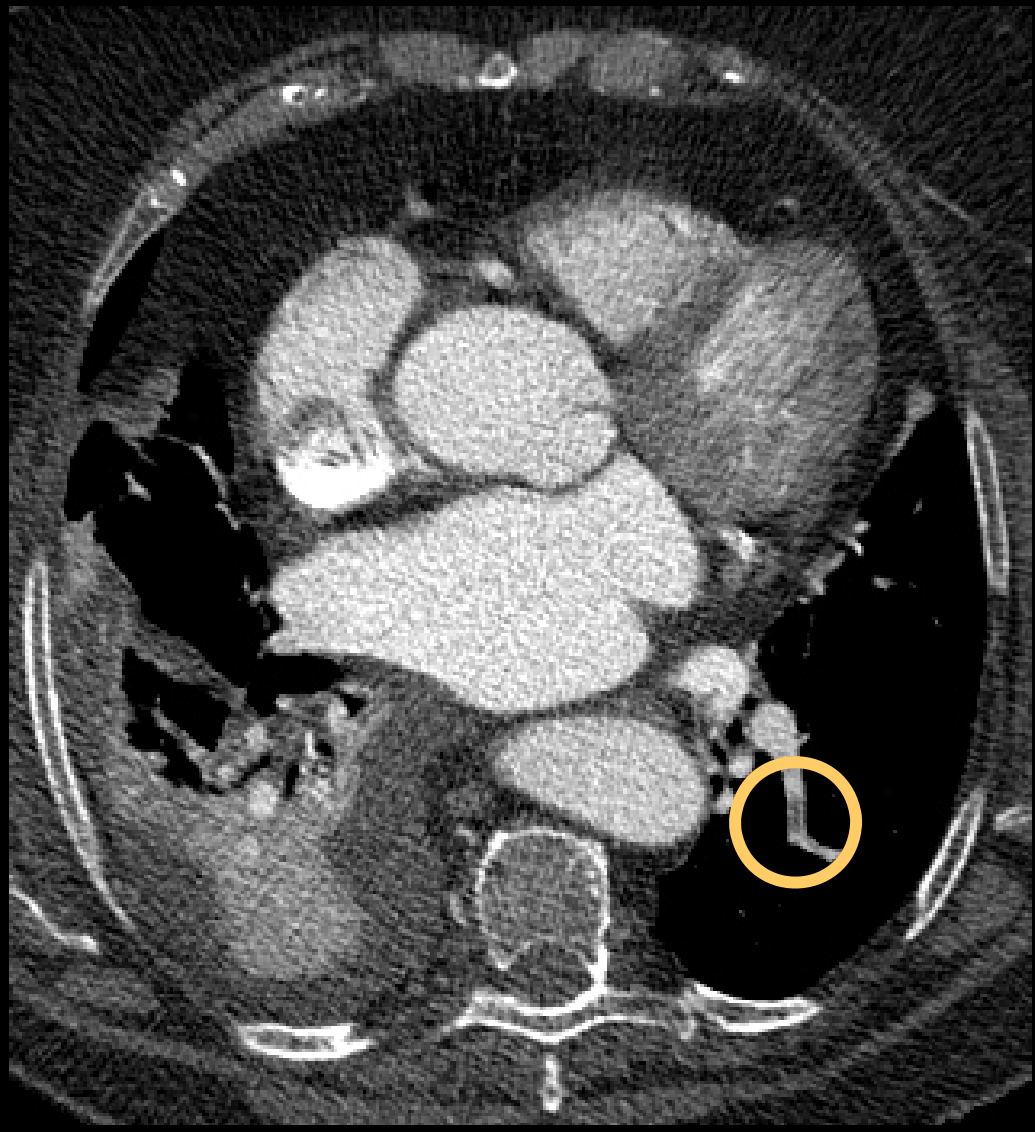
During the past decade, the contribution of computed tomographic (CT) angiography in the diagnosis of pulmonary embolism (PE) has dramatically increased as a consequence of major advances in CT technology. The question now no longer concerns dem-

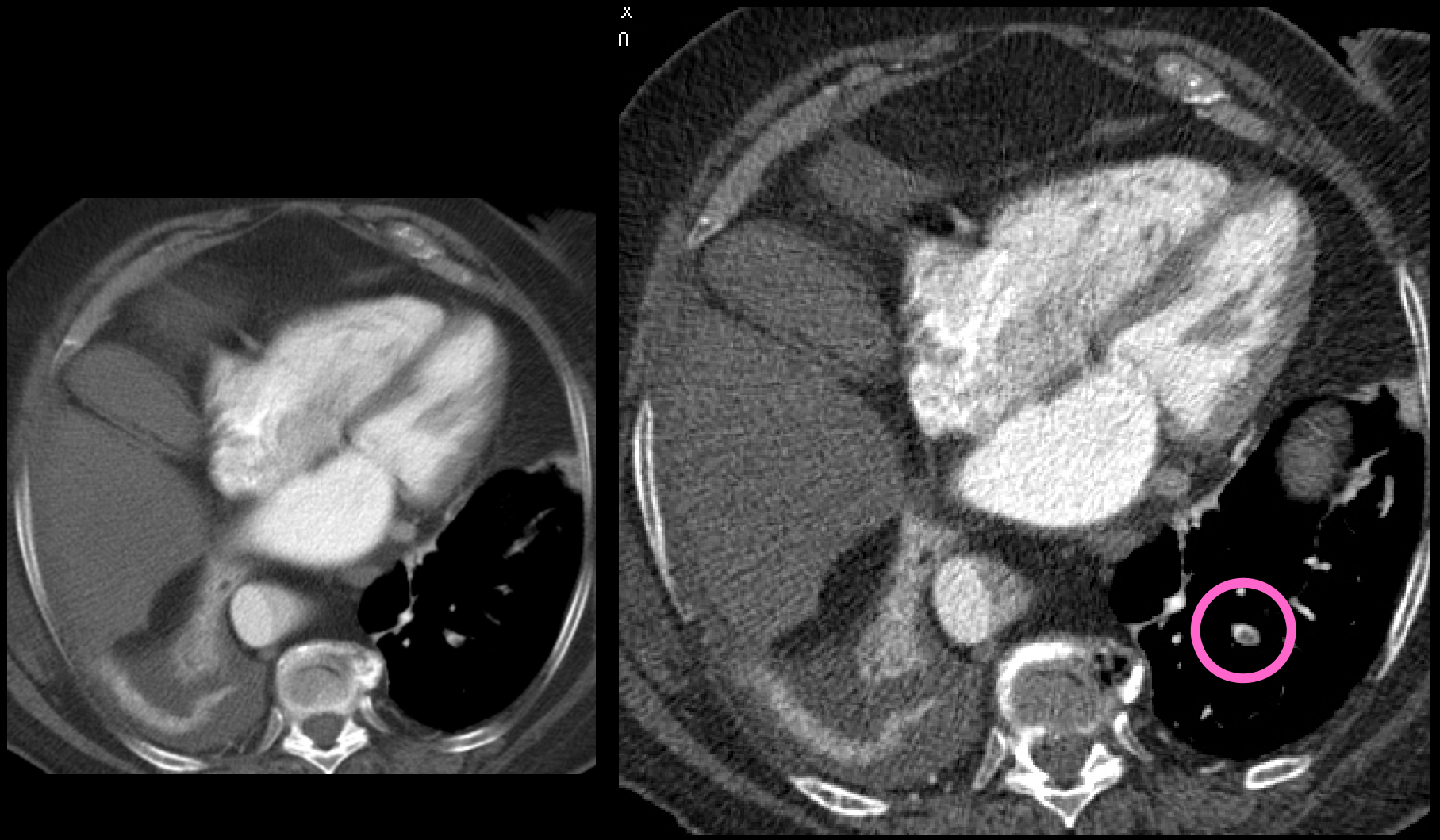
use of CT has raised concerns about the overall radiation exposure to the population scanned and has imposed on the radiology community a need to optimize scanning protocols. This, in turn, makes it necessary to stratify more precisely the population being scanned according

IN 2007, MULTIDETECTOR CT ANGIOGRAPHY HAS FULFILLED THE CONDITIONS TO REPLACE PULMONARY ANGIOGRAPHY AS THE REFERENCE STANDARD FOR DIAGNOSIS OF ACUTE PE.







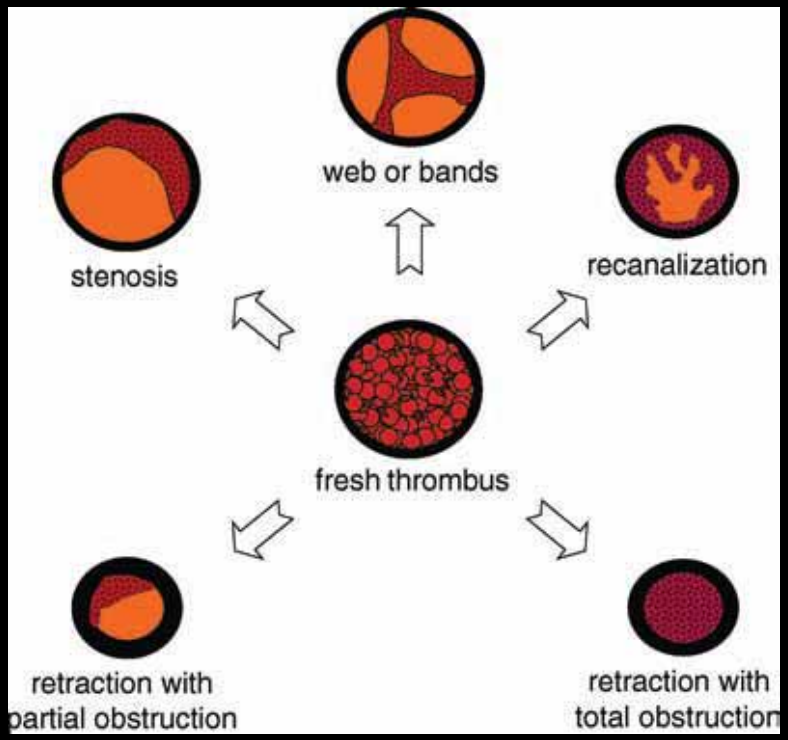


IMAGING ISOTROPICO

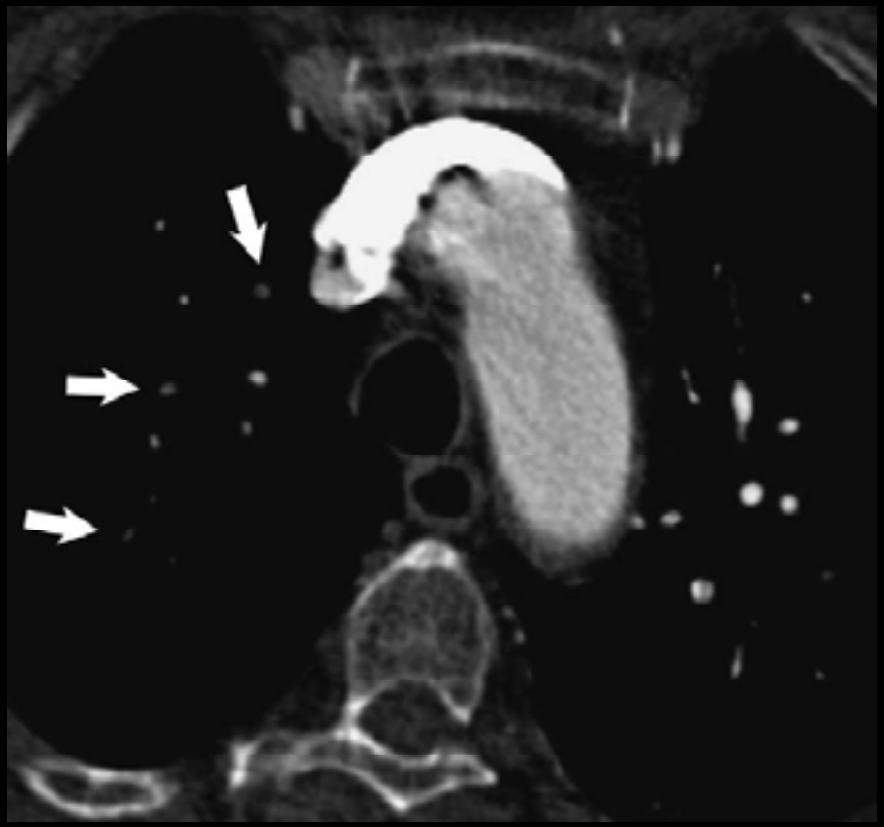
SUBMILLIMETRICO (0.6 mm)

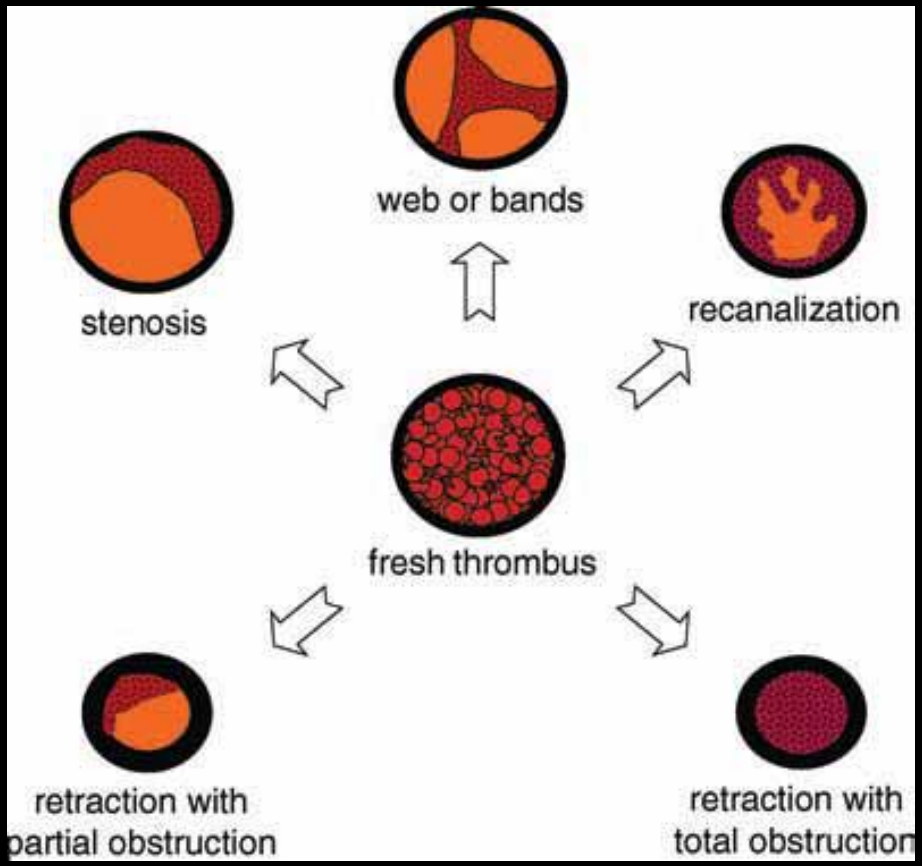
TEP CRONICA

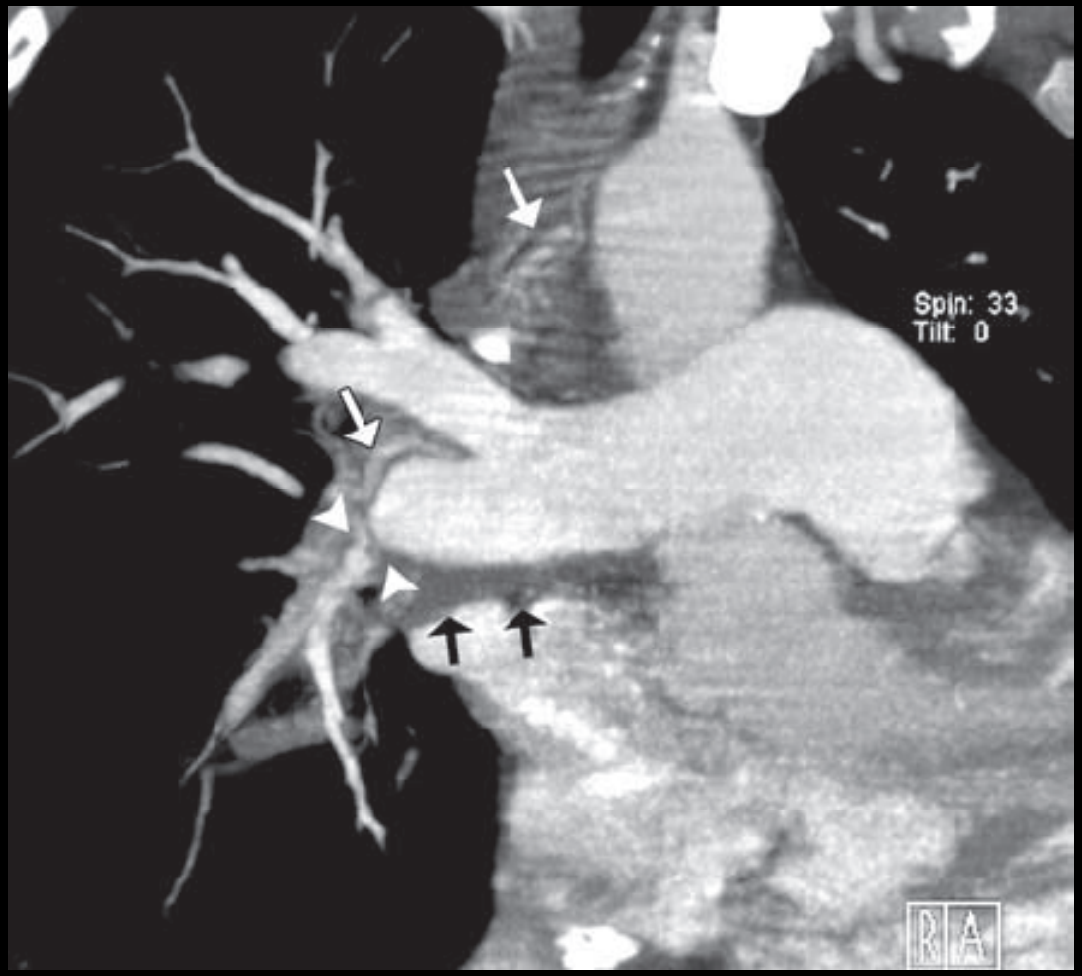
- Il meccanismo patogenetico è poco chiaro
- Irregolarità nel processo di risoluzione del trombo acuto



SEGNI VASCOLARI DIRETTI



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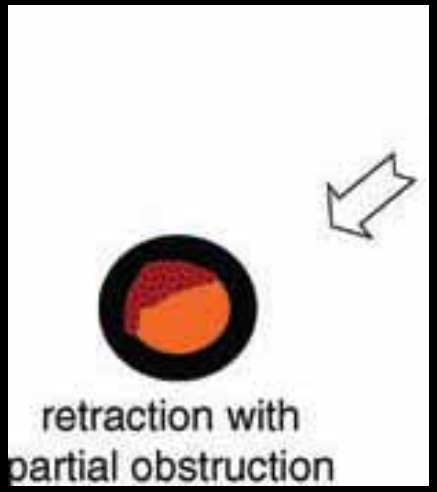
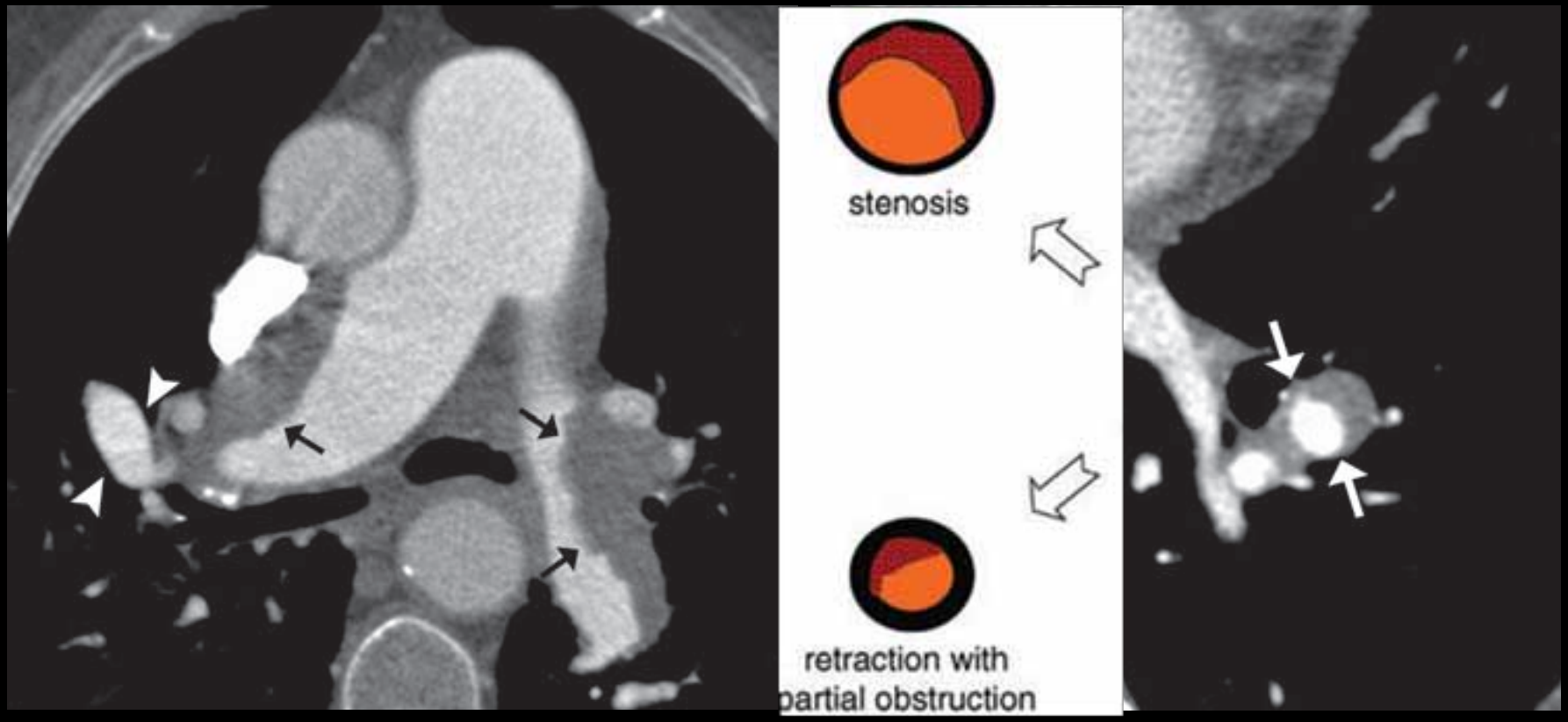
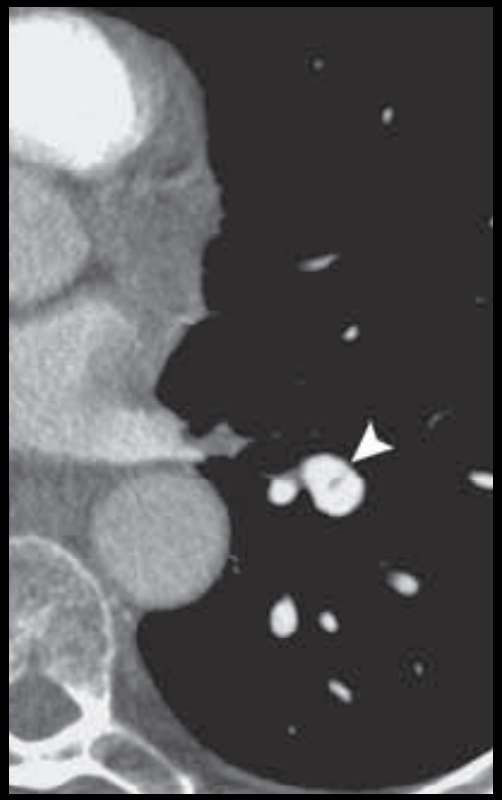
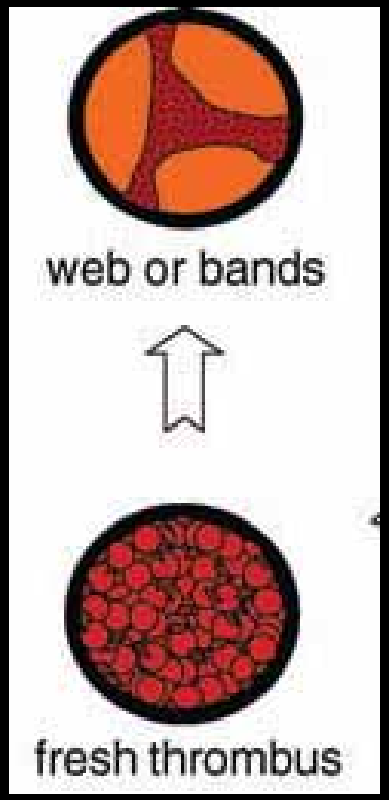
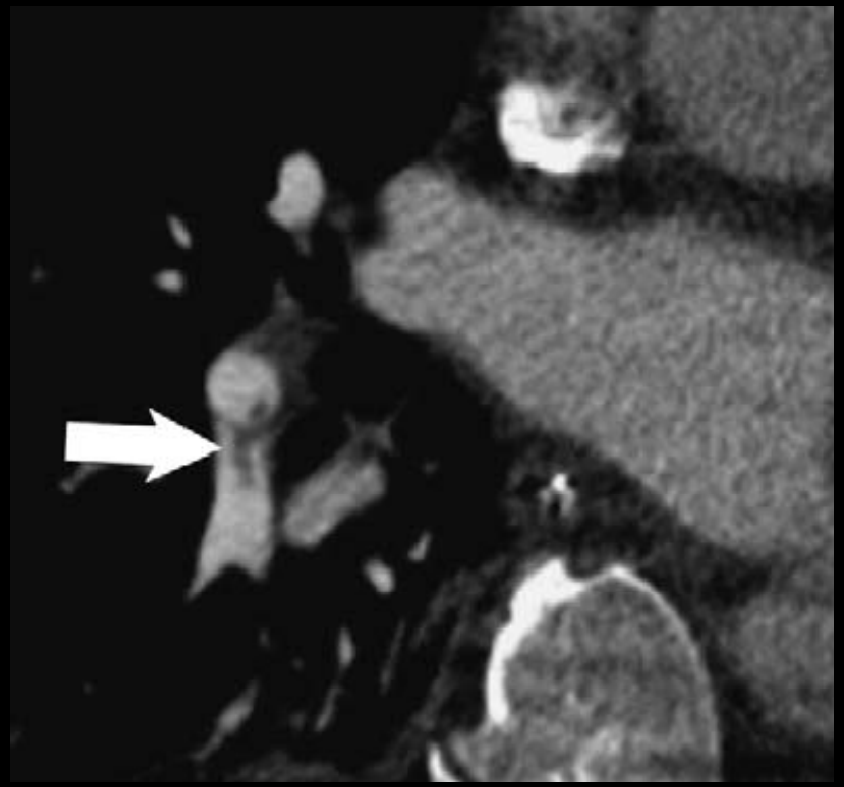
R A

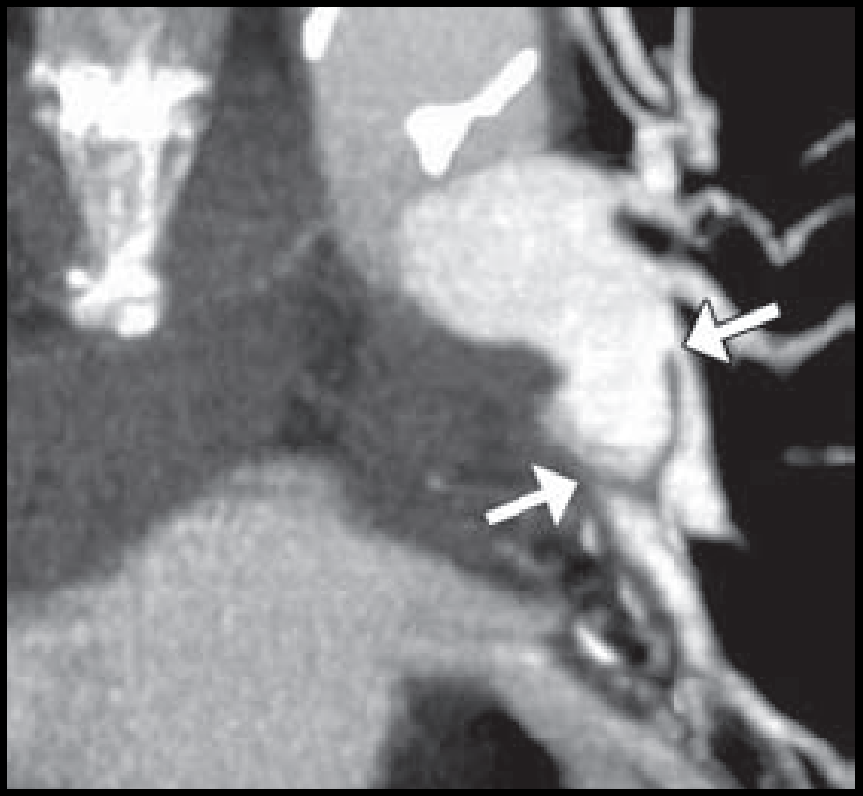

retraction with
partial obstruction

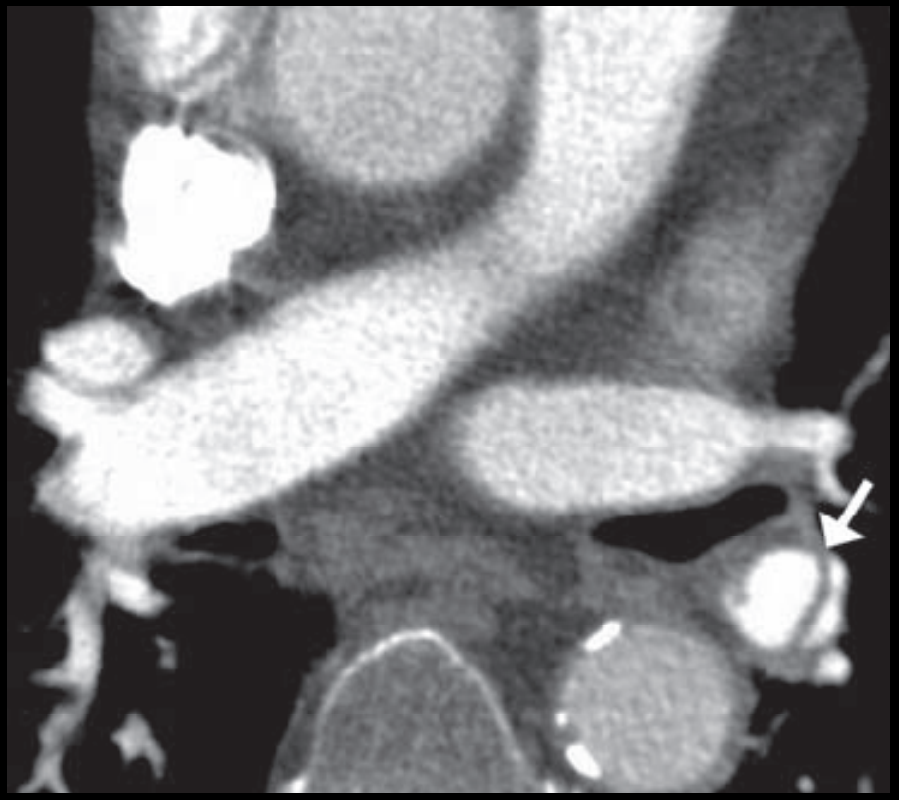

stenosis
retraction with
partial obstruction




web or bands
fresh thrombus



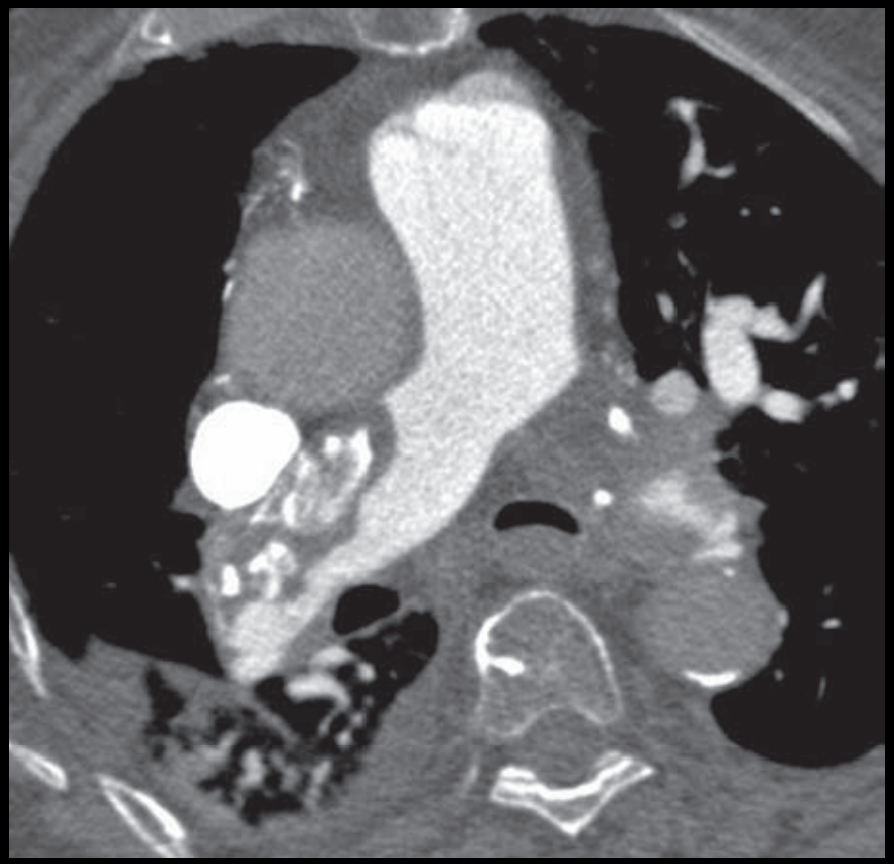




LE BANDE SONO LOCALIZZATE SOPRATTUTTO NELLE ARTERIE LOBARI E/O SEGMENTARIE,

RARAMENTE NELLE ARTERIE PRINCIPALI

SEGNI DI IPERTENSIONE POLMONARE



- aumento delle resistenze vascolari da ostruzione causa dilatazione rami principali
- diametro arteria polmonare centrale maggiore di 30 mm
- ratio AP / Ao maggiore di 1

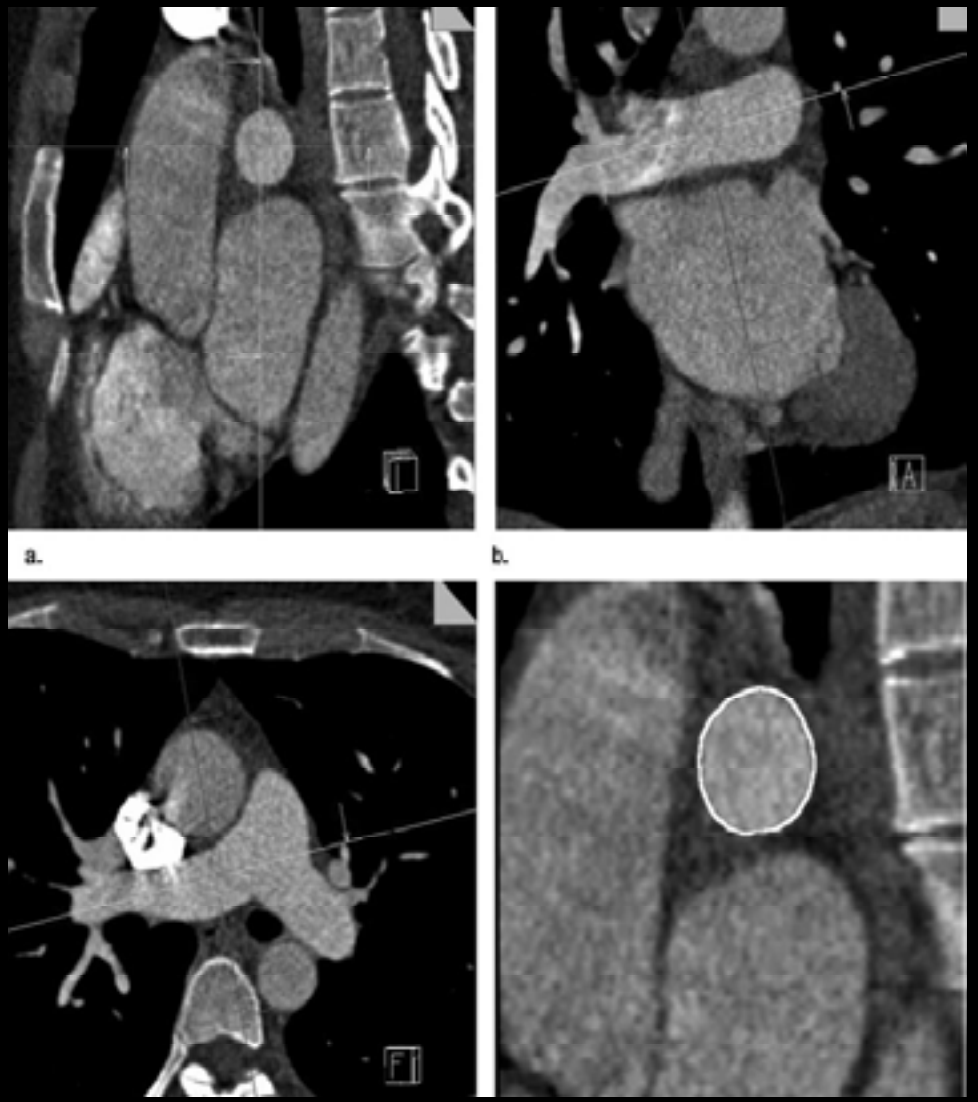
NELLA CTPH, SPESSO ASIMMETRIA DELLA DILATAZIONE DELLE POLMONARI

Pulmonary Hypertension: ECG-gated 64-Section CT Angiographic Evaluation of New Functional Parameters as Diagnostic Criteria[1]

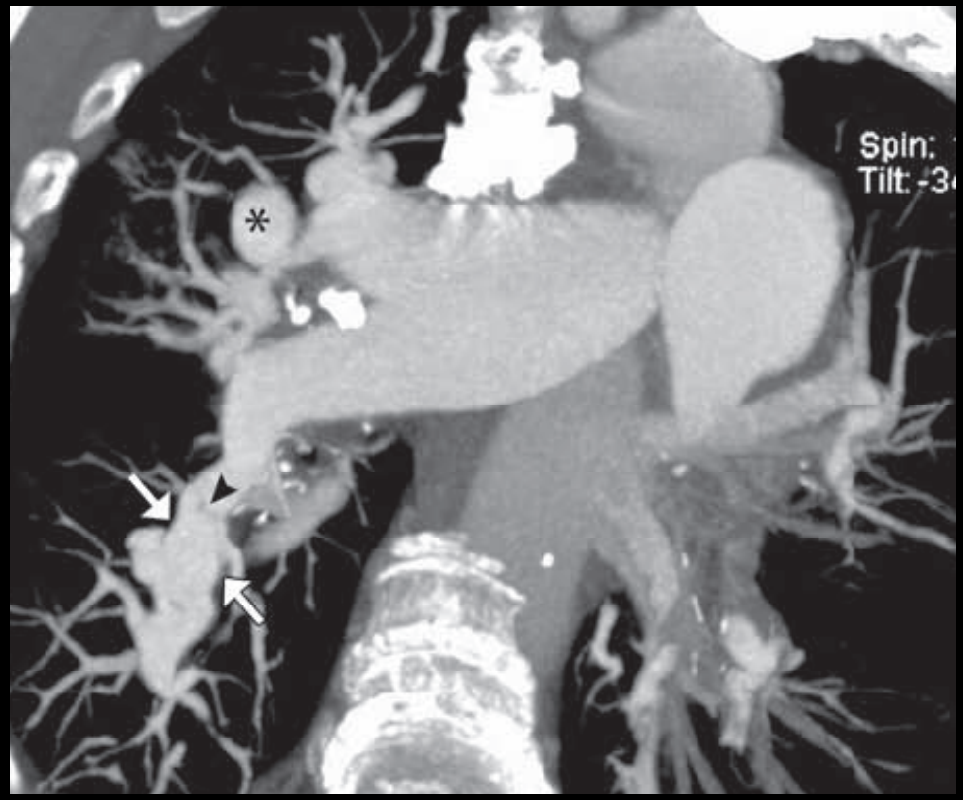
Marie-Pierre Revel et al

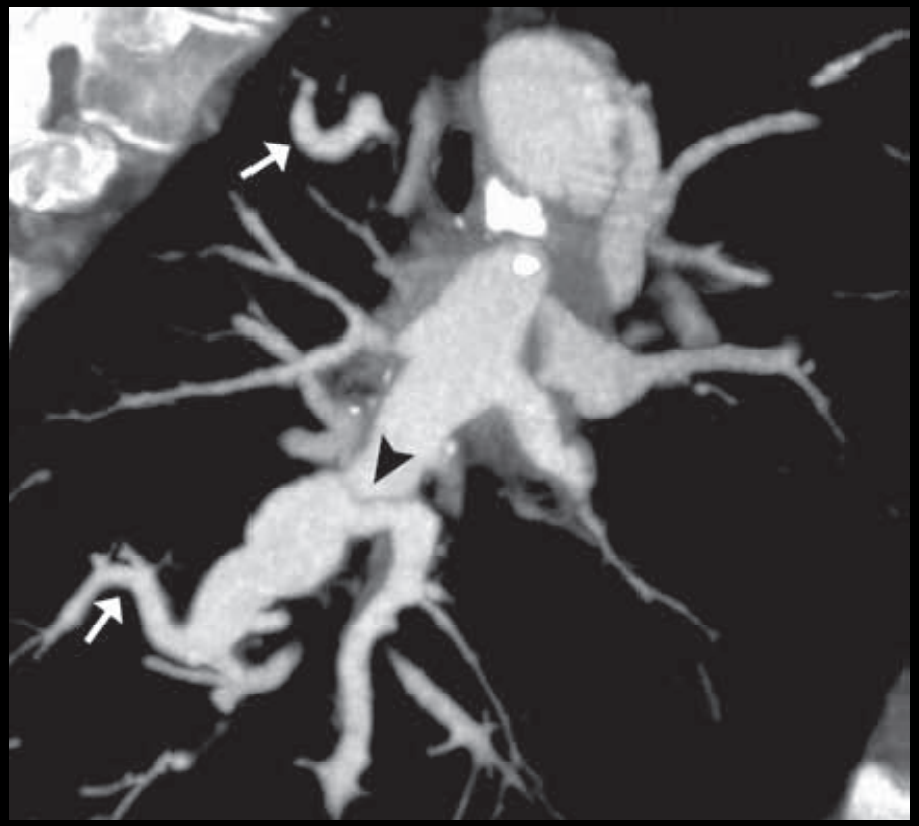
Radiology 2009;250:558-566

DISTENSIBILITA' ARTERIA POLMONARE DESTRA



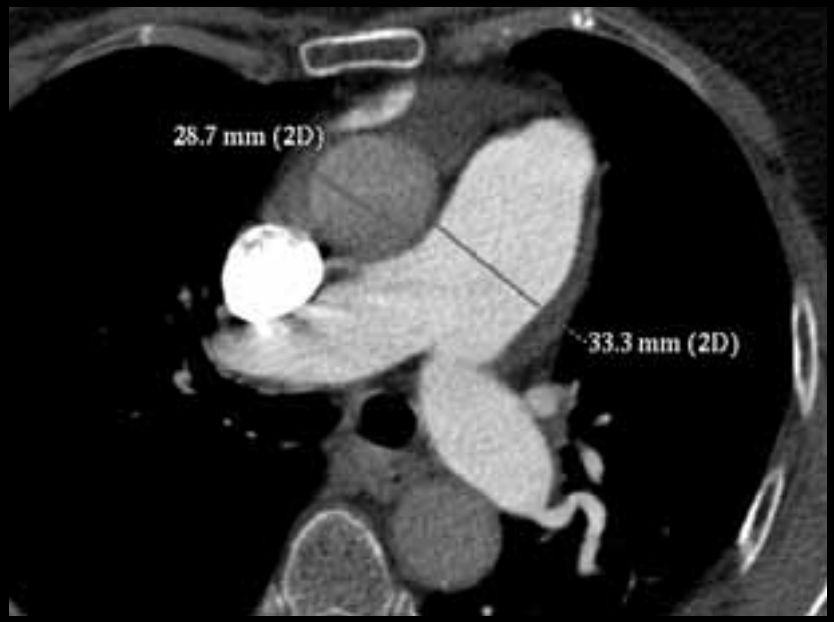
DILATAZIONE POST-STENOTICA





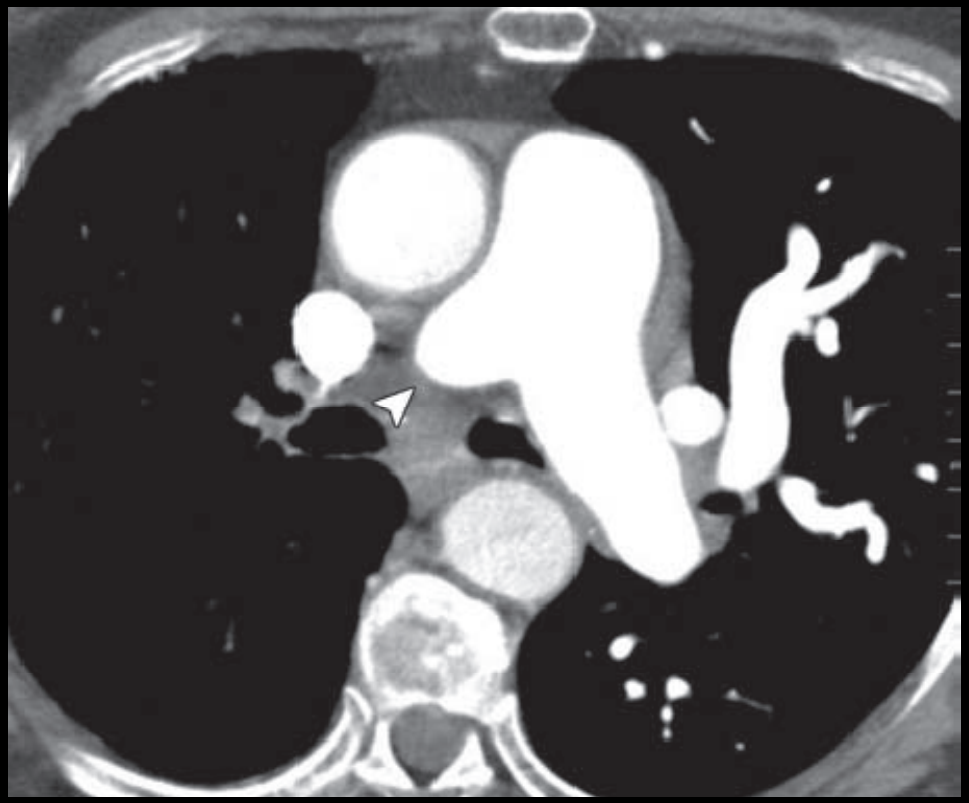
TORTUOSITA’ DEI VASI POLMONARI

IPERTENSIONE POLMONARE IDIOPATICA



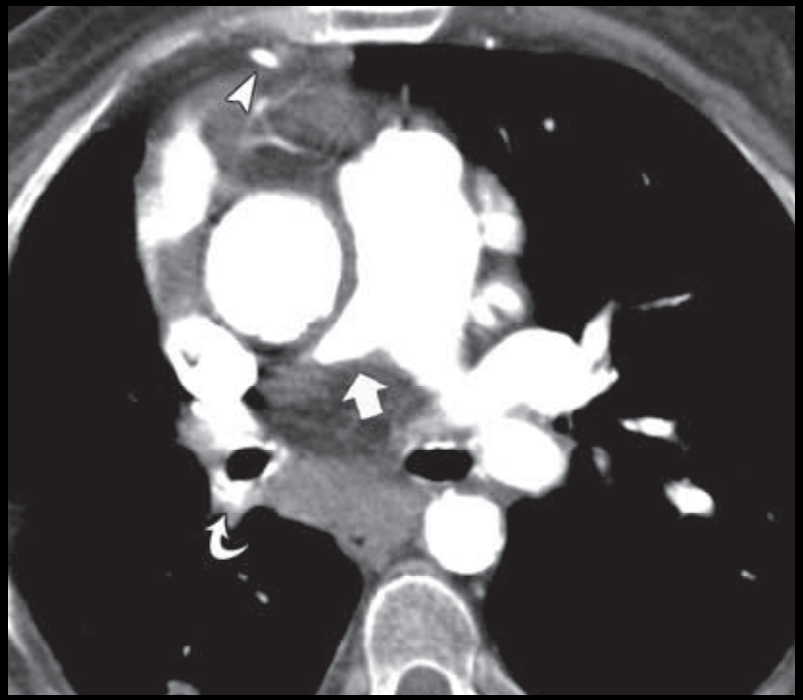
- La trombosi arteriosa in situ può mimare l'occlusione del vaso da materiale tromboembolico
- E' meno frequente l'ipertrofia del sistema bronchiale
- Non c'è l'associazione tra oligoemia a mosaico e salto di calibro dei vasi
- Infarti polmonari rari

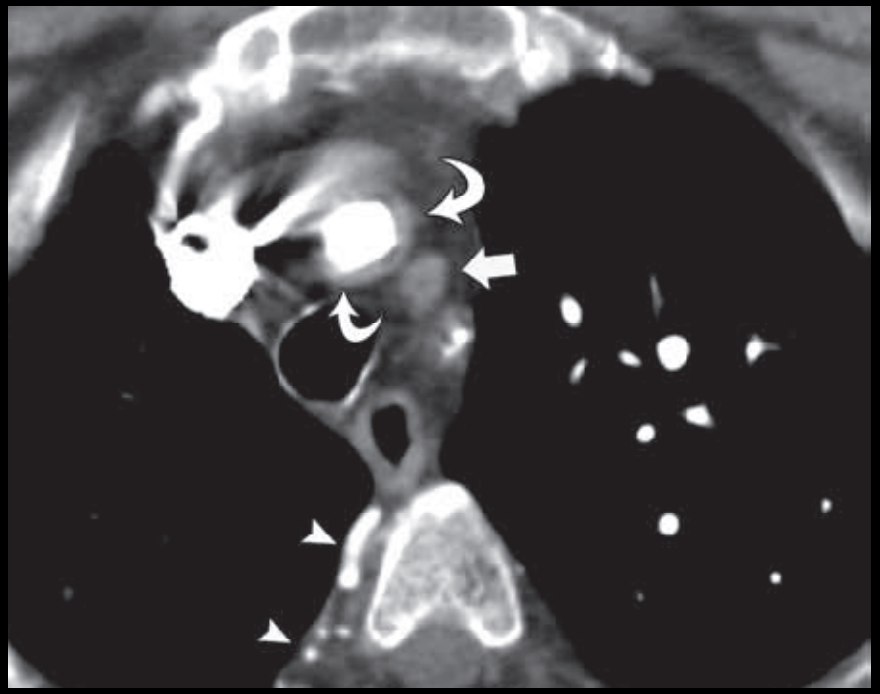
INTERRUZIONE PROSSIMALE DELL'ARTERIA POLMONARE



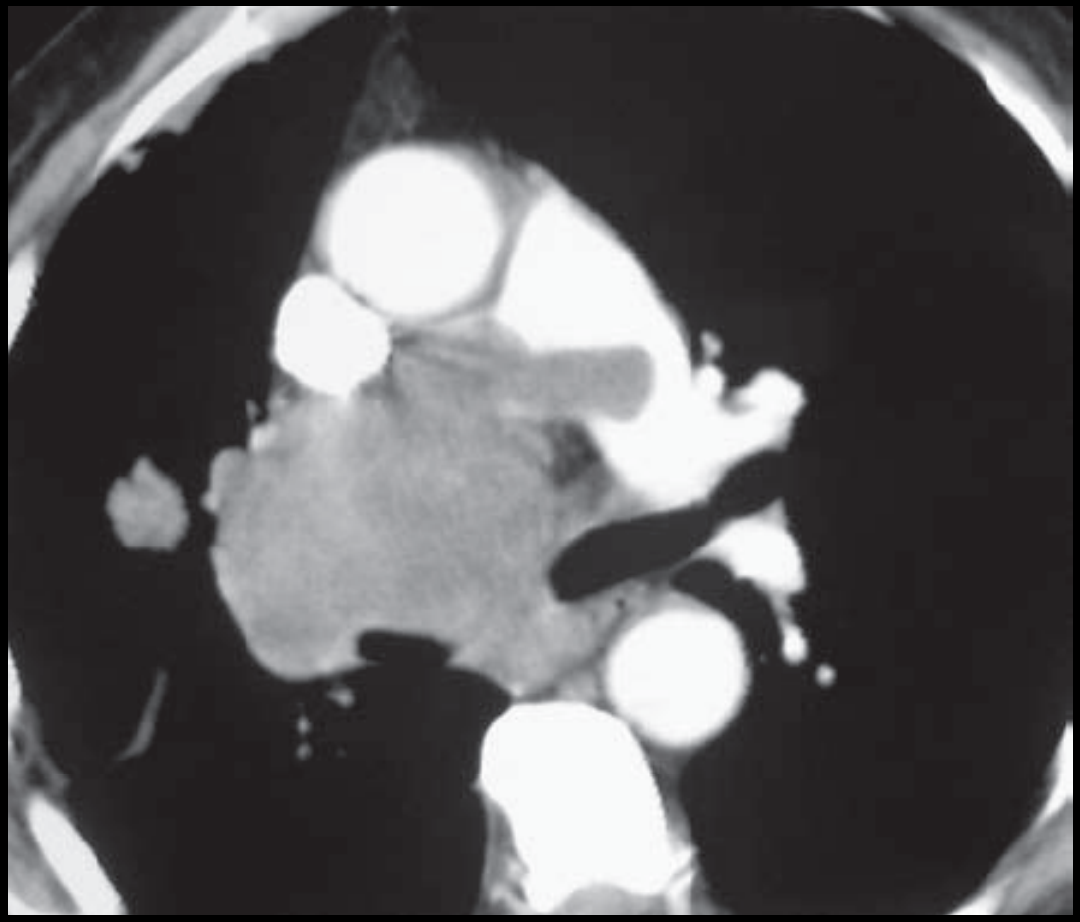
- A sinistra è associata ad anomalia congenita cardiovascolare (Fallot)
- A destra è più frequente
- E' salto di calibro del vaso morfologicamente distinguibile dalla TEP cronica

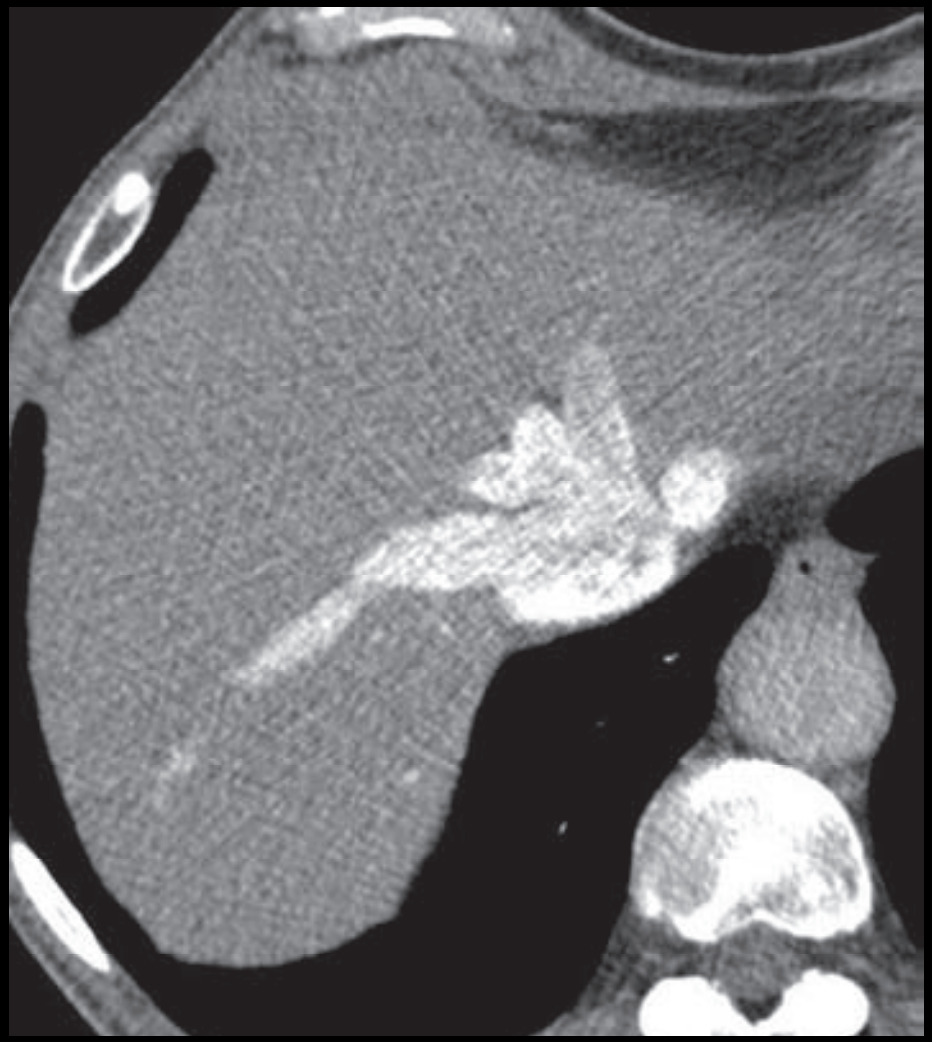
ARTERITE TAKAYASU

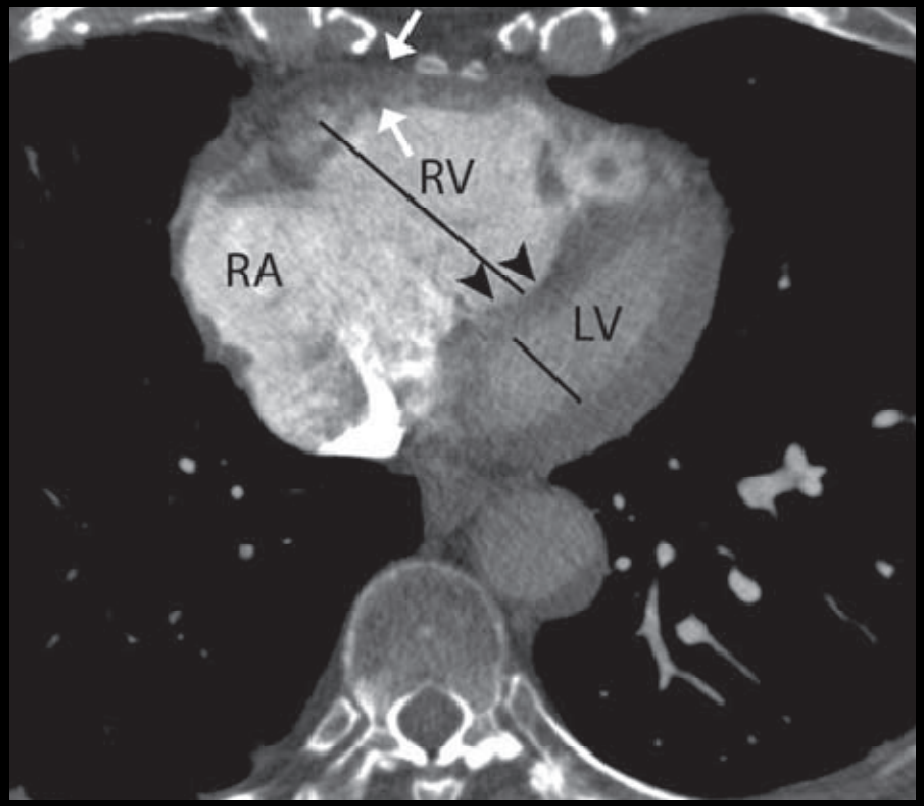




SARCOMA dell' ARTERIA POLMONARE





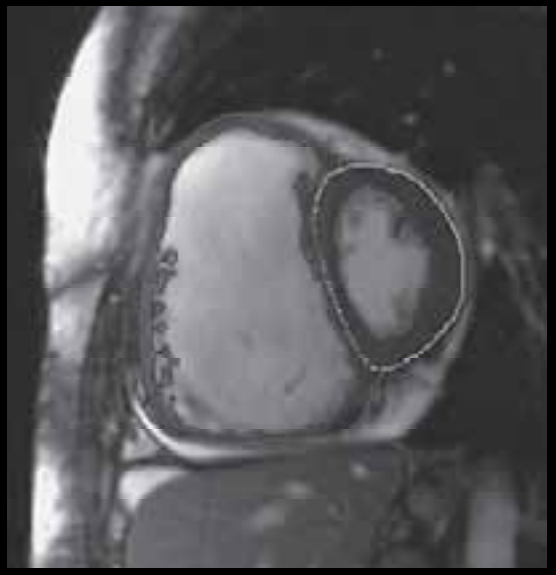


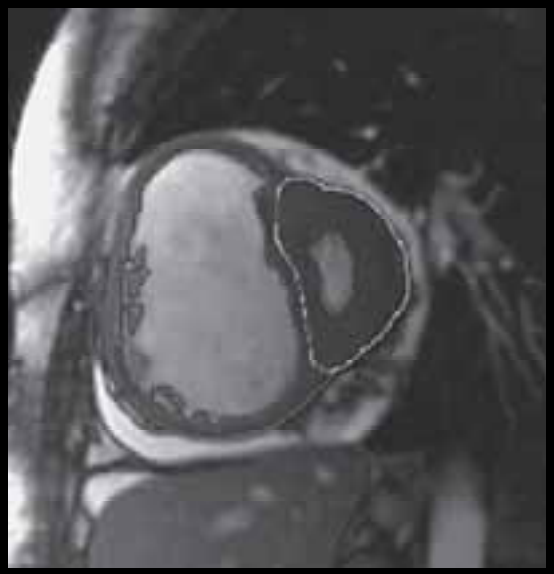
DILATAZIONE del VENTRICOLO DESTRO

- Le limitazioni funzionali e la morte dei pazienti con ipertensione polmonare sono conseguenza della progressiva insufficienza del cuore destro, con riduzione dell' output cardiaco e incremento della pressione atriale destra

- Ciò spiega l'importanza della valutazione e del monitoraggio della funzionalità del ventricolo destro

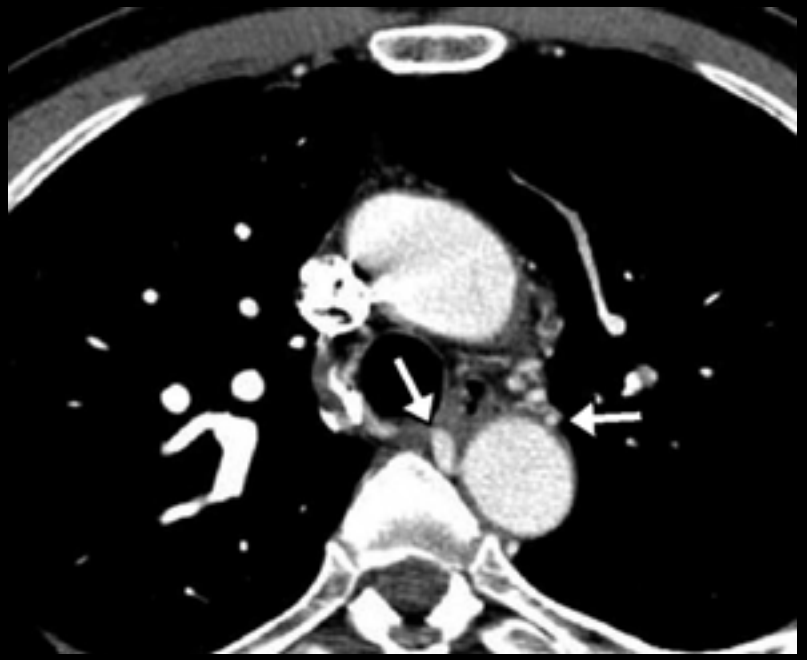
- L'esame di MR cardiaca è attualmente considerato l'esame di riferimento nella valutazione morfologica e funzionale cardiaca

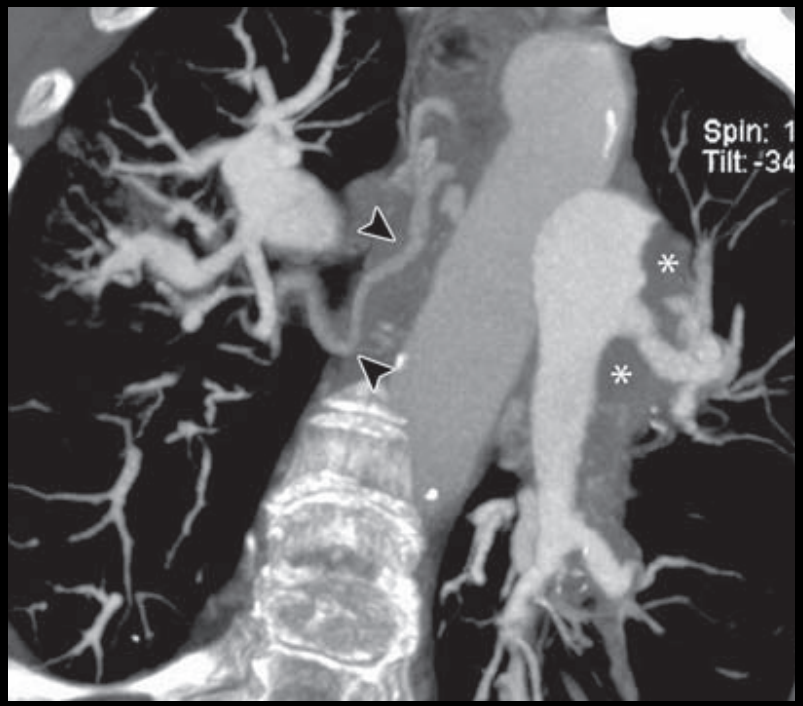




IPERTROFIA DEL SISTEMA BRONCHIALE

(assente nei casi di ipertensione idiopatica)





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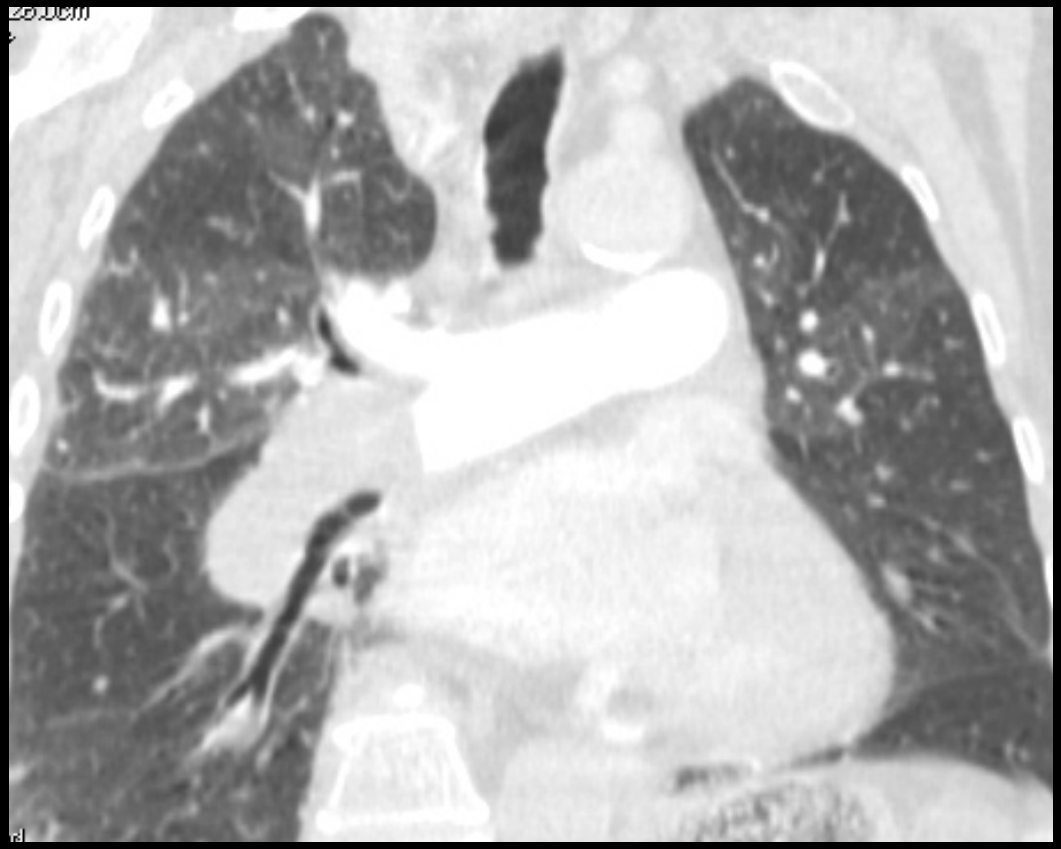
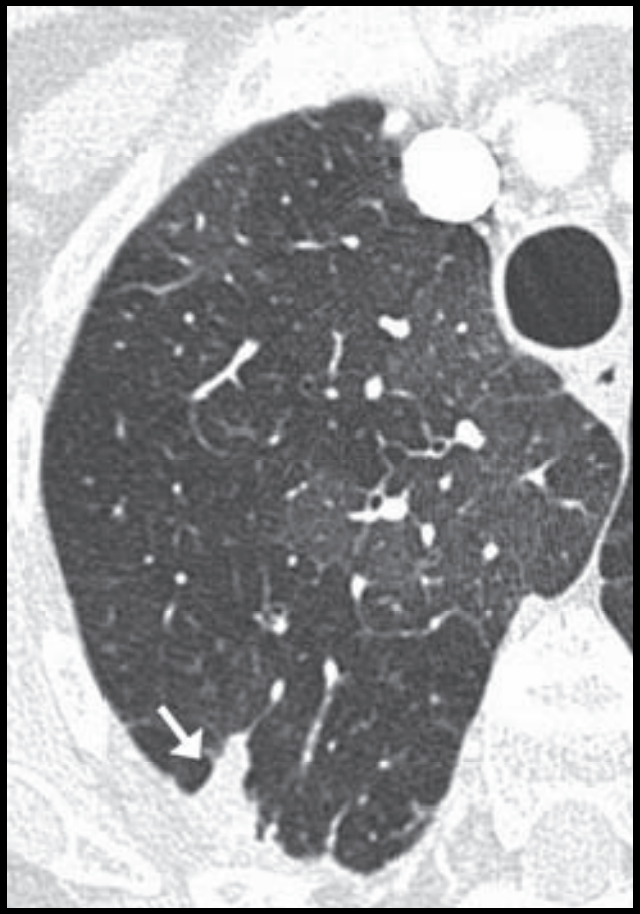
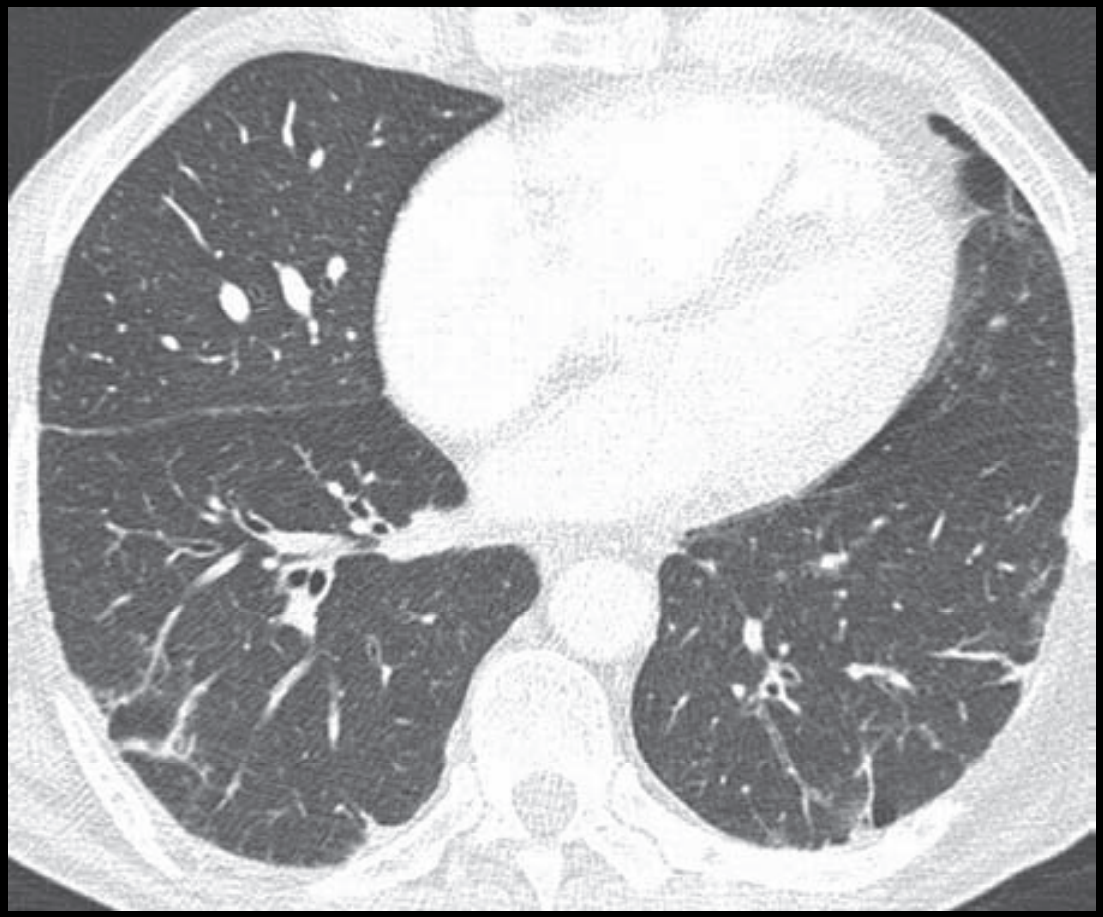
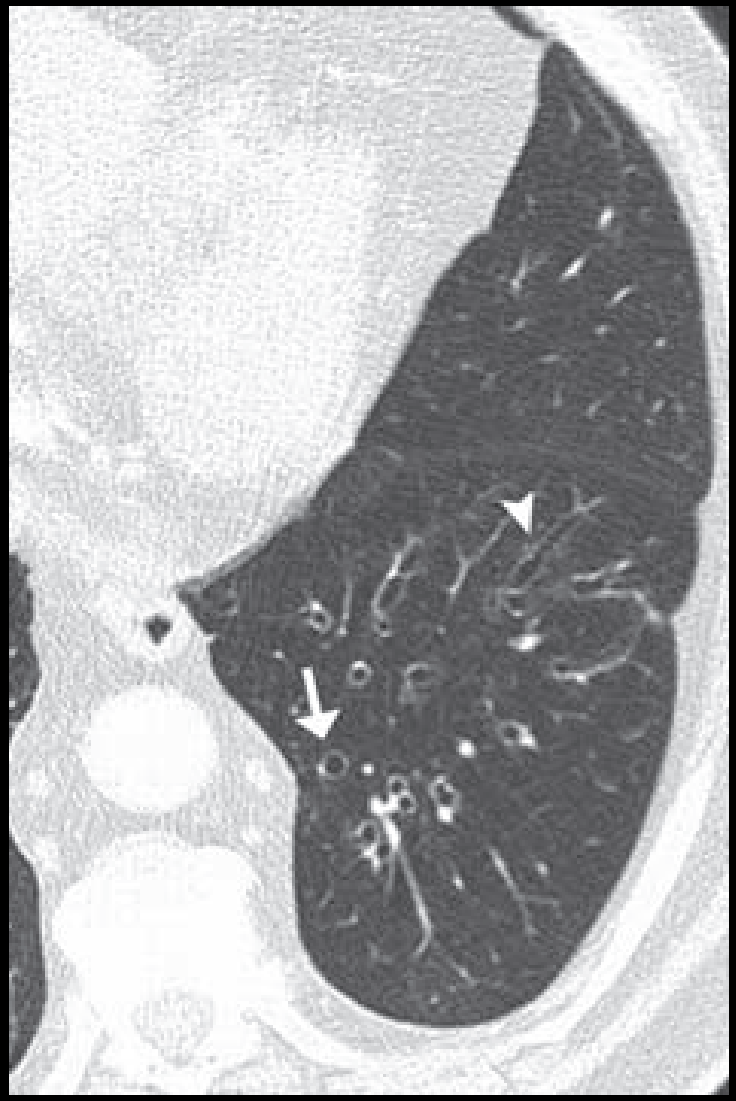








IN 2/3 DEI CASI DI IPERTENSIONE POLMONARE DA TEP CRONICA:

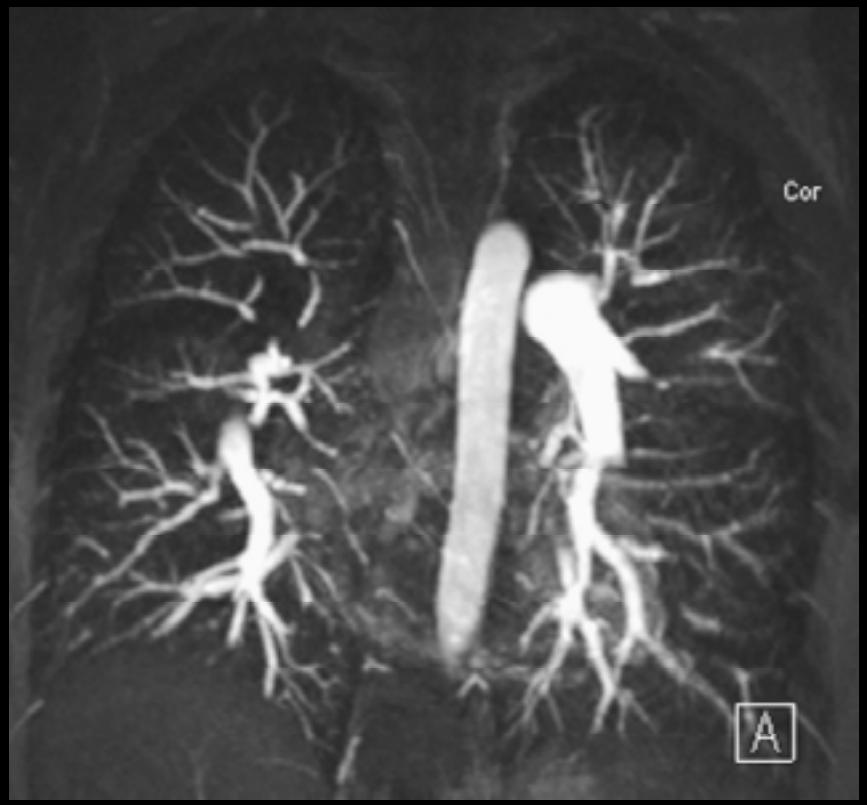
BRONCHIECTASIE CILINDRICHE

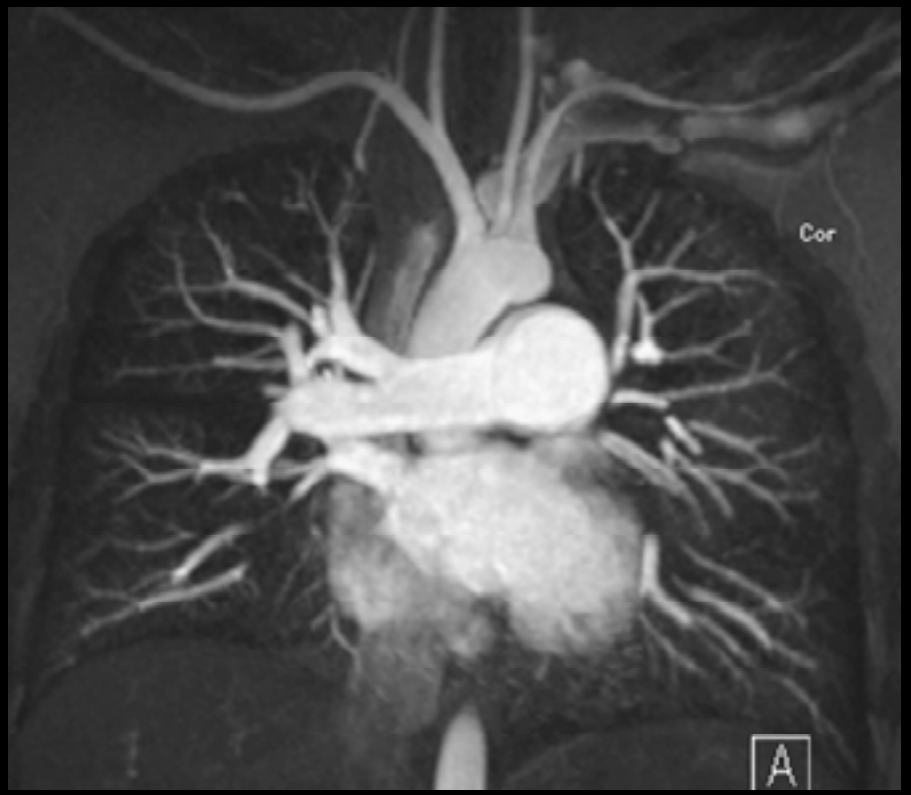
ALLA BASE DELLO SVILUPPO DELL' IPERTENSIONE POLMONARE CRONICA NON C'È SOLO L' OCCLUSIONE DEI VASI POLMONARI MA ANCHE

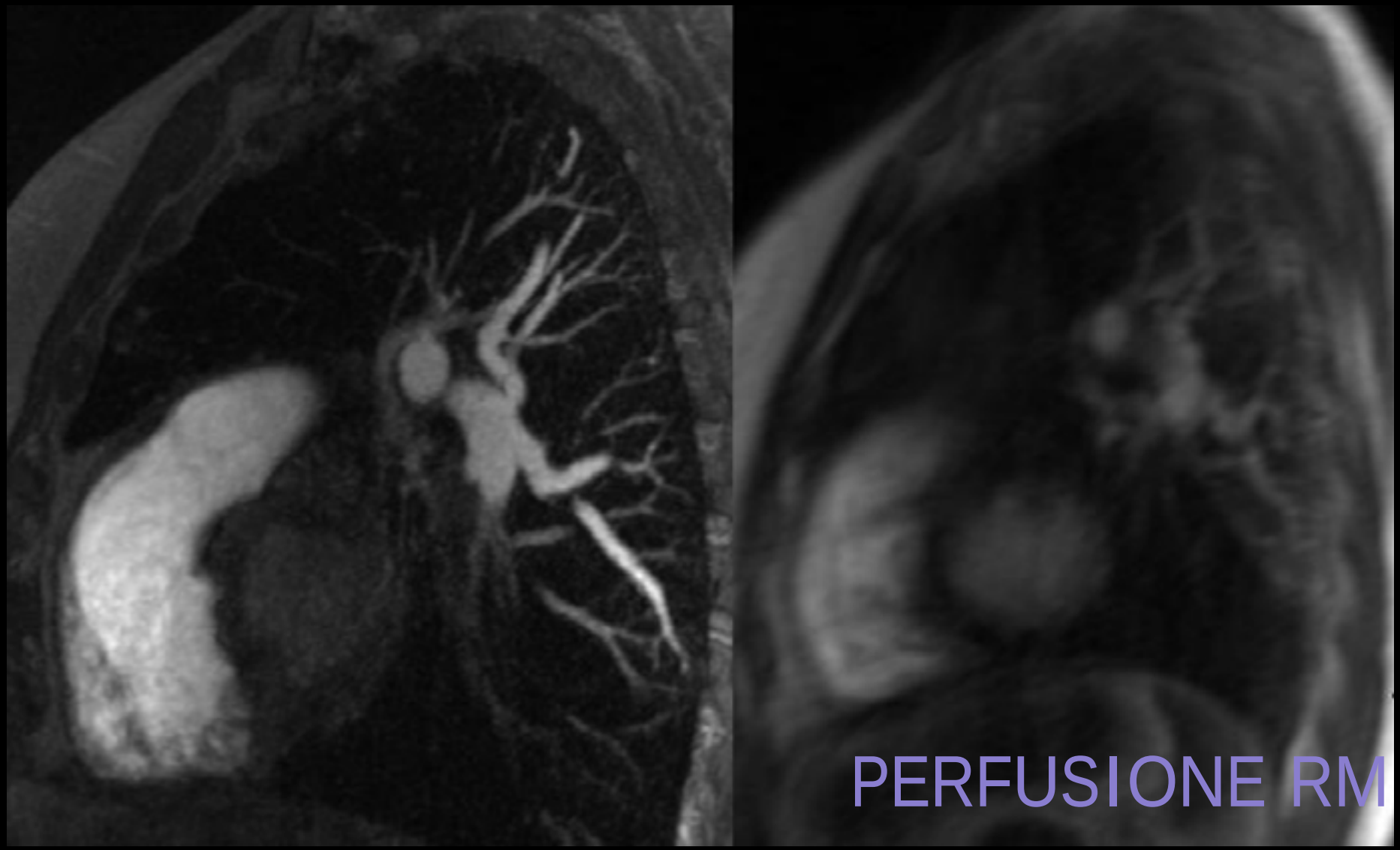
LO SVILUPPO DI VASCULOPATIA DEI VASI ARTERIOSI DISTALI

IN AREE NON OSTRUITE, COSÌ COME DISTALMENTE A VASI PARZIALMENTE O COMPLETAMENTE OCCLUSI

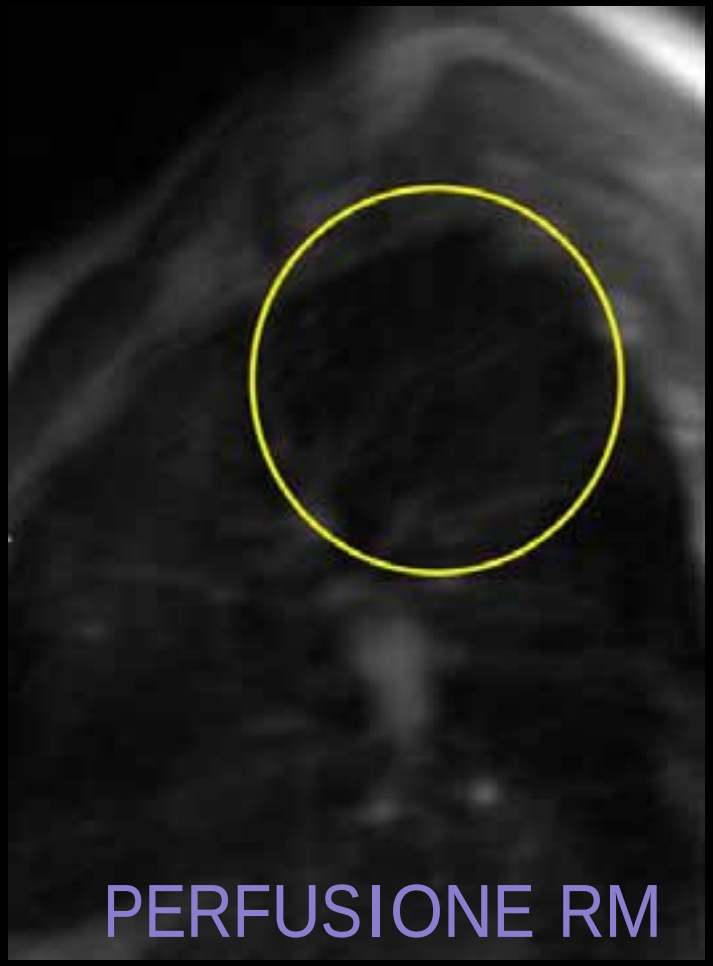
ANGIO RM





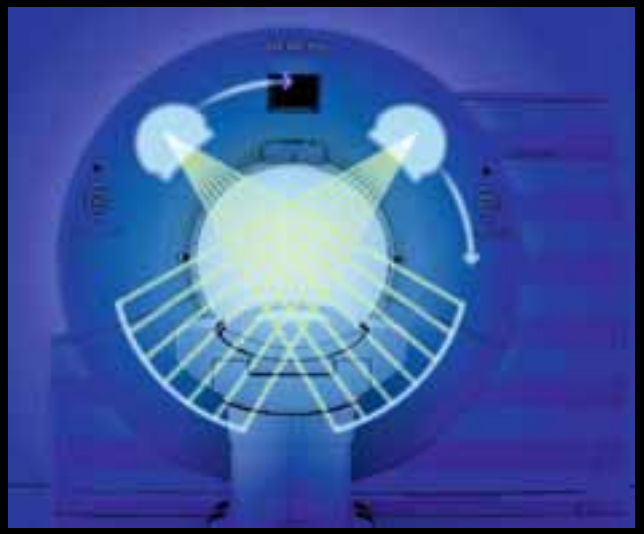

PERFUSIONE RM

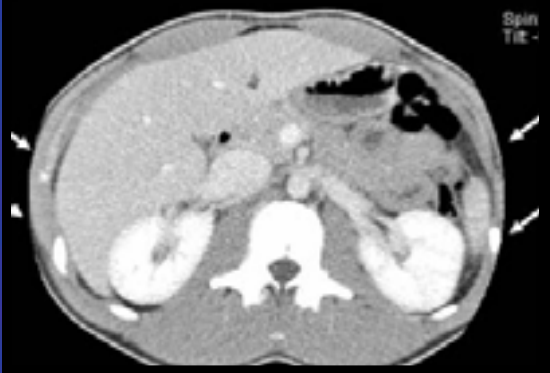
ANGIO RM

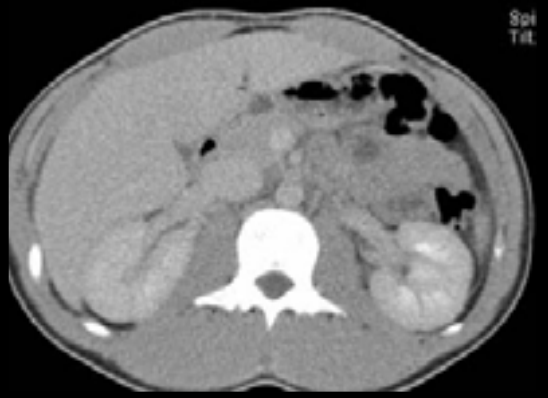


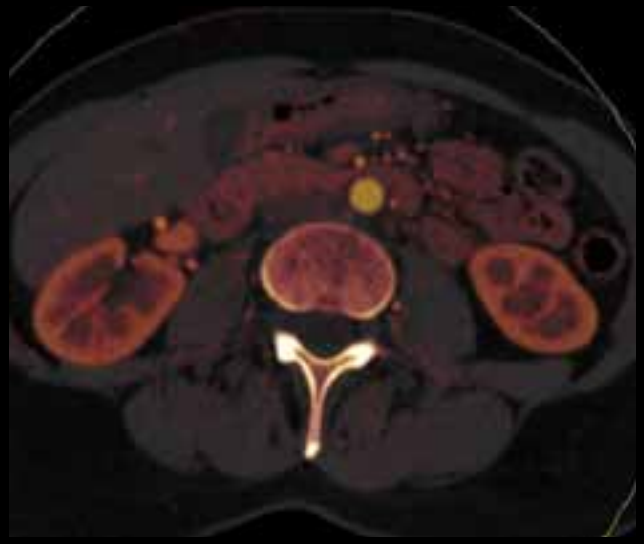
PERFUSIONE RM

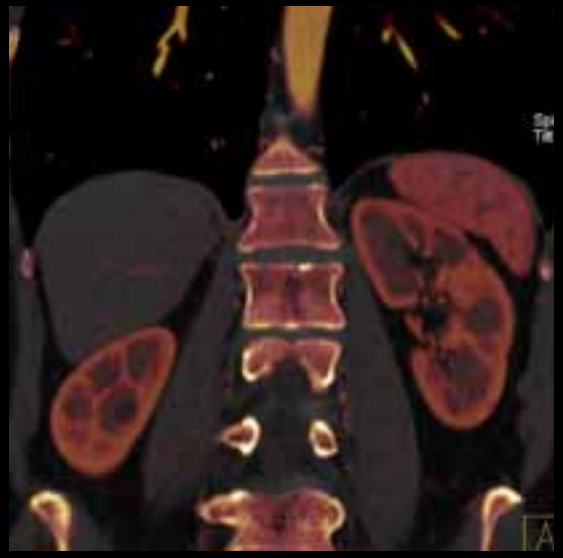
TC DUAL ENERGY

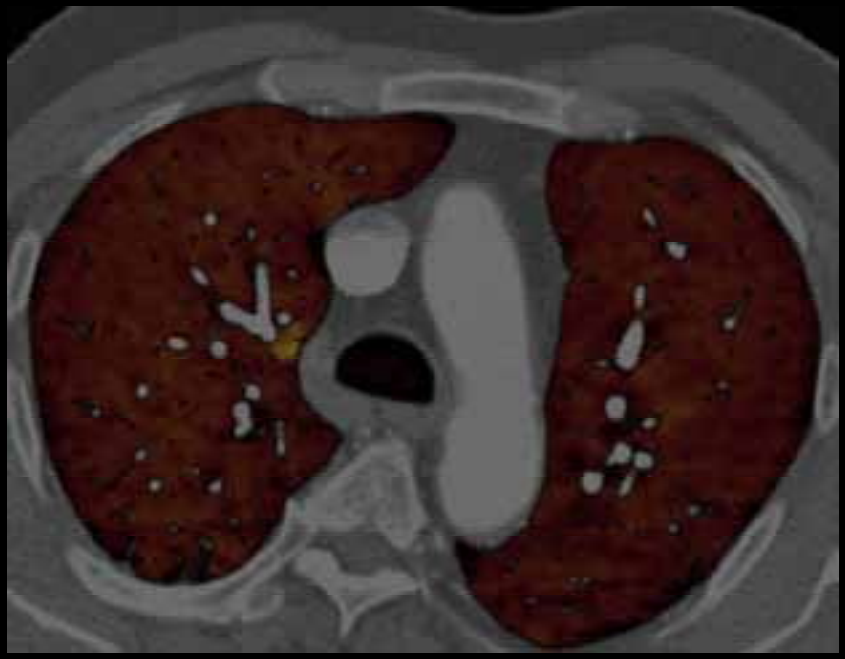


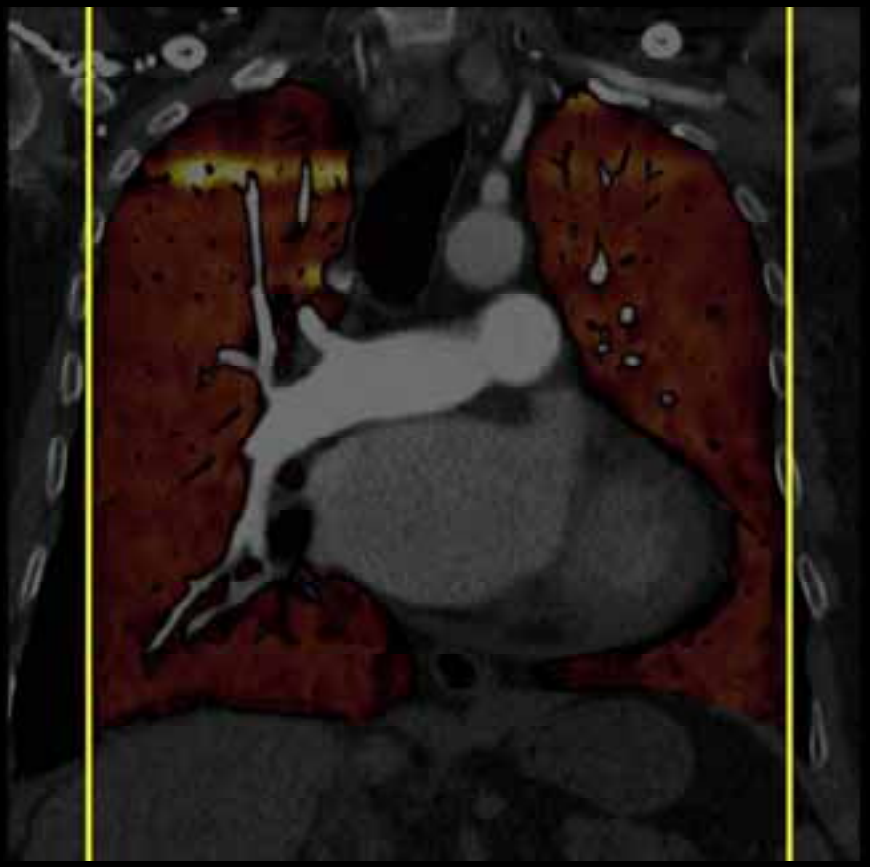




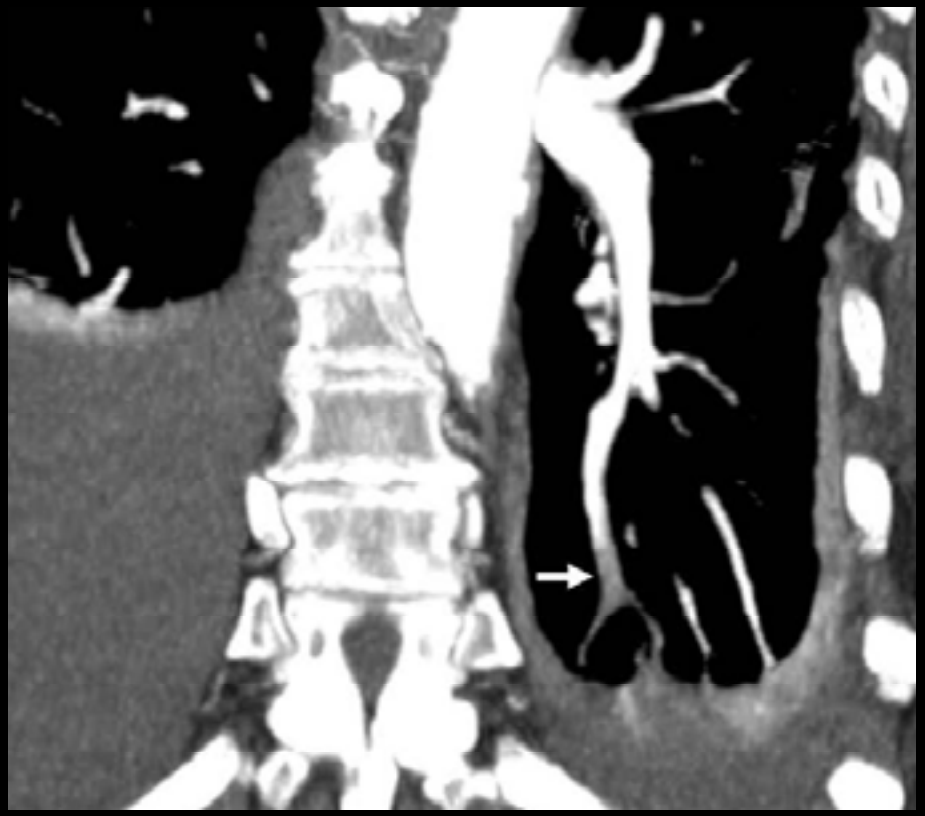


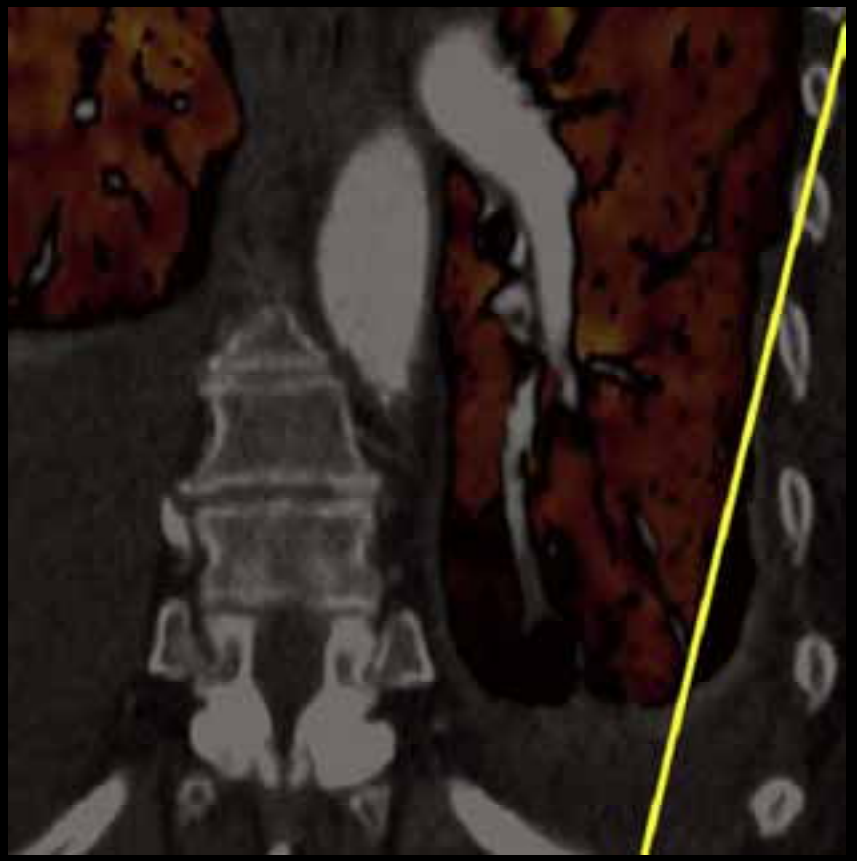






COLOR CODE IMAGING MOSTRA LA DISTRIBUZIONE DI IODIO NELL'AMBITO DEL VOLUME ESAMINATO

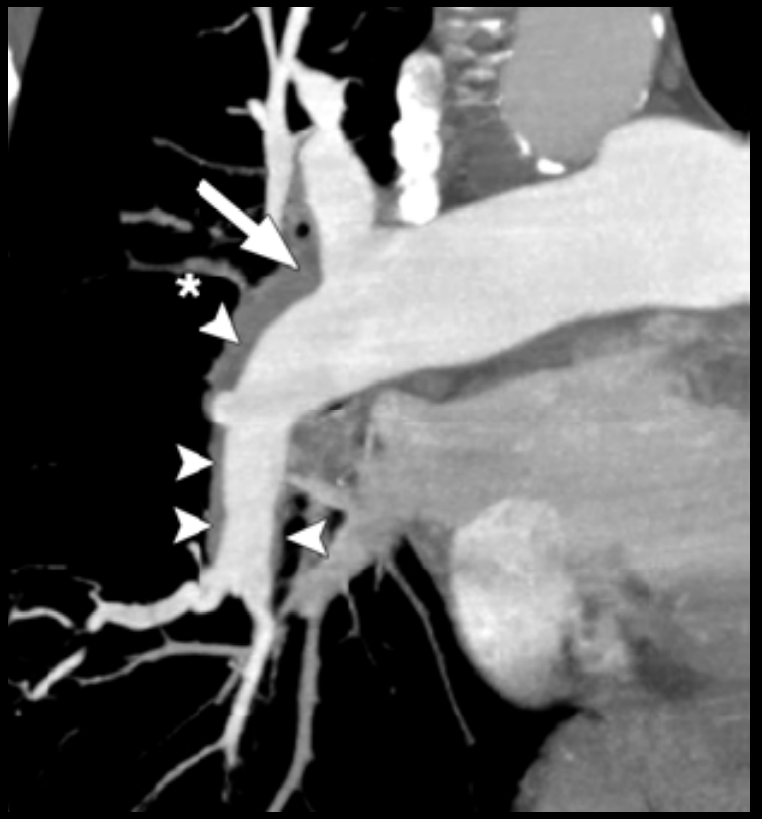




IDENTIFICAZIONE PIANO TROMBOENDOARTECTOMIA

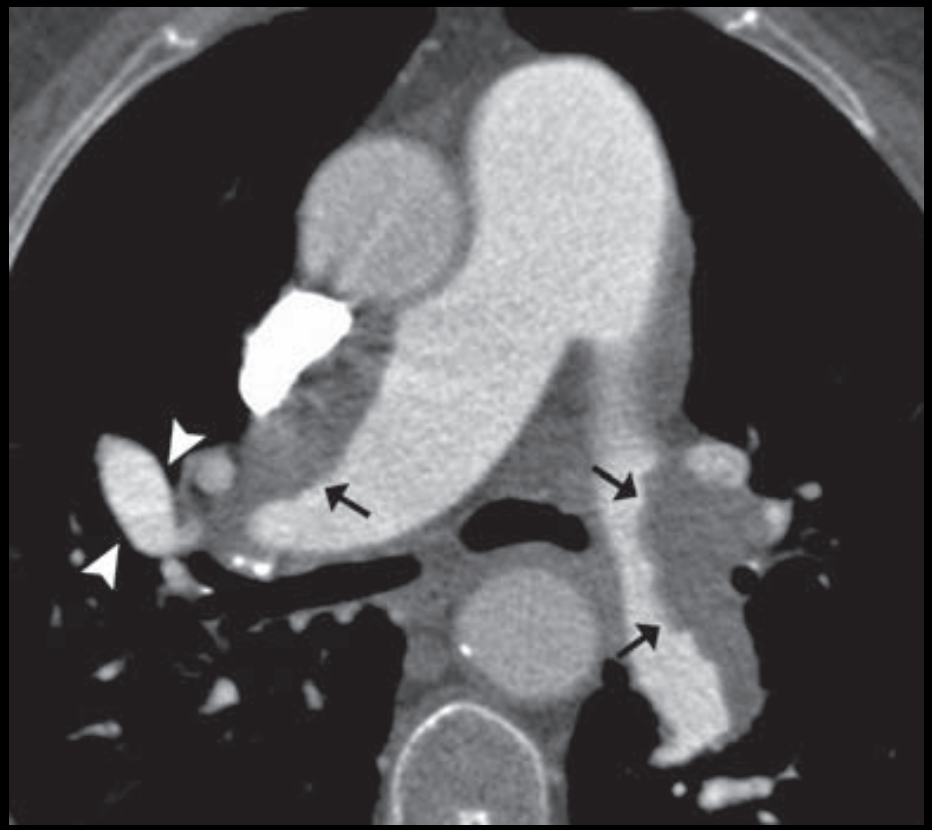
- Ispessimento parietale dell'arteria polmonare che origina all'altezza dei rami principali e/o non oltre l'origine delle arterie lobari-segmentarie

- Ispessimento parietale di almeno 2 mm



In pazienti con PA tromboembolica, alcuni reperti TC possono avere un valore predittivo di miglioramento emodinamico post PTE

Tra questi va segnalata la presenza di trombi centrali e di dilatazione del sistema bronchiale



Heinrich M, Uder M, Tscholl D et al. *Chest 2005;127;1606-1613*

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Diagnostic performance for characterization of chronic thromboembolic pulmonary hypertension (CTEPH): Comparison of ECG-gated multi-detector CTA, MRA and DSA

Poster No.: C-0961

Congress: ECR 2010

Type: Scientific Exhibit

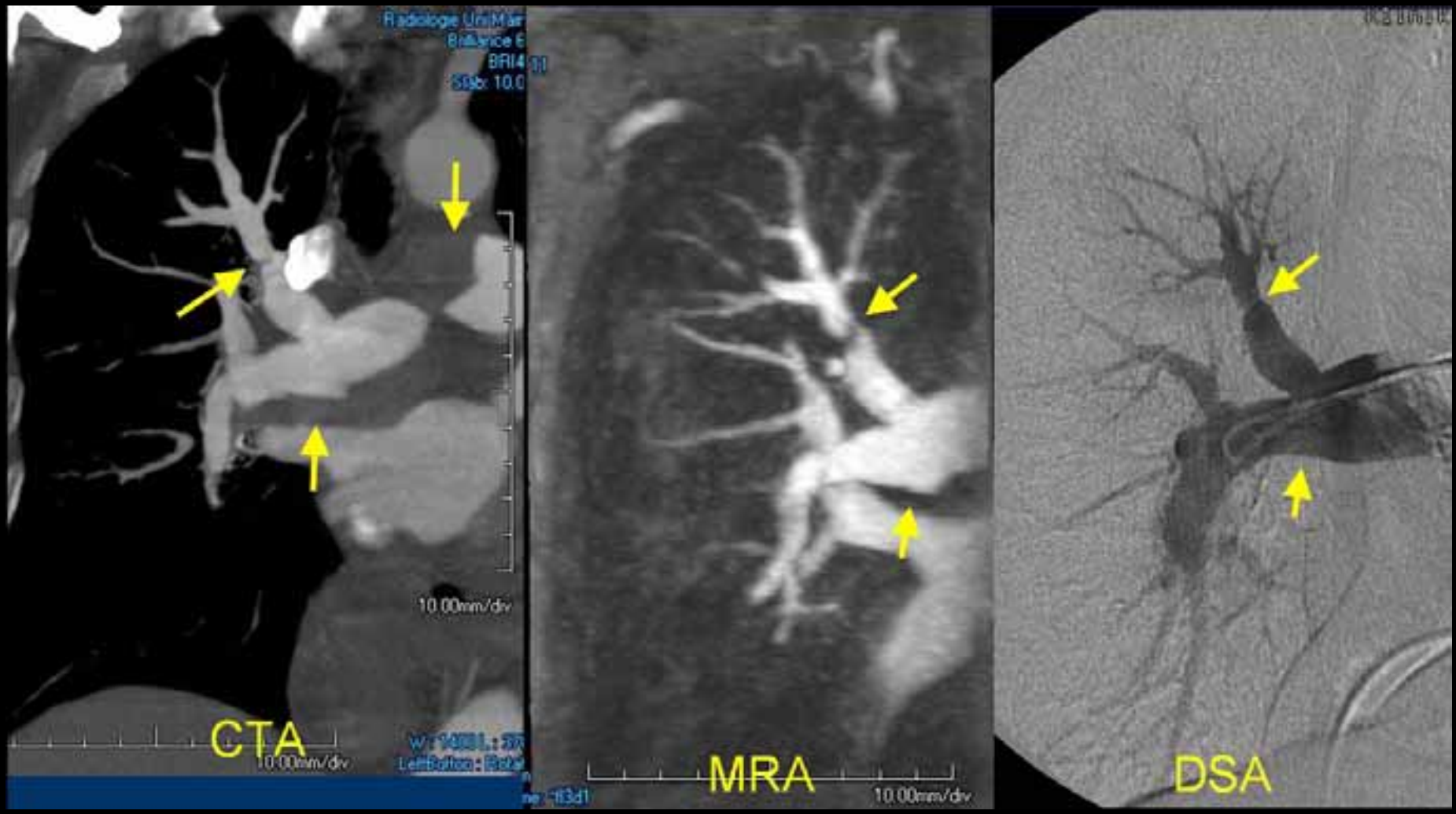
Topic: Chest

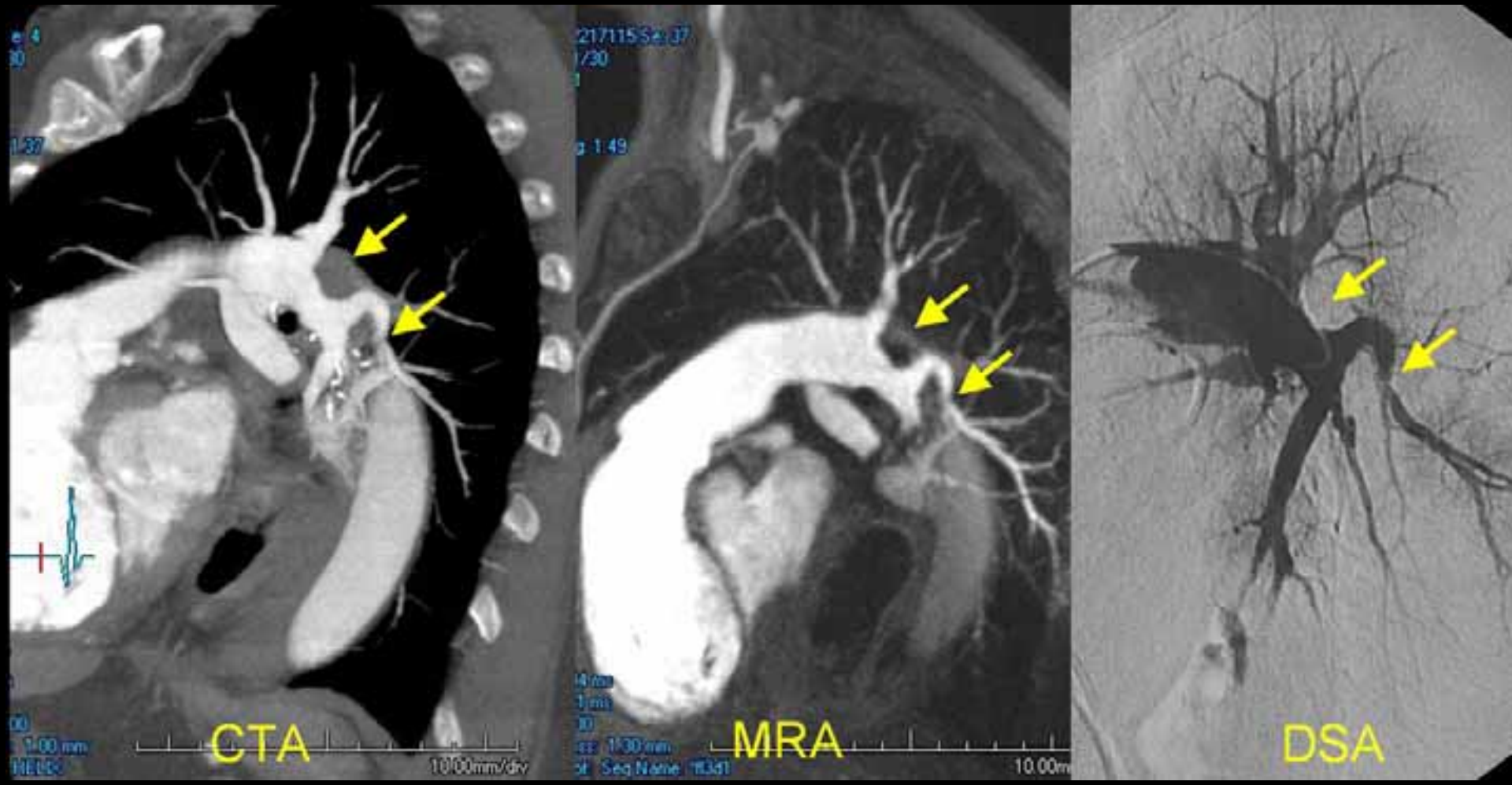
Authors: J. Ley-Zaporozhan[1], S. Ley[1], E. Mayer[2], P. R. Kunz[3], G. Wirth[3], M. B. Pitton[3], K.-F. Kreitner[3]; [1]Heidelberg/DE, [2]Bad Nauheim/DE, [3]Mainz/DE

Keywords: CTEPH, CTA, MRA

DOI: 10.1594/ecr2010/C-0961

- IN A 12 MONTHS PERIOD, 24 PATIENTS WITH SUSPECTED CTEPH WERE PREOPERATIVELY EVALUATED BY MD-CTA, MRA AND DSA
- 11 W, 13 M MEAN AGE OF 58 ± 13 YEARS
- MEAN PULMONARY ARTERIAL PRESSURE (MPAP) 42 ± 10 MMHG




CTA
MRA
DSA

		Sensitivity	Specificity
Lobes			
	CTA	100%	100%
	MRA	86%	99%
	DSA	56%	100%
Segments			
	CTA	100%	99%
	MRA	92%	97%
	DSA	82%	100%

ECG-gated MDCTA was the most accurate diagnostic imaging technique for work-up of patients with CTEPH

Especially subtle pathological findings at bifurcations were better assessed by the 3D techniques CTA and MRA

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Value of MR-perfusion compared with MR-angiography for assessment of small and large vessel disease in patients with chronic thromboembolic pulmonary hypertension (CTEPH)

Poster No.: C-0962

Congress: ECR 2010

Type: Scientific Exhibit

Topic: Chest

Authors: J. Ley-Zaporozhan[1], S. Ley[1], E. Mayer[2], G. Wirth[3], C. Düber[3], K.-F. Kreitner[3]; [1]Heidelberg/DE, [2]Bad Nauheim/DE, [3]Mainz/DE

Keywords: CTEPH, MR, Perfusion

DOI: 10.1594/ecr2010/C-0962

MR-angiography:

337 segmental arteries were evaluated. 41% of the segmental arteries showed no disease and 59% had typical pathological changes.

At the subsegmental level, 22% of the vessels were normal and 78% demonstrated pathological findings.

MR-perfusion:

At MR perfusion 8% of pulmonary segments showed regular perfusion and 92% showed perfusion defects . 42% of the segments presented with a complete loss of perfusion, and 50% with subsegmental perfusion defects that matched with findings of MRA in proximal territories.

Conclusion

In patients with CTEPH there is considerable amount of peripheral vascular disease. MR-Perfusion imaging is more sensitive in demonstrating the amount of peripheral disease than MRA and should be routinely performed to assess the relation between central and peripheral disease burden.

CONCLUSIONI

- MDCT e RM sono entrambe efficaci nella valutazione del paziente con ipertensione polmonare cronica
- La TCMD è superiore nella rappresentazione dei segni vascolari diretti della patologia
- La RM con studio di perfusione è superiore nella valutazione della patologia vascolare periferica e nello studio morfologico e funzionale del cuore destro

Grazie per l’ attenzione

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