



SISTEMA SANITARIO REGIONALE

AZIENDA OSPEDALIERO-UNIVERSITARIA
SANT'ANDREA



REGIONE
LAZIO



SAPIENZA
UNIVERSITÀ DI ROMA

MEETING

24/09/2021

Dott. Giuseppe Tremamunno - Diagnostic Radiology Resident
Department of Radiological Sciences
University of Rome "Sapienza"
Sant'Andrea University Hospital

CASE PRESENTATION

Uomo, 70 aa

Iperteso

Pregresso episodio di EP (in terapia anticoagulante, Coumadin)

Portatore di AAA (DT 46mm), controllato regolarmente.



Giunge in PS: vigile, collaborante, agitato.

Riferisce, mentre guidava, improvvisa insorgenza di dolore toracico anteriore e retroscapolare, irradiato ai lombi.

Riferisce inoltre ipostenia e iposensibilità arti inferiori, deficit che passa nel giro di qualche ora.

Parametri emodinamici stabili 110/70, 88bpm, Sp=98%,

Polsi validi, addome trattabile.



Richiesta: angio-TC



Un-enhanced



Arterial phase

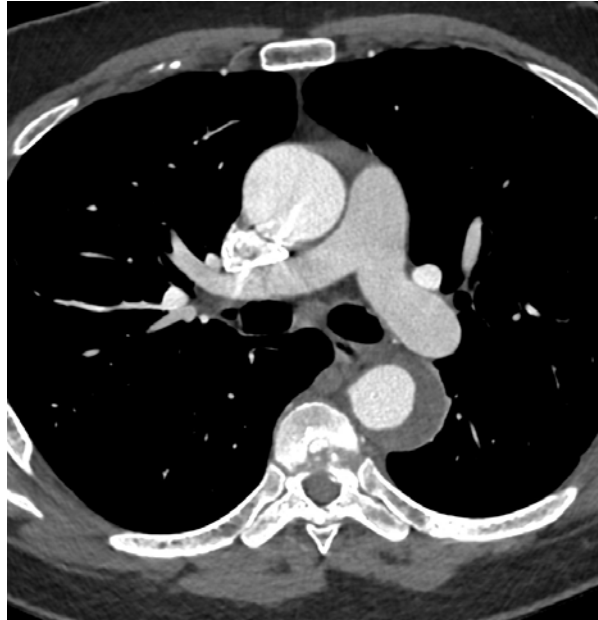


Arterial phase - MIP

Un-enhanced



Arterial phase



Delayed phase



Qual è la vostra diagnosi?

- a. Aneurisma parzialmente trombizzato
- b. Dissezione dell'aorta discendente
- c. Ematoma intramurale
- d. Ulcera penetrante aterosclerotica
- e. Pseudoaneurisma

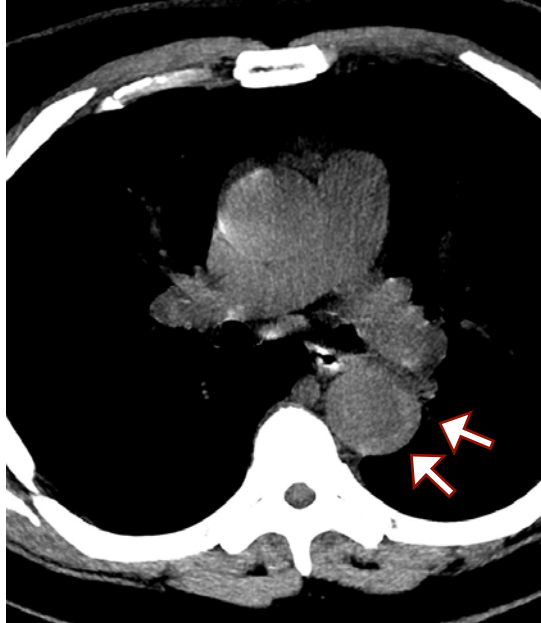




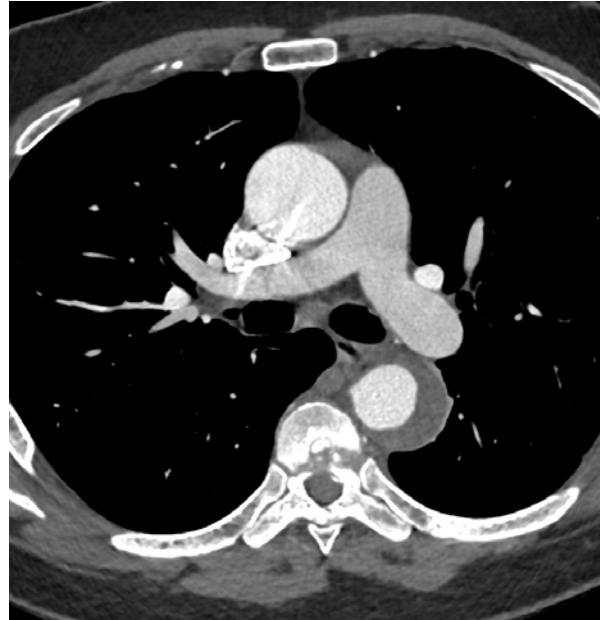
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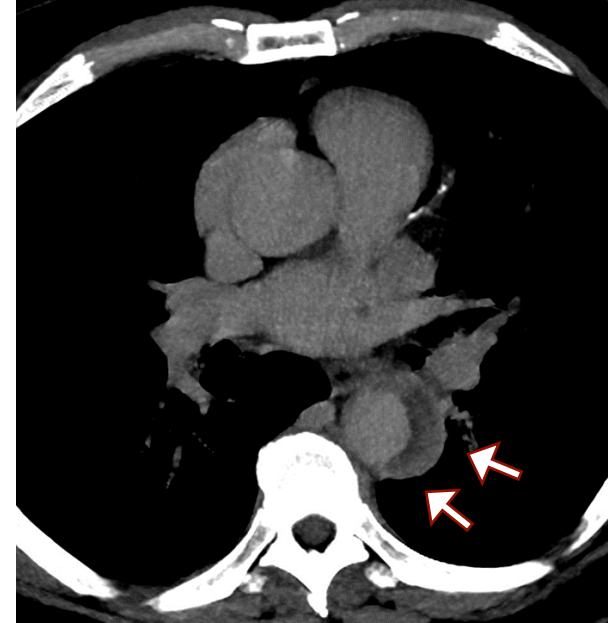
Un-enhanced



Arterial phase

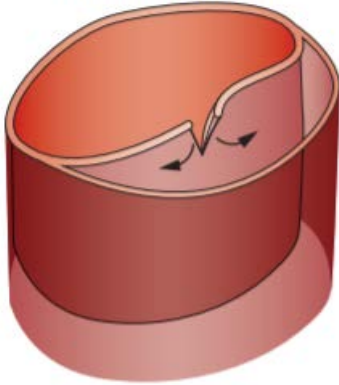


Delayed phase



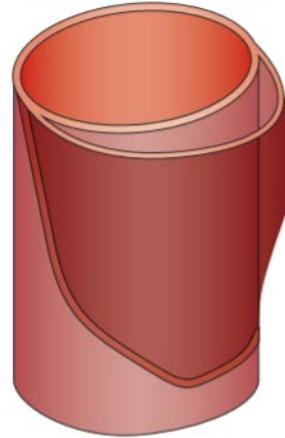
ACUTE AORTIC SYNDROMES

Aortic dissection



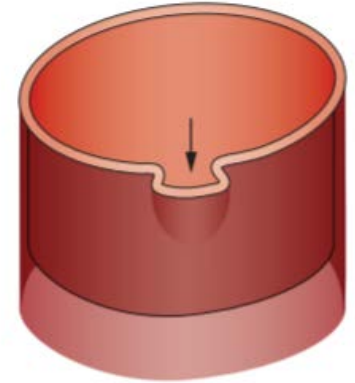
85-95% of AAS

Intramural haematoma



5-25% of AAS

Penetrating ulcer



2-7% of AAS

Intramural
haematoma



- Intramural Haematoma (IMH) is defined as a circular or crescent-shaped thickening of $> 5\text{mm}$ of the aortic wall, in absence of detectable blood flow.
- Ascending aorta and aortic arch (Type A) 30% and 10%;
- Descending thoracic aorta (Type B) 60–70%.

Unenhanced- CT acquisition is crucial for the diagnosis of IMH. A high-attenuation crescentic thickening of the aortic, extending in a longitudinal, non-spiral fashion, is the hallmark of this entity.

The aortic lumen is rarely compromised in IMH, and no intimal flap or enhancement of the aortic wall is seen after administration of contrast.



- IMH can progress to AD (16-47%) or Aortic Rupture (20-45%), especially for type A;
- Negative prognostic factors:
 - progressive increase in aortic diameter (> 48-50mm) and wall thickness (> 11mm);
 - Development of a peri-aortic hematoma;
 - Development of a peri-cardiac collection;
 - Presence of associated PAUs;
- Overall, IMH has a better long-term prognosis than AD: survival at 5 years ranged from 43-90%, depending on the population characteristics.

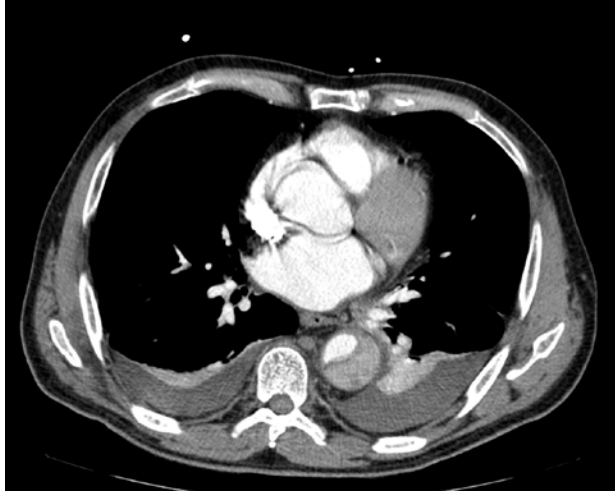
CASE PRESENTATION

- 5 giorni dopo, il paziente viene trasferito in terapia intensiva per insorgenza di ipertensione arteriosa resistente al trattamento farmacologico e dolore toracico incoercibile.
- Richiesta ulteriore angio-TC

Emocromo

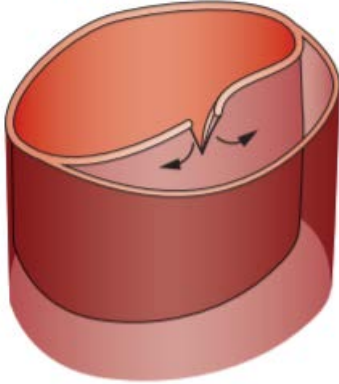
EMOCROMO COMPLETO

Globuli Rossi (RBC)	5,1	4,6	4,3	4,1	3,9
Emoglobina (HGB)	16,4	14,7	13,7	12,9	11,7
Ematocrito (HcT)	49	44	41	39	38



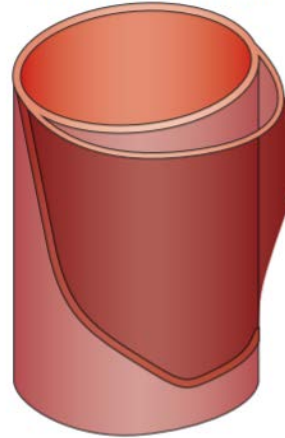
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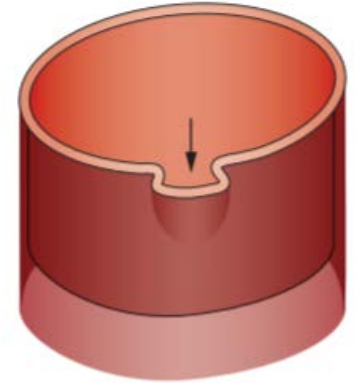
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Acute Aortic Dissection

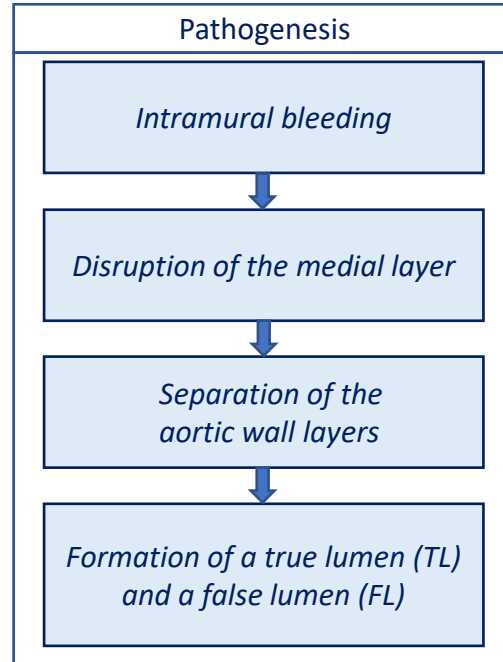


Table 4 Main clinical presentations and complications of patients with acute aortic dissection

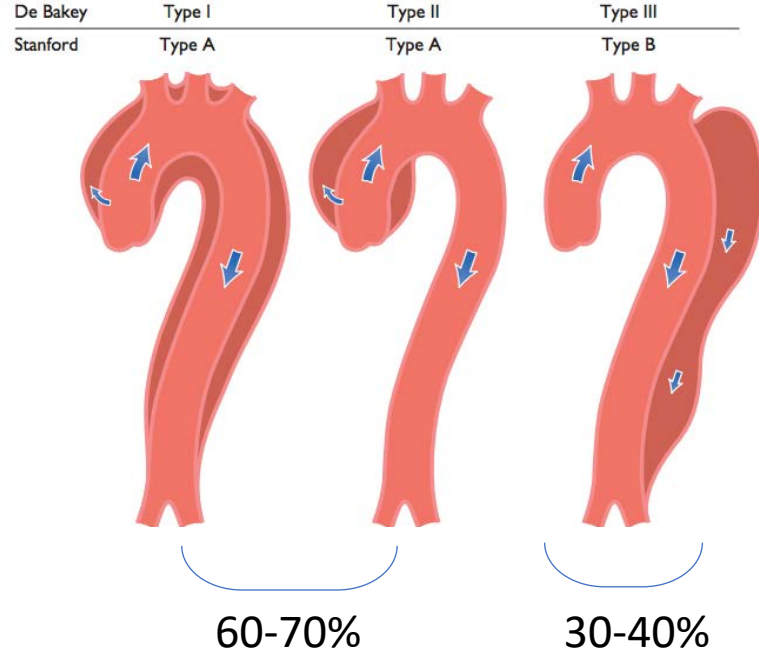
	Type A	Type B
Chest pain	80%	70%
Back pain	40%	70%
Abrupt onset of pain	85%	85%
Migrating pain	<15%	20%
Aortic regurgitation	40–75%	N/A
Cardiac tamponade	<20%	N/A
Myocardial ischaemia or infarction	10–15%	10%
Heart failure	<10%	<5%
Pleural effusion	15%	20%
Syncope	15%	<5%
Major neurological deficit (coma/stroke)	<10%	<5%
Spinal cord injury	<1%	NR
Mesenteric ischaemia	<5%	NR
Acute renal failure	<20%	10%
Lower limb ischaemia	<10%	<10%

NR = not reported; NA = not applicable. Percentages are approximated.


Time course of the aortic dissection

- Acute (< 14 days)
- Subacute (15–90 days)
- Chronic (>90 days)

Aortic dissection localization



DIAGNOSIS: Crucial role of Imaging

- Chest X-Ray;
- Echocardiography: transthoracic (TTE) or transoesophageal (TOE);
- Computed tomography angiography (CTA); 
- Magnetic resonance imaging (MRI);
- Aortography.

Scan protocol

Patient preparation: A 6-h fast prior to the examination; 18G intravenous catheter in the right antecubital vein.

Iodine flow rate: 2.0 g/s.

CM concentration (mgI/mL)	Flow rate (mL/s)
---------------------------	------------------

300	6.7
320	6.2
350	5.7
370	5.4
400	5.0

CM volume: (Scan time + trigger delay)*flow rate.

Saline flush: 50 ml of saline at the same flow rate.

Pre-contrast scan: Unnecessary.

Post-contrast scan:

CM injection protocol: Injection time = scan time + 7-s trigger delay.

Trigger delay: 7 s after the threshold of 100 HU is reached in the ascending aorta using a bolus-tracking technique.

Scan protocol:

Gating: Retrospective or prospective (according to patient HR and technology available) to best evaluate the aortic arch.

Scan region: From the aortic arch to the pelvis.

Spiral with maximum values of pitch and thin collimation.

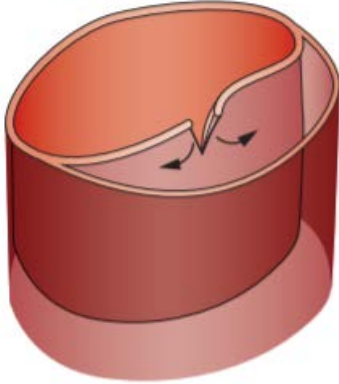
2014 ESC Guidelines on the diagnosis and treatment of aortic diseases

Document covering acute and chronic aortic diseases of the thoracic and abdominal aorta of the adult

“Electrocardiogram (ECG)-gated acquisition protocols are crucial in reducing motion artefacts of the aortic root and thoracic Aorta.... In suitable candidates scanned on 64-detector systems or higher-end devices, simultaneous CT coronary angiography may allow confirmation or exclusion of the presence of significant coronary artery disease before transcatheter or surgical repair.”

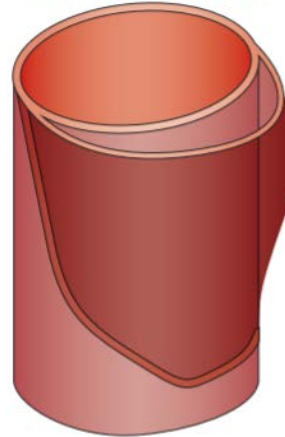
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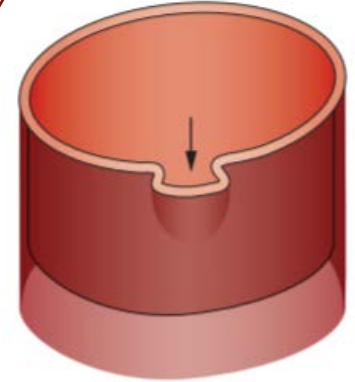
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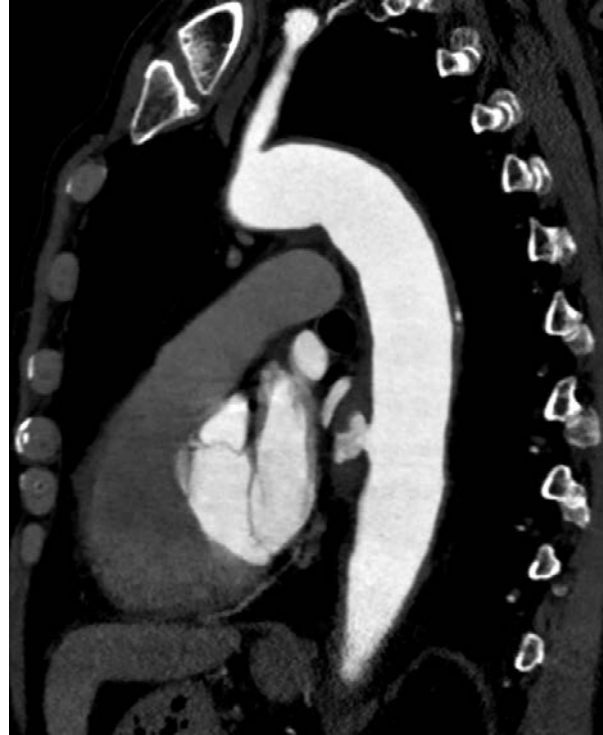
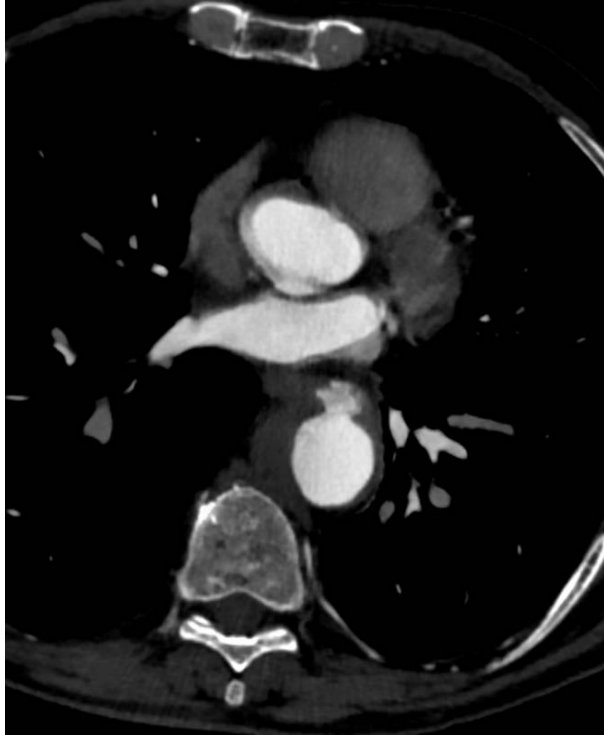


2-7% of AAS

Penetrating Atherosclerotic Aortic Ulcer - PAU



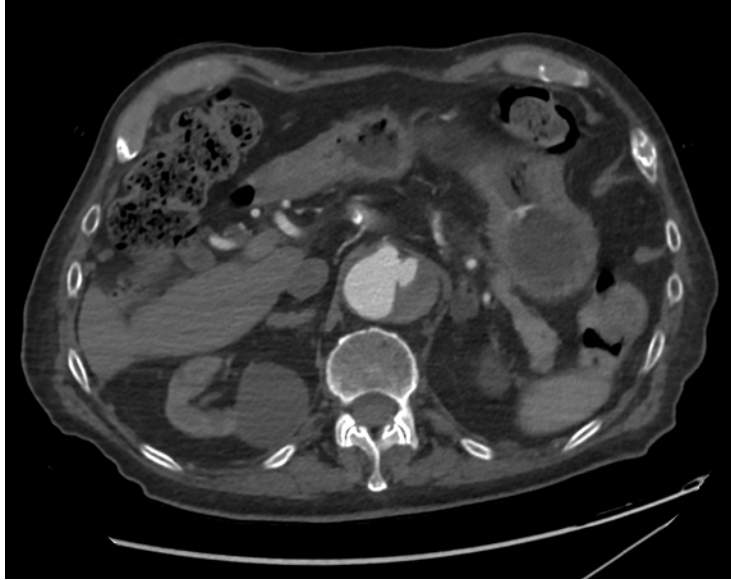
- It's defined as the ulceration of the atheromatous plaque that penetrates the medial tunic through the internal elastic lamina.
- PAU is an atherosclerotic-based pathology therefore:
 - it is mainly localized in the descending aorta 90% (**Type B**);
 - it occurs in patients with advanced age (> 65 years) with multiple risk factors and comorbidities



- PAU can be multiple;
- PAU can be associated with IMH or AD;
- PAU can progress into the media tunic causing erosion of the vasa vasorum and evolve into IMH or AD or lead to the formation of a pseudo-aneurysm.



Male, 86 years old - occasional finding; un-enhanced phase.



Male, 86 years old - occasional finding; arteria phase.

CASE PRESENTATION



Acute Aortic Syndromes



Surgery is the treatment of choice.
Acute Type A AD has a mortality of 50% within the first 48 hours if not operated.

Acute Type B AD is often uncomplicated: in the absence of malperfusion or signs of early progression, the patient can be safely stabilized under medical therapy.

CTA report

- Visualization of intimal flap;
- Stanford classification;
- Identification of the false lumen (if present);
- TRUE LUMEN: early enhancement, calcification, smaller and internally positioned.
- Localization of entry and re-entry tears (if present);
- Involvement of side branches → detection of organ ischaemia;
- Detection of pericardial and/or pleural effusion;
- Co-existence of AAS or other aortic lesions.

Take home messages

- Dissezione aortica <-> ematoma intramurale <-> PAU
- ECG gating (anche in PS) → permette di eliminare gli artefatti da pulsazione della radice aortica e aorta ascendente e permette di escludere l'interessamento dei principali vasi coronarici; TRIPLE RULE OUT!
- Iniezione preferibilmente da accesso periferico destro per evitare gli artefatti da contrasto nel tronco anonimo;
- Alto IDR;
- Fase pre-contrastografica, soprattutto se paziente non noto;
- Fase venosa → per valutare l'enhancement e quindi la perfusione degli organi;
- Fase tardiva → in caso di pazienti portatori di endoprotesi (TEVAR) per valutazione endoleaks;



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GRAZIE PER L'ATTENZIONE

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REVIEWS

Management of acute aortic syndrome

Rachel E. Clough and Christoph A. Nienaber