Case 8036
Multiple penetrating atherosclerotic ulcers

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Section: Cardiovascular
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Patient: 78 year(s), male

Clinical History

A 78-year-old hypertensive male patient was admitted to the ER with thoraco-abdomino-lumbar pain, fever, asthenia and weight-loss.
Laboratory results revealed leucocytosis and elevated CRP with no obvious focus of infection.
Haemocultures were positive.
Echocardiography showed a hypoechoic mass within the wall of the descending thoracic aorta.
CTA showed 6 penetratic atherosclerotic ulcers, 3 with pseudoaneurysm formation.

Imaging Findings

A 78-year-old male patient with a history of hypertension was admitted to the ER with complaints of asthenia, anorexia, weight-loss, fever, and posterior thoracic, lumbar and abdominal pain, with 3 week duration. He denied cough, diarrhoea and vomiting.
Physical examination revealed no signs of skin or mucosal infection.
Blood tests revealed leucocytosis (24.4 x 10^9/L) with neutrophilia and an elevated CRP (16.85 mg/l).
Chest X-Ray and urinalysis were normal.
Haemocultures were positive for Streptococcus Pneumoniae.
Echocardiography was performed to discard endocarditis and showed a hypoechoic mass within the wall of the descending thoracic aorta.
Thoraco-abdomino-pelvic CT Angiography showed 6 areas of outpouching of the intravascular contrast column, one located in the descending thoracic, one in the thoraco-abdominal transition and one in the infra-renal abdominal aorta; two in the left common iliac artery and one in the right common iliac artery. These outpouchings extended beyond the calcified atherosclerotic intimal

plaques and were surrounded by spontaneously hyperdense intramural haematomas, corresponding, therefore, to penetrating atherosclerotic ulcers (PAUs). The four caudal PAUs had a sacular morphology with lobulated contours, suggesting pseudoaneurysm formation, possibly due to infection, although no gas bubbles were seen within the aortic wall and no peri-aortic fat stranding, fluid collections or masses were detected. The larger one (7 cm), located in the infra-renal abdominal aorta, pushed the 3rd part of the duodenum forward and upward. Although there were no signs of rupture on CT examination, the patient went on to develop massive gastrointestinal haemorrhage due to aorto-duodenal fistulisation and died despite attempted aortic surgical repair.

Discussion

PAU is, along with aortic dissection, intramural haematoma and aortic aneurysm leak and rupture, included in the acute aortic syndromes", which usually have a similar clinical profile: aortic pain with a coexisting history of hypertension in an elderly patient [1].
PAU refers to an ulcerating atherosclerotic lesion that penetrates the elastic lamina. It is more frequently located in the descending thoracic aorta, but abdominal aorta may also be involved [2]. When an atherosclerotic plaque penetrates into the media, the media is exposed to pulsatile arterial flow, which causes haemorrhage into the wall, leading to intramural haematoma and/or localised intramedial dissection (progression of dissection is usually prevented by the severe atherosclerosis). Blood may then break through into the adventitia to form a pseudoaneurysm and/or may rupture [1].

On CT Angiography, a PAU presents as a focal, contrast-filled outpouching, surrounded by an intramural, spontaneously hyperattenuating haematoma, located beneath the frequently calcified and inwardly displaced intima. There is often thickening and enhancement of the surrounding aortic wall [1]. A sacular outpouching filled with contrast representing pseudoaneurysm formation and signs of rupture are possible associated findings.
Differential diagnosis based on imaging findings is not straightforward, as findings overlap considerably, particularly between PAU and thrombosed aortic dissection. It includes:
. Intramural haematoma (no communication with the lumen);
. Ulcerated atheromatous plaque (no contrast material extends beyond the frequently calcified intima and no intramural haematoma is found);
. Aortic dissection (presence of an intimomedial flap that traverses the aortic lumen);
. Aortic aneurysm (unlike pseudoaneurysm in penetrating atherosclerotic plaque, there is an outpouching of all layers of the aortic wall, the calcified plaques being thus peripherally located) [1].
Atherosclerotic aortic lesions such as PAU are considered susceptible to bacterial infection, which may precipitate true aneurysm or pseudoaneurysm formation [3].
Saccular aneurysms/pseudoaneurysms (especially those with lobulated contour) with rapid expansion or development and adjacent mass, stranding, and/or fluid in an unusual location are highly suspicious for infection. Other findings include adjacent vertebral body destruction with psoas muscle abscess and periaortic gas [4].

Final Diagnosis

Multiple penetrating atherosclerotic ulcers, some of them with pseudoaneurysm formation.

Figures

Figure 1 Figure 1

Crescent-shaped, spontaneously hyperdense intramural haematoma in the left distal descending aorta.

Figure 2 Figure 2

Same level as Figure 1. A sacular outpouching of intraluminal contrast is seen.

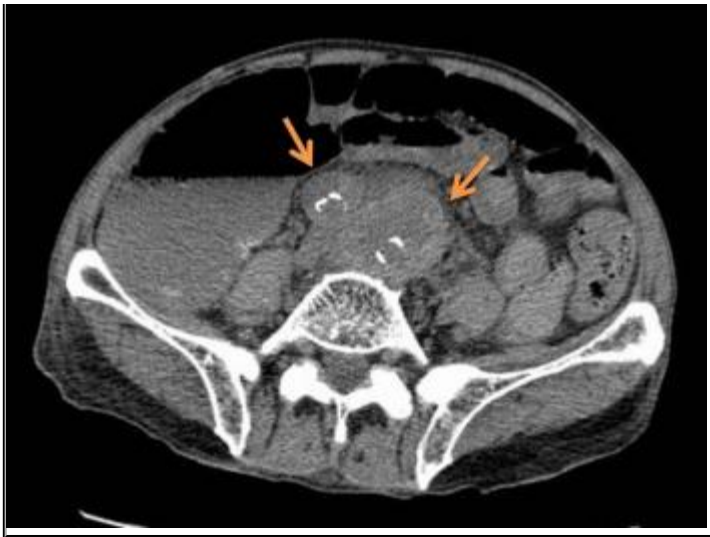
Figure 3 Figure 3

Pre-contrast axial image shows a large outpouching of the distal abdominal aorta, despite centrally located calcified plaques. These findings suggest PAU with pseudoaneurysm formation.

Figure 4 Figure 4

Same level as Figure 3. Contrast extravasion beyond the intimal calcifications, excluding a true aneurism. Note irregular peripheral thrombus.

Figure 5 Figure 5



Common iliac arteries'PAUs are depicted.

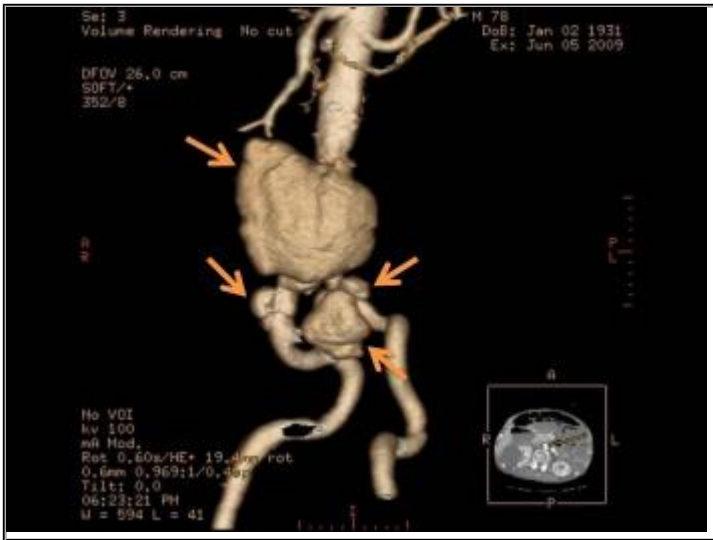
Figure 6 Figure 6

Common iliac arteries' PAUs are depicted.

Figure 7 Figure 7

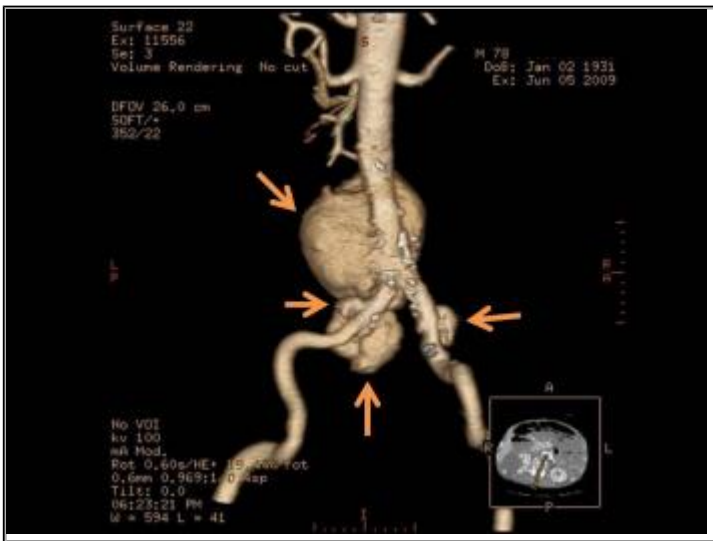
3D VR Reconstruction of the aorta depicting the PAUs located in the descending thoracic aorta and thoraco-abdominal transition.

Figure 8 Figure 8



3D VR Reconstruction of the aorta, right anterior oblique view, depicting the PAUs located in the distal abdominal aorta and common iliac arteries.

Figure 9 Figure 9



3D VR Reconstruction of the aorta, posterior view, depicting the PAUs located in the distal abdominal aorta and common iliac arteries.

MeSH

Aneurysm, False [C14.907.055.090]
An aneurysm in which the entire wall is injured and the blood is contained by the surrounding tissues, with eventual formation of a sac communicating with the artery or heart. (Dorland, 28th ed)

Aortic Diseases [C14.907.109]

References

[1] Macura KJ, Corl FM, Fishman EK, Bluemke DA. (2003) Pathogenesis in Acute Aortic Syndromes: Aortic Dissection, Intramural Hematoma, and Penetrating Atherosclerotic Aortic Ulcer AJR 181:309-316

[2] Hayashi H, Matsuoka Y, Sakamoto I, Sueyoshi E, Okimoto T, Hayashi K, Matsunaga N (2000) Penetrating Atherosclerotic Ulcer of the Aorta: Imaging Features and Disease Concept RadioGraphics 20:9951005

[3] Moriyama Y, Toda R, Iwamura H, Kawashima S, Shimokawa S, Toyohira H, Taira A. (1998) Infected Atherosclerotic Ulcer of the Abdominal Aorta as a Cause of Mycotic Aneurysm Treated by In-situ Prosthetic Graft Reconstruction: Report of a Case Surgery Today 28:325-7

[4] Macedo TA, Stanson AW, Oderich GS, Johnson CM, Panneton JM, Tie ML. (2004) Infected Aortic Aneurysms: Imaging Findings Radiology 231:250-257

Citation

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