Ruptured aortic aneurysm: CT imaging findings.

Poster No.: C-1459
Congress: ECR 2013
Type: Educational Exhibit
Authors: F. O. Lenghel\textsuperscript{1}, L. Fatahi Bandpey\textsuperscript{1}, D. yago\textsuperscript{1}, I. Fernandez Bedoya\textsuperscript{2}, G. Martinez Sanz\textsuperscript{1}; \textsuperscript{1}Teruel/ES, \textsuperscript{2}Buenos Aires/AR
Keywords: Abdomen, Arteries / Aorta, CT, Diagnostic procedure, Aneurysms, Acute, Hemorrhage
DOI: 10.1594/ecr2013/C-1459

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR's endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.

As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is strictly prohibited.

You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys' fees, arising from or related to your use of these pages.

Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.

www.myESR.org
Learning objectives

To describe CT radiological findings in ruptured aortic aneurysm (AA) in a series of 5 patients.

Background

Health care staff working in emergency departments usually attends many patients with acute abdominal pain/acute abdomen. Certain diagnoses will always be difficult to make and some clinical presentations can be deceptive. Ruptured AA should be considered as a differential diagnosis in all elderly patients presenting with acute severe abdominal pain who may be haemodynamically stable. Imaging techniques play a very important role in establishing an accurate diagnosis and frequently allow the prompt management to be instituted.

The AA is a permanent aorta dilatation, greater than 5 cm in the ascending aorta, 4 cm in the descending aorta and 3 cm in the abdominal aorta. The most common location of AA is the infrarenal aorta.

Its most frequent causes are: atherosclerotic (80-90%), inflammatory (5%), mycotic, post aortic dissection and in young adults the Marfan syndrome.

It may involve various complications: aneurysm rupture, thromboembolic events, erosion and compression of adjacent structures.

Acute rupture of an abdominal AA has a high mortality (77-94%). The classical manifestation (but present only in one third of the patients) consists in abdominal pain, arterial hypotension and the presence of a pulsatile abdominal mass.

Imaging findings OR Procedure details

CT is the gold standard imaging technique for the evaluation of hemodynamically stable patients with a possible ruptured AA.

After a chest radiograph, CT is often the first exploration to perform in patients with suspected AA rupture. It accurately describes the aneurism size, its relationships
with adjacent structures, possible complications and involvement of supraaortic trunk, allowing the correct treatment planning.

If a ruptured aortic aneurysm is suspected, plain CT images must be obtained first, in order to identify a possible intramural hematoma (seen as a hyperattenuating semilunar periaortic image). Afterwards, a contrast-enhanced study has to be performed, in order to assess the size, morphology and parietal aortic alterations.

Contrast-enhanced CT images are acquired during the arterial phase of enhancement, studying the whole aorta and its branches up to the femoral arteries. A combination of axial, MPR, MIP and VR images is used.

The CT findings of ruptured AA include an increased aortic diameter, hyperdense periaortic retroperitoneal collection and the visualization of contrast leakage from the aorta, which suggests active bleeding.

These are the CT findings /signs of imminent rupture of an AA:

1. The main predictor of fracture risk is the size of the aneurysm; 30-40% of aneurysms larger than 5 cm will break in the next 5 years after its detection. An aneurysm which increases by 1 cm or more in six months is also a sign of imminent breakage.
2. High-attenuating crescent sign, which consists of a high-density, semilunar morphology area, inside the aortic wall or inside the aneurysm intraluminal thrombus.
3. A thin posterior wall on lumbar osteophyte, which occurs when the rear wall of the aorta is not well defined and its rear edge closely follows the contour of the vertebral body.

We performed a retrospective review of one year (2011) of patients attended in the Emergency Department of the Obispo Polanco Hospital of Teruel for suspected vascular pathology, with confirmed ruptured aortic aneurysm on CT.

Case 1

The first patient was a 59 year-old male, who came to the emergency room (ER) for intense abdominal pain.

Case 2

The second patient was a 76 year-old male who came to the ER for severe chest pain.
**Case 3**

The third patient was a 85 year-old female, prosthesis-wearer in both aorta and iliac.

**Case 4**

The fourth patient was a 80 year-old male with abdominal pain of 3 days duration more intense in the last 12 hours and irregular response to treatment.

**Case 5**

The fifth patient was a 69 year-old woman with diffuse abdominal pain and arterial hypotension.

**Images for this section:**

![Figure 1](https://example.com/image1.png)

**Fig. 1:** Figure 1. Plain (A) and contrast-enhanced (B,C) abdominal CT. Large retroperitoneal hematoma, extending through the pararenal anterior and posterior left spaces into the pelvic cavity. Infrarenal abdominal aortic aneurysm to the iliac bifurcation, with mural thrombus and active bleeding. Jet contrast indicating the source of bleeding (arrow).
Fig. 2: Figure 2. Axial (A), MPI reconstructions (B, C) and VR (D) contrast-enhanced abdominal CT. Saccular aneurysm of the infrarenal abdominal aorta to the iliac bifurcation. Extensive retroperitoneal hematoma around the aorta, occupying both pararenal and perirenal spaces, with anterior displacement of the left kidney.

Fig. 3: Figure 3. Plain abdominal CT (due to kidney failure). A - Hematoma adjacent to the prosthesis. B - Retroperitoneal hematoma C - Breakage of the prosthesis in the left iliac artery.
Fig. 4: Figure 4. axial (A, B), Coronal (C) and sagital (D) reconstructions of contrast-enhanced abdominal CT. Abdominal aortic aneurysm with circumferential parietal thrombosis associated with retroperitoneal bleeding that cause thickening of the perirenal fascia.
**Fig. 5:** Figure 5. Axial ultrasound images of the abdominal aortic aneurysm with wide circumferential parietal thrombosis.

**Fig. 6:** Figure 6. Longitudinal ultrasound images of an abdominal aortic aneurysm with eccentric mural thrombosis.
**Fig. 7:** Figure 7. Axial (A,B), Sagital(C) and coronal (D) reconstructions of contrast-enhanced abdominal CT. Abdominal aortic aneurysm cracked from the level of the renal arteries to the bifurcation, with irregularity in his right lateral posterior quadrant, at the level of the bleeding. Retroperitoneal hematoma around the right kidney, posterior pararenal space and near the renal vessels, right wall of the infrarenal aorta and right iliac vessels.
Conclusion

The aortic pathology has a high mortality rate, so an early and accurate diagnosis is crucial. CT is the gold-standard imaging technique because it is fast, non-invasive, with high spatial resolution and so useful in subsequent treatment planning.

References


**Diagnostic and therapeutic strategies for small abdominal aortic aneurysms.**


2. Clark A. Davis.

**Computed Tomography for the Diagnosis and Management of Abdominal Aortic Aneurysms.**


3. Chao CP, Walker TG, Kalva SP.

**Natural history and CT appearances of aortic intramural hematoma.**


**Sealed rupture of abdominal aortic aneurysms: CT features in 6 patients and a review of the literature.**


5. Shah TT, Herbert P, Beresford T.

**An atypical presentation of aortic rupture: intuition and investigation can avoid disaster.**

6. Lee J.

Radiological Imaging of Aortic Aneurysms.


**Personal Information**