

Computed tomography evaluation of ruptured abdominal aortic aneurysm – A case report

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Abstract

Aim: Ruptured abdominal aortic aneurysm remains a true surgical emergence, therefore appropriate diagnosis and prompt treatment is required. Computed tomography is the best rapid imaging modality in evaluation of the location of the aneurysm, its extent and complications. The purpose of this case report is to categorize the imaging findings and the role of computed tomography in evaluation of ruptured aortic aneurysm.

Methods: In this case report, we describe a patient with severe back pain who was preliminarily considered to have a spinal pathology. We proceeded with CT imaging of the abdomen.

Results: CT scan revealed a ruptured abdominal aortic aneurysm with anterior displacement of kidneys and retroperitoneal hematoma.

Conclusions: CT is the first choice in a patient with a classical midline sharp, tearing abdominal pain that radiates to the back, and has a midline pulsatile mass upon examination.

Keywords: aortic aneurysm, computed tomography, rupture.

Introduction

Abdominal aortic aneurysms are the most common type of aortic aneurysm (1). The most common risk factors include hypertension, advanced age, male sex, family history, tobacco use, peripheral vascular disease, Marfan syndrome, and Ehlers-Dandies type IV (2). Rupture is one of the most frequent complications of aortic aneurysm. Ruptured abdominal aortic aneurysm is a relatively common and often fatal condition. It can be misdiagnosed with other diseases (such as urolithiasis, diverticulitis, gastrointestinal hemorrhage, back pain, traumatic injury), leading to significant delays in treatment (3,4). CT scans play an important role in the diagnosis of abdominal aortic aneurysm and its complications. Precise evaluation with CT of aneurysm in any plane, details about its size, morphologic features, relationship to branch vessels, its effect on adjacent structures – all provide important information for the management of complications in the affected patients.

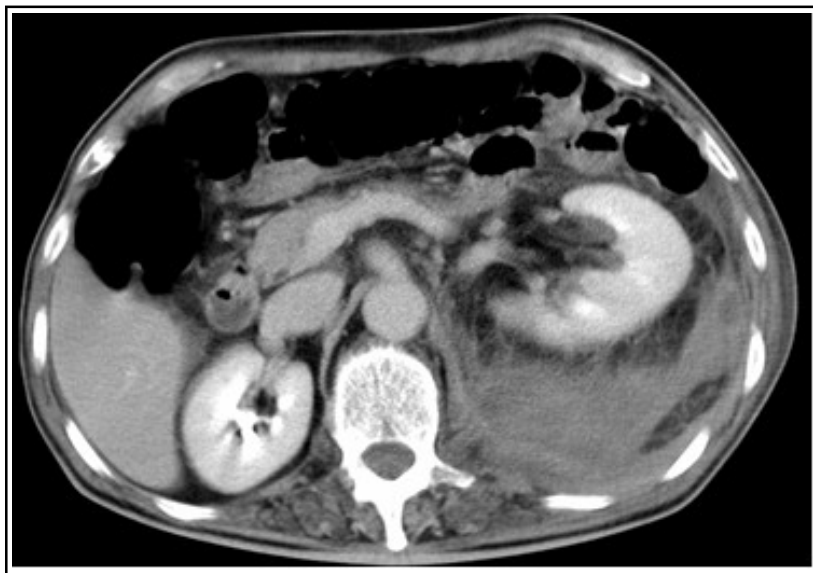
The aim of this case report is to describe the usefulness of CT examination in evaluation of

abdominal aortic aneurysms and its complications.

Case report

A 75-year old man with a past history of hypertension was admitted to the emergency clinic due to the sudden onset of severe back pain independent of the patient's body position. He had a past history of hypertension. Upon presentation, his blood pressure was 174/ 78 mm Hg, and his pulse rate was 40 beats/ minute. Upon examination, the patient was afebrile. No pulsatile mass was palpated in the abdomen. With suspicion of spinal pathology, a non-contrast computed tomography was undertaken, which demonstrated aneurysmal dilatation of the abdominal aorta. CT scan was performed with Dual-slice helical CT (Somatom Emotions 2, Siemens, Germany). Subsequently, 100 mL of iodinated contrast media with a power injector through a 20-gauge catheter at a rate of 3.5 mL, was injected. Abdominal contrast enhancement computed tomography depicted a ruptured abdominal aortic aneurysm, below the level of renal artery origin (figure 1).

Figure 1. Contrast-enhanced axial computed tomography image shows normal aorta at renal artery (arrow) level. Retroperitoneal hematoma from ruptured infrarenal aortic aneurysm (arrowheads)



There was evidence of anterior displacement of the left kidney (Figure 2), hematoma within posterior pararenal and perirenal spaces (Figures 1-4) with

active extravasation of contrast material in retroperitoneal space (Figures 2-4).

Figure 2. Active extravasation (arrows) of contrast into the retroperitoneum. Anterior displacement of the left kidney (K) and large retroperitoneal hematoma is on the left side (arrowheads)



Figure 3. Aortic aneurism (AA) with large retroperitoneal hematoma (arrowheads) and active extravasation of contrast material in retroperitoneal space (arrows)



Figure 4. Aortic aneurysm (AA), hematoma within the retroperitoneal space (arrowheads) and active extravasation of contrast material (arrow)



Discussion

An abdominal aortic aneurysm is defined as an aortic diameter exceeding 3 cm. Normally, the diameter of the abdominal aorta is approximately 2 cm, a dimension that increases with age (1). Aortic aneurysm is most often seen in 1-4% of population over 50 years of age who have one or more risk factors (2). The majorities of abdominal aneurysms remains asymptomatic and are detected as an incidental finding on US, CT, or MRI. Hypotension, pulsatile abdominal mass, and flank or back pain constitutes the classic triad for ruptured abdominal aortic aneurysm. The risk of rupture is related to the maximum cross-sectional diameter of the aneurysm (usually over 6 cm) (2,3).

Radiologically, rupture of aortic aneurysm in CT scan is more frequently characterized by discontinuity of the rim of calcification in the true aneurysm wall; - well defined soft tissue density adjacent to the aorta; - the concealed psoas muscle and the displaced viscera depending on the size of the lesion, and no appearance of contrast material in the hematoma in some cases (5-7).

The CT diagnosis of ruptured abdominal aortic aneurysm is based on demonstration of high-density material (approximately +70 HU on noncontrast scans corresponding to blood) within the periaortic

fat and extending into the perirenal and pararenal spaces (4,5). Freshly extravagated blood typically has a high CT attenuation value; whereas an iso attenuating or hypo attenuating hematoma signifies that a leak is days or weeks old. The use of contrast enhancement is of particular value because it documents active arterial extravasation either as a focal high density area (attenuation values 80 to 130 HU) surrounded by a large hematoma, or as a diffuse area of high density. Additional findings include anterior displacement of the kidney by the hematoma and enlargement or obscuration of the psoas muscle (6). In our case, there was evidence of a ruptured infrarenal abdominal aortic aneurysm with hematoma within posterior para renal and perirenal spaces (Figure 3) with active extravasation of contrast material in retroperitoneal space.

Patients with ruptured aortic aneurysm require prompt diagnostic evaluation so that urgent therapeutic interventions can begin. CT is a superior diagnostic modality compared with aortography and MRI because it includes minimal invasiveness, widespread availability, consistently reproducible results, and a relative cost savings (7). It is used as a screening test when ultrasound images are suboptimal; or, in cases when a ruptured aortic

aneurism is suspected; and finally in the preoperative work-up for the repair of abdominal aortic aneurism.

Conclusion

Rupture of the abdominal aortic aneurysm is a highly lethal risk pathology, which requires precise diagnosis and urgent and efficient surgical treatment (7,8). Delayed diagnosis (as a consequence of

misdiagnosing with other diseases) may reduce the patient's chance of survival (9). CT scan is an excellent imaging modality for comprehensive evaluation of aortic aneurysm and its complications because of its fast speed, excellent sensitivity and specificity (10). CT is the technique of choice for evaluating patients for whom a diagnosis of ruptured aortic abdominal aneurism is being considered.

Conflicts of interest: None declared.

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