

CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Medical Imaging Quiz – Case 6

A 71-year-old patient was admitted to our hospital with fever and back pain of acute onset. Chest x-ray, blood count and blood culture were unremarkable. Chest CT with IV contrast enhancement revealed focal dilatation of the thoracic aorta at the level of T5 to T7 with hazy aortic wall and the presence of intramural air and paraaortic fluid collection (fig. 1). There was no vertebral erosion. The diagnosis was mycotic aneurysm of the thoracic aorta. The patient was treated with antibiotics. Four days later, chest CT without IV contrast enhancement revealed smaller amount of air, hazy aortic wall, intima calcifications, paraaortic fluid collection and bilateral pleural effusions (figures 2, 3). The patient had a poor outcome.

Comment

*Mycotic aneurysms are infected aneurysms. The term mycotic is restricted to fungal infections but is practically used for all aneurysms of infectious etiology except for syphilitic aortitis. Both Gram-positive –60% of cases most commonly streptococci and staphylococci– and Gram-negative organisms –mostly salmonellae– cause the infection. Fungal (*Aspergillus*) and tuberculous mycotic aneurysms are less often.*

They may occur at any site of the arterial tree. Predisposing causes for aortic mycotic aneurysms include intravenous use of drug, valvular or congenital disorders of the heart, pericardiac infections

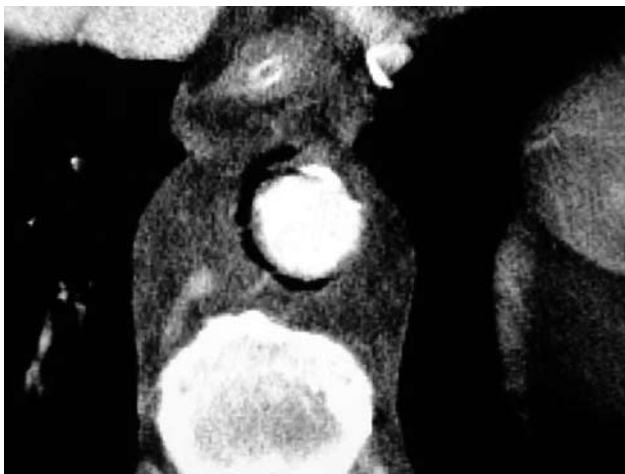


Figure 1. CT of the thoracic aorta at admission, demonstrating the gas forming inflammation.

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S. Tandeles,
A. Pomoni,
S. Kampanarou,
M. Pomoni,
L. Thanos

Department of Computed Tomography,
"Sotiria" General Hospital of Chest
Diseases, Athens, Greece



Figure 2. CT of the thoracic aorta at admission, demonstrating hazy aortic wall and gas formation.



Figure 3. CT of the thoracic aorta four days after admission has shown smaller amount of gas which is observed with hazy aortic wall, paraaortic fluid collection and bilateral pleural effusions. There is also intima calcification.

or compromised immunity. It is a rare entity and is considered a surgical emergency because this type of aneurysm is highly prone to rupture. Males predominate over women by 3 to 1 (mean age 65 years) when it occurs by hematogenous seeding of a previously damaged arteriosclerotic vessel while when it occurs with infective endarteritis (IE) men and women are affected approximately equally (mean age 40 years).

Mycotic aneurysms are extremely rare in childhood and when present, are usually associated with IE, cardiovascular malformations, connective tissue disorders or umbilical artery catheterization in newborn infants.

- There are four possible mechanisms for the pathogenesis of mycotic aneurysms: secondary to septic microemboli to the vasa vasorum (usually in patients with IE)
- Hematogenous seeding of the intima during bacteremia originating from a distant infection (when the intima is altered by congenital malformations, as in aorta coarctation or in acquired disease, as in atherosclerotic plaques or ulcers)
- Extension from a contiguous infected focus (caseous tuberculous lymph node or pyogenic vertebral osteomyelitis)
- Trauma to the arterial wall with direct contamination.

Secondary infection of a pre-existing aneurysm is most commonly found in the abdominal aorta (70%) because this is the area most frequently and severely damaged by atherosclerosis. Ascending and descending aortic aneurysms each account for about 15% of the cases. The primary bacteremia most commonly originates from distal infections in soft tissue, lung, bone, or joint. The wall of the aneurysm is thinned and there is focal acute and chronic inflammation that may lead to rupture. The lesion is characterized by acute inflammation with a predominance of polymorphonuclear leukocytes, necrosis, abscess formation, hemorrhage, and visible bacterial colonies. Erosion and rupture may be present without aneurysmal dilatation. Lumbar or thoracic osteomyelitis is present in up to a third of the cases and may either precede the aneurysm or develop secondary to contiguous spread from the vascular infection.

There are no pathognomonic clinical findings which differentiate infected aortic atherosclerotic aneurysms from uninfected aneurysms. Fever is a helpful differentiating sign (present in over 70% of the patients) because it is uncommon in patients with non infected aneurysms. Back pain or abdominal pain, each occur in about a third of the cases. A draining cutaneous sinus may be present. The aneurysm is palpable in 50% to 60% of the cases. The non specificity of the clinical manifestations is reflected by the 75% preoperative rupture.

The most common site for aorto-enteric fistula is between the aorta and the third portion of the duodenum. Severe pain and the rapid onset of shock usually accompany rupture of the aneurysm.

Patients with infected aortic aneurysms usually demonstrate a leukocytosis (65% to 83%) but this is nonspecific and may be present when the aneurysm is not infected. Bacteremia is found in 53% to more than 90% of the cases, is continuous, and usually does not clear with antibiotic therapy alone. Evidence for a primary source of bacteremia may be present but is absent in up to 46% of the cases.

The abdominal aorta appears calcified on abdominal x-ray films in 47% of the cases, and anterior vertebral body erosion has been demonstrated in 18%. A lack of calcification is suggestive of infection, because 70% to 80% of non infected aneurysms demonstrate calcification on x-ray films.

CT features of mycotic aneurysm include hazy aortic wall with rupture, gas forming inflammation around the aneurysm, retroperitoneal para-aortic fluid collection with or without vertebral erosion, thrombus formation within a false lumen after aneurysmal rupture and absence of intimal calcification. The sudden appearance of an aneurysm in a septic patient is suggestive of a mycotic aneurysm. Gas in the aortic wall is diagnostic but rare. Preoperative angiography is often used to delineate precisely the extent of aneurysmal involvement. Two-dimensional echocardiography (TTE or TEE) is a very useful non-invasive technique for documenting mycotic aneurysms in the vicinity of the aortic valve.

References

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Corresponding author:

L. Thanos, Department of Computed Tomography, "Sotiria" General Hospital of Chest Diseases, 152 Mesogeion Ave., GR-115 27 Athens, Greece
e-mail: loutharad@yahoo.com