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Mycotic Aneurysm: Case Report and Literature Review

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Abstract

Mycotic aneurysm is a type of aneurysm related to an inflammatory process in the vessel wall, however, it does not refer to a specific pathogenic cause, but rather to an acute inflammatory response to a pathogenic infection that induces neutrophilic infiltration in the vessel wall, leading to the activation of enzymes that favor the weakening of this wall and consequent aneurysm formation [1]. Clinically, it manifests with symptoms of systemic infection or symptoms localized to the site of the affected artery. Most patients present with fever and sepsis. In the case of mycotic aortic aneurysm, the usual manifestation is chest and interscapular pain [2]. Due to its often-nonspecific clinical presentation, its diagnosis becomes challenging. Therefore, knowledge of the imaging patterns of this pathology is of paramount importance so that the diagnosis can be made and the correct treatment can be carried out as quickly as possible, thus improving the patient's prognosis.

Keywords

Computed Tomography, Aortic Aneurysm, Thoracic, Aneurysm, Infected

1. Introduction

Mycotic aneurysm is a type of aneurysm related to an inflammatory process in the vessel wall, however, it does not refer to a specific pathogenic cause, but rather to an acute inflammatory response to a pathogenic infection that induces neutrophilic infiltration in the vessel wall, leading to the activation of enzymes that favor the weakening of this wall and consequent aneurysm formation [1].

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Its exact incidence is difficult to determine, but studies report that it represents about 0.6 to 13% of aortic aneurysms [3], it is predominant in the thoracic portion of the aorta [4], with the descending segment being the most affected, about 75.7% of cases [3], and it can occur in a previously normal aorta or in a previously existing aneurysm [4].

It has a high mortality rate [5], with ruptures reported in about 37 to 47% of cases, requiring emergency treatment [4].

Clinically, it manifests with symptoms of systemic infection or symptoms localized to the site of the affected artery. Most patients present with fever and sepsis. In the case of mycotic aortic aneurysm, the usual manifestation is chest and interscapular pain [2].

Imaging tests are necessary both to define the diagnosis and to locate and better characterize the mycotic aneurysm, with Computed Tomography (angiography) being the modality of choice [2].

Some signs of impending rupture are reported, such as a diameter greater than 7.0 cm, aneurysm growth rate greater than 1.0 cm in six months, peri-aortic hemorrhage, and crescent sign (intramural hemorrhage) [6].

2. Case Description

A 54-year-old female patient presented with back pain, cough with expectoration and hemoptysis, and unmeasured weight loss for approximately 2 months. During this period, she denied fever and contact with a patient with tuberculosis. Initial examinations showed signs suggesting a large left pleural effusion, raising the hypothesis of parapneumonic origin. She was hospitalized for clinical stabilization and further investigation. A chest CT scan with contrast was then performed, revealing a left pulmonary collection (see **Figure 1** and **Figure 2**), with a fluid level and interspersed gas foci, presenting a density of thick/proteinaceous fluid, measuring approximately 18.2 × 9.5 × 9.5 cm and an estimated volume of 850 ml, suggesting an inflammatory/infectious process. A saccular aneurysm was also characterized in close contact with the collection, located in the superior aspect of the aortic isthmus (see **Figure 3**), with partially thrombosed contents and interspersed gas foci, measuring 8.1 × 5.8 × 6.2 cm and a neck measuring approximately 2.0 cm. This aneurysm causes displacement of the tracheobronchial tree and esophagus to the right, resulting in extrinsic compression and esophageal luminal reduction. The patient was transferred from another institution, from which we were unable to obtain information regarding the previously used antibiotic regimen. At our service, empirical therapy with Tazocin was initiated, later escalated to Meropenem and Vancomycin, and finally to Levofloxacin. Due to the empirically administered antibiotic therapy, the collected blood cultures were negative. Even with the antibiotic therapy regimen used, the patient continued to show worsening of symptoms, and therefore an endovascular surgical intervention with an endoprosthesis was chosen (see **Figure 4**).

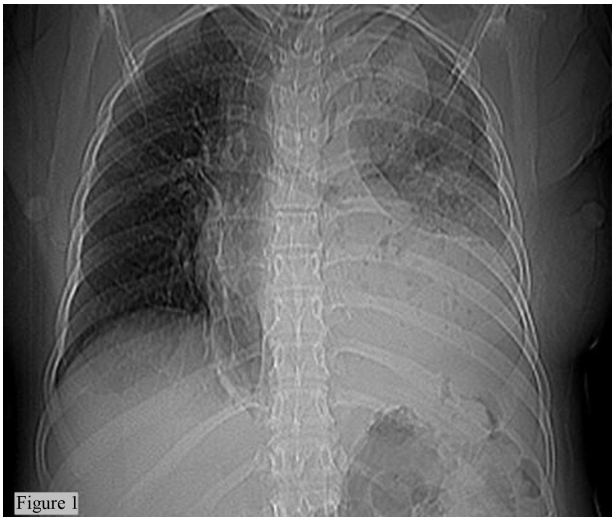

Figure 1. Chest CT scan (October 1st, 2024) showing a large left pleural effusion with nodular opacity in the left upper hemithorax.

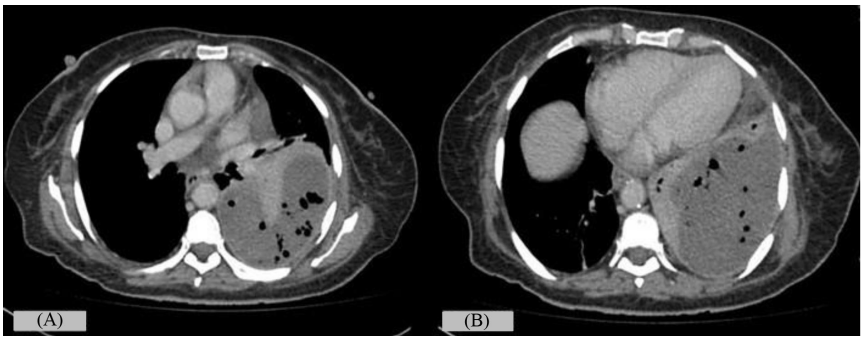

Figure 2. (A) and (B): Chest CT scan with contrast in axial section and soft tissue window (October 1st, 2024): Voluminous collection on the left with interspersed gas foci.

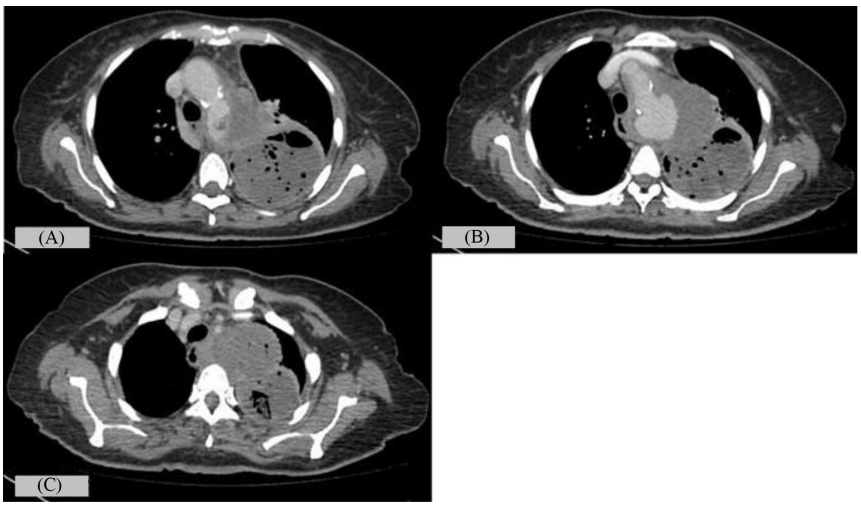

Figure 3. Chest CT scan with contrast in axial slices and soft tissue window (October 1st, 2024) showing saccular aneurysm in the isthmus of the aortic arch, partially thrombosed, with thrombus extending into the lumen of the vessel (**Figure 3(A)**), as well as interspersed gas foci (**Figures 3(B)-(C)**).

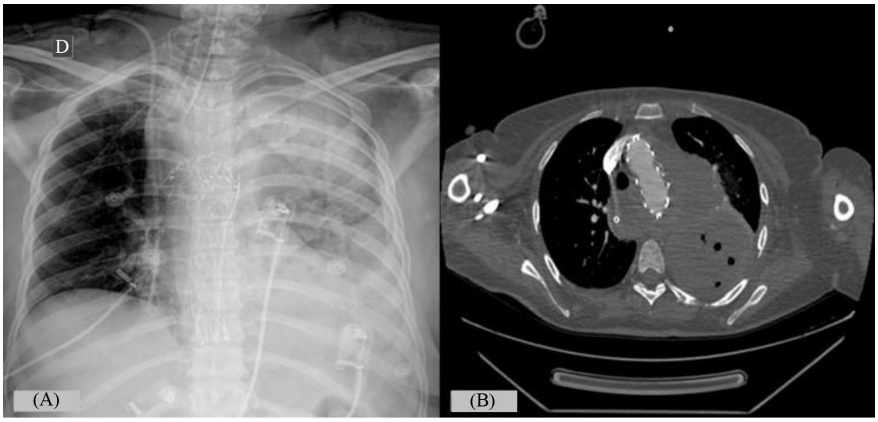

Figure 4. (A): Chest X-ray (October 12th, 2024); (B): Chest Angiography (October 13th, 2024), showing an aortic endoprosthesis.

3. Discussion

In the present case, the patient exhibited a prolonged and nonspecific clinical presentation, with imaging studies playing a decisive role in diagnosis and management. Computed tomography demonstrated a large left-sided pulmonary collection associated with a partially thrombosed saccular aneurysm of the aortic isthmus containing intralesional gas—findings highly suggestive of a mycotic aneurysm. The close anatomical relationship between the pulmonary collection and the aneurysm supports contiguous infectious spread, which has been described in the literature as one of the pathogenic mechanisms of this entity [2].

When evaluating a saccular lesion of the thoracic aorta, several differential diagnoses should be considered. Degenerative atherosclerotic aneurysms represent a common etiology; however, they typically present as fusiform dilatations without significant periaortic inflammatory changes. Another diagnosis that should be considered is penetrating atherosclerotic ulcer, which results from ulceration of an atherosclerotic plaque and appears as a focal contrast-filled outpouching of the aortic wall, often associated with intramural hematoma, without adjacent inflammatory collections. Aortic pseudoaneurysms secondary to trauma or prior surgical interventions should also be considered, particularly when there is a history of injury or vascular instrumentation. However, the presence of a saccular aneurysm with irregular margins, associated periaortic inflammatory changes, intralesional gas, and a contiguous infected pulmonary collection represents an imaging pattern suggestive of an infectious etiology, characteristic of mycotic aneurysm, as described in previous radiologic series [1] [2] [5].

Mycotic aneurysm is a rare and potentially fatal condition, physiopathologically characterized by direct microbial invasion of the arterial wall, leading to localized infectious inflammation and subsequent weakening of the vascular wall. This process results from an intense neutrophilic response with degradation of the extracellular matrix and elastic fibers, culminating in aneurysm formation with a high risk of rupture [1] [2].

Despite its historical designation, the term does not refer exclusively to fungal

infections, as bacterial pathogens account for the majority of cases [1] [2]. Studies indicate that these aneurysms may develop in previously normal arteries or arise from pre-existing degenerative aneurysms, with a predilection for the descending thoracic aorta, which is involved in up to 75% of cases [1] [3].

Clinical presentation is typically nonspecific and often characterized by systemic signs of infection and localized pain, contributing to diagnostic delay [2] [5]. In the present case, the absence of fever and predominance of respiratory symptoms illustrate this diagnostic challenge, underscoring the importance of clinical suspicion in conjunction with imaging findings.

Contrast-enhanced computed tomography is considered the imaging modality of choice, allowing not only aneurysm detection but also identification of characteristic features such as saccular morphology, rapid growth, irregular mural thrombus, intralesional gas, and perivascular inflammatory changes [1] [2] [5]. These findings were clearly demonstrated in this case and align with the imaging spectrum described by Zhang *et al*. and Lee *et al*., who emphasize intramural gas and saccular configuration as strong indicators of infectious etiology [1] [2].

The clinical significance of mycotic aneurysms lies in their high mortality, with rupture rates reported as high as 47%, frequently necessitating emergent intervention [3] [4]. Contemporary management increasingly incorporates endovascular repair combined with prolonged antibiotic therapy, particularly in patients at high surgical risk. In this case, the patient underwent endovascular repair with stent graft placement in association with antibiotic therapy—an approach supported by recent series demonstrating favorable short-term outcomes and reduced morbidity and mortality. Nevertheless, long-term follow-up remains essential due to the risk of persistent or recurrent infection [3] [4], as well as procedure-related complications that may require further intervention.

This case highlights the critical role of the radiologist in the early recognition of this pathology, particularly in atypical presentations. Furthermore, it emphasizes the fundamental contribution of imaging not only to initial diagnosis but also to therapeutic planning and post-intervention surveillance [2] [5].

4. Conclusions

Mycotic aneurysm is a life-threatening pathology, both because of the infectious process itself, which can progress to sepsis, and because of the risk of rupture and hemorrhage. Due to its often-nonspecific clinical presentation, its diagnosis becomes challenging. Therefore, knowledge of the imaging patterns of this pathology is of paramount importance so that the diagnosis can be made and the correct treatment can be carried out as quickly as possible, thus improving the patient's prognosis.

Furthermore, the need for imaging monitoring of this pathology is reinforced, allowing for prompt management of possible complications.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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