Statewide Campus System
College of Osteopathic Medicine
MICHIGAN STATE UNIVERSITY

A 72-Year-Old Male Presents To the Emergency Department with Hemoptysis

Torretta C[1], Gaed P[1], Hanson C[2], Cronovich H[2]
[1]Michigan State College of Osteopathic Medicine
[2]Henry Ford Macomb Healthcare

Introduction

In the emergency department, Thoracic Aortic Aneurysm (TAA) is a silent, but deadly condition. Thoracic Mycotic Aortic Aneurysm (TMAA) is rare sub-etiology, has limited studies, and presents with an alarming rate of progression and clinical presentation. This case highlights the importance of clinical suspicion given red flags, detailed history taking, and comprehensive workup with multidisciplinary patient care.

Background/Presentation

HPI: A 72-year-old male presented to the emergency department with chief complaint of "hemoptysis". Patient endorses cough with blood-tinged sputum that started 10 hours prior to presentation with no associated abdominal or chest pain. He denies coughing up any large clots or profuse bleeding. He denies any fever, chills, rhinitis, nausea, vomiting, abdominal pain, or chest pain.

PMH: The patient has history significant for pan lobular emphysema with chronic cough (no blood in the past), aortic atherosclerosis, HLD, GERD without esophagitis, and a 37.5 pack year smoking history (having quit 2 months prior).

Meds: His medication list includes albuterol inhaler PRN, Avanafil 200mg daily PRN, Ibuprofen 800mg TID PRN for shoulder pain, Vitamin K2 100mg daily, Cholecalciferol 5k units daily.

Review of Records: Patient had CT Chest w/o contrast 61 days prior which demonstrated moderate to severe centrilobular emphysema, a 6mm consolidative change in the LLL with a 1.4cm Lung-RADs 4B nodule, and mild secretions in the left mainstem bronchus. Findings were suspicious for possible pneumonia secondary to consolidative changes. CT at the time otherwise relatively unremarkable.

Vitals: BP: 109/62 HR: 83 O2Sat: 97% RA

Physical Exam:
General: Non-toxic appearing, underweight male, blood-tinged sputum in Kleenex
HEENT: Normocephalic, EOMI, PERRL
CV: Regular rate and rhythm, no murmurs
Pulm: Wheezing in the bilateral lung fields
Neuro: No focal neurologic deficits

Labs

Laboratory Test	Patient's Value	Reference Range
WBC	28.0 x 10^9/L	4.5 to 11.0 × 10^9/L
Neutrophil, absolute	24.64 x 10^3/µL	2.5-6 x 10^3/µL
Lymphocytes, absolute	5.6 x 10^3/µL	1 - 4.8 x 10^3/µL
Monocytes, absolute	1.96 x 10^3/µL	0.1 to 0.9 x 10^3/µL
Basophils, absolute	0.28x10^3/µL	0.0 to 0.1 x 10^3/µL
Prothrombin time	15 seconds	11 to 13.5 seconds
Hemoglobin	12.9 g/dl	13.2 to 16.6 g/dl
Hematocrit	38.2%	38.3% to 48.6%
Platelet Count	532x10^3/µL	150 to 400 x 10^3/ µL
Sodium	131 mEq/L	135 to 145 mEq/L
Chloride	96 mEg/L	96 to 106 mEq/L

Table 1: Laboratory results revealed significant leukocytosis with neutrophilia, monocytosis, lymphopenia, and anemia.

Imaging

Image 1: **Top Left**
New focal ruptured saccular aneurysm along the left lateral aspect of the descending thoracic aorta at the level of the Carina not seen on his prior CT with intramural thrombus.

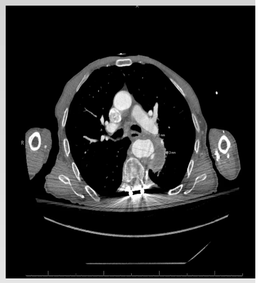

Image 2: **Top Right**
Aneurysm measuring 4.8 x 4.5 x 4.0 cm with evidence of rupture/contained hematoma adjacent to the left mainstem, left lobe bronchus, and left main and lower lobe pulmonary artery.

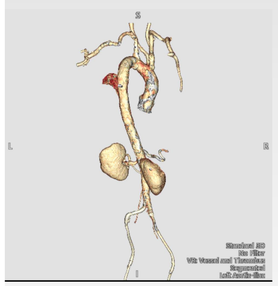

Image 3: **Bottom Left**
Mediastinal lymphadenopathy along with a mass-like heterogeneous enlargement of the left subscapularis muscle belly with adjacent lymphadenopathy was also seen suspicious for infectious process versus malignancy. Concern for the presence of a new aortopulmonary fistula as there was debris and fluid within the left lower lobe bronchus.

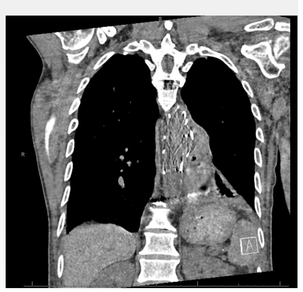

Image 4: **Bottom Right**
Vascular and thoracic surgery were consulted. Given herald bleeding with evidence of thoracic aortic rupture the decision was made to take the patient to the OR for an emergent Thoracic Endovascular Aortic Repair (TEVAR).

Management

Post-ED Course

- Patient underwent Thoracic Endovascular Repair (TEVAR)
- Given rapid presentation and growth of the aneurysm with significant leukocytosis the patient was started on IV Piperacillin/Tazobactam, Vancomycin, and Voriconazole pending blood cultures, fungal antibodies, and respiratory cultures, Acid-Fast Bacilli cultures (AFB), and Tuberculosis PCR following infectious disease consultation.
- Patient completed a 6-day course of the above therapy with negative findings for microbial, viral, and fungal etiology
- From an infectious disease standpoint, the exact etiology of the mycotic aneurysm remained unknown, however given interval development and leukocytosis, mycotic aneurysm was still favored as the most likely diagnosis
- Patient was cleared by vascular, thoracic surgery, and infectious disease teams with follow up with pulmonology

Risk Factors/Discussion

Risk Factors of TAA in our patient

- Advanced age
- Male Sex
- Chronic Tobacco usage
- Aortic atherosclerosis
- Severe pan lobular Emphysema

Discussion: Previous studies have described an average maximal aneurysmal growth of 0.2cm per year for typical chronic thoracic aortic aneurysms. This patient's case, however, has shown an accelerated development and rupture within just over 8 weeks. Pre-existing aneurysms can become secondarily infected leading to acceleration of aortic dilation, but development and progression of aortic wall degeneration can also be caused by infection, as suspected in this patient who demonstrated a ruptured saccular aneurysm at the level of the carina not seen on prior CT imaging 61 days before his presentation. The pathophysiology is thought to be due to predisposing risk factors that render the aorta susceptible to bacterial infection (7). Such risk factors include, but are not limited to, atherosclerosis, nearby infections, traumatic injury, congenital anomalies, or pre-existing aneurysms. Chronic Atherosclerosis strips the intima layer leaving the media exposed and vulnerable to bacterial seeding, particularly salmonella species, which are often isolated in MTAA (9). Atherosclerosis in combination with nearby infection such as pneumonia also increases the risk of contiguous spread and seeding into the aortic wall (10). Although surgical repair is the definitive treatment for aortic aneurysms, and by no means can antibiotic treatment replace surgical intervention, It is critical to supplement with antibiotics to ensure successful prognosis for such patients (11).

Conclusion

Thoracic Mycotic Aortic Aneurysm (TMAA) is a rare, but life-threatening condition characterized by bacterial infection of the aortic wall, leading to accelerated damage to the integrity of the vessel wall. If unrecognized in a timely manner, outcome can be catastrophic for patients. Early recognition and diagnosis of this rare etiology is crucial to implement life-saving measures and reestablish the integrity of the aortic wall before severe complications ensue. Emergency physicians should be well versed in recognizing this clinical presentation and have high suspicion for those presenting with lab work indicative of an ongoing infectious process in high-risk patients for TAA, as management for MTAA requires prompt antibiotic treatment to severe the burden of infection, prevent further spread, and ensure successful recovery post surgical repair.

References

1. https://www.sciencedirect.com/science/article/pii/S0735109709040753?via%3Dihu
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5290913/
3. https://pubmed.ncbi.nlm.nih.gov/20233780/
4. https://www.sciencedirect.com/science/article/abs/pii/S1050173812002666?via%3Dihub
5. https://pubmed.ncbi.nlm.nih.gov/32119454/
6. https://www.sciencedirect.com/science/article/pii/S1078588421008261
7. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9632233/#:~:text=Mycotic%20aortic%20aneurysm%20(MAA)%20is,or%20severe%20and%20rapidly%20growin
8. https://academic.oup.com/eurheartj/article/43/25/2356/6446067
9. https://pubmed.ncbi.nlm.nih.gov/12368720/
10. https://pubmed.ncbi.nlm.nih.gov/18696212/
11. https://pubmed.ncbi.nlm.nih.gov/2919901/
12. https://pubmed.ncbi.nlm.nih.gov/27122829/