

A Rare Case of Ruptured Mycotic Infrarenal Aortic Aneurysm Secondary to Salmonella Species

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Abstract

Introduction: Ruptured mycotic aortic aneurysm is a rare and life-threatening condition. An early and proper initiation of antibiotics aside from aneurysmal repair is of paramount importance. The typhidot IgG and IgM may help with this dilemma, especially when the blood culture is negative and during the waiting period for the the aortic sample result.

Case: A 47-year-old male Filipino with type 2 diabetes mellitus presented with severe back pain for one month and intermittent fever for three weeks. Complete blood count showed anemia and leukocytosis with predominance of neutrophils. On computed tomography of the aorta, a segmental calcification and wall discontinuity in the right posterolateral wall of the infrarenal abdominal aorta with heterogenous collection of blood in the retroperitoneal region was seen and aortic rupture secondary to mycotic aneurysm was considered. He underwent emergency abdominal aortic aneurysm repair with debridement, antibiotic lavage, aortoiliac grafting, anastomosis and

omental packing. The typhidot IgG and IgM test was positive and was given ceftriaxone 2gm/IV every 24 hours for six weeks. Blood cultures did not reveal significant growth of any pathogen. The aortic wall culture showed heavy growth for salmonella species sensitive to ceftriaxone, confirming and guiding the management. He was then discharged improved.

Conclusion: A mycotic aneurysm secondary to salmonella should be one of the considerations in an adult male diabetic presenting with prolonged fever, abdominal and back pain with or without a tender pulsatile mass. The Typhidot test is an easy and affordable test that allows rapid detection of salmonella infection. Early surgical intervention and antibiotics are the treatment of choice

Keywords: mycotic aneurysm, salmonella, typhidot, case report

Introduction

Salmonella is an intracellular gram-negative bacteria that commonly affects the intestines. It may spread to the bloodstream and to other body sites. The aortic vasculature may be affected, notably the infrarenal aorta. Although uncommon, Salmonella has been reported in literature to cause aortic rupture with aneurysm.¹⁻²

The prevalence of mycotic aneurysm is only 0.7 to 2.6%³ and 40% is secondary to Salmonella,^{4,5} highlighting its rarity.

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The current epidemiology typically involves diabetic men who are between 50-70 years old with an atheromatous or aneurysmal aorta.²

Case

We report a case of a 47-year-old Filipino male engineer who was admitted at our institution due to severe, tearing back pain associated with abdominal pain for about a month. He had also been complaining of on-and-off fever for three weeks. He has no known comorbid illnesses. He is a 30-pack per year cigarette smoker and regularly indulges in street food. Consult was sought at a local clinic. Complete blood count showed a normal leukocyte count (WBC 8.14, Neutrophils 74.5%, Lymphocytes 16%), normal hemoglobin and hematocrit levels (14.4 g/dL and 43.4% respectively) and a normal platelet count (274x10³uL). Chest x-ray revealed hazy densities in the left lower lung suggestive of pneumonia. Lumbar spine x-ray showed spondylosis at L3-L4. Urinalysis showed pyuria (WBC 33/HPF), hematuria (RBC 42/HPF). Urine culture was taken which did not reveal any growth. Whole abdominal ultrasound was unremarkable. He was managed as a case of complicated urinary tract

infection and community acquired pneumonia. Levofloxacin 750mg/tab one tablet once a day was given for one week and paracetamol 325 mg/tramadol 37.5 mg tab thrice a day were given for pain. Morphine 15mg tablet one tablet thrice a day was added for breakthrough pain. HBA1C was taken which was high (9.8%). Oral anti-diabetic medications were started. However, there was persistence of pain, which prompted further work-up.

Whole abdominal CT-scan was done which revealed a saccular aneurysm arising from the infrarenal abdominal aorta with evidence of rupture. A computed tomography of the aorta was then done which showed segmental calcification and wall discontinuity in the right posterolateral wall of the infrarenal aorta at the prebifurcation level with active extravasation of contrast material in the retroperitoneal region (extending from L3 level down to L5-S1 level) measuring 16.8x6.8x7.4 cm with approximate volume of 440 cc. (Figure 1 and Figure 2) Because of these findings, he was then immediately transferred to our institution.

On admission, the patient complained of severe back and abdominal pain. He was in respiratory distress with the

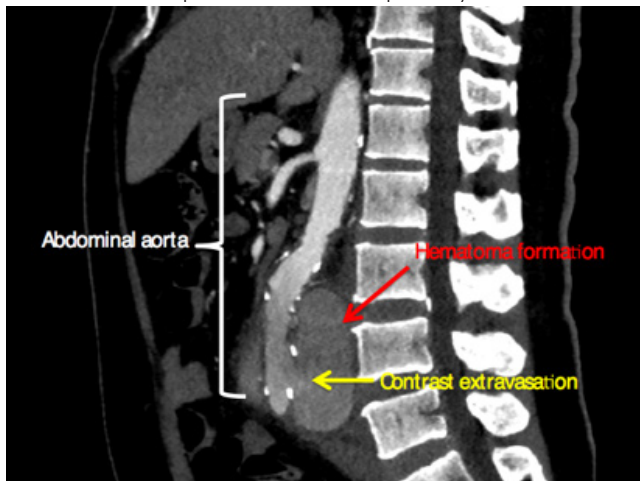


Figure 1. Sagittal view post-contrast image shows discontinuity of the wall of the infrarenal abdominal aorta and active contrast extravasation.

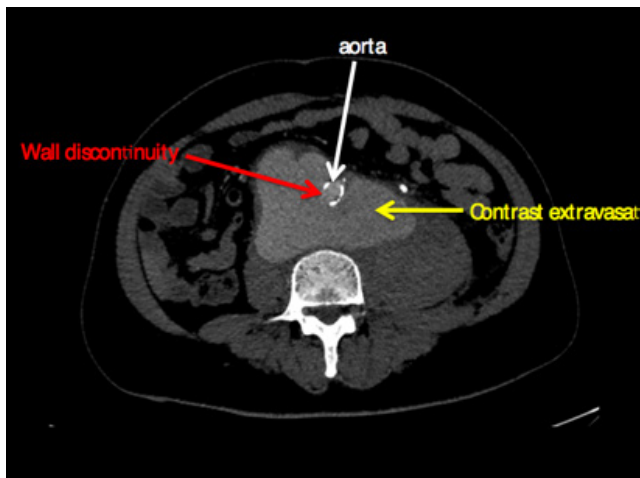


Figure 2. Axial view image shows discontinuity of the infrarenal aorta with active extravasation of contrast in the retroperitoneal region

following vital signs: BP 100/70 mmHg, HR104 bpm, RR 28 cpm, T 38.3, O₂ sat 99% at room air. He had pale palpebral conjunctivae. The abdomen was soft with direct tenderness at the right lower quadrant. Complete blood count revealed anemia (Hgb 85g/L, Hct 26%), leukocytosis with neutrophilic predominance (WBC 14.7 neutrophil 75%) and 693 platelet count. He was started on piperacillin-tazobactam 4.5gm/IV every six hours. He underwent emergency abdominal aortic aneurysm repair, debridement, antibiotic lavage, aortoiliac grafting, anastomosis and omental packing of aneurysmal sac space. (Figure 3). Operative findings include an infrarenal aneurysm with point of rupture at the right posterolateral aspect. There was hematoma and fibrinous material within. Tissue samples were taken from the aortic wall for histopathology and for culture.

Post-operatively, septic work-up was done. Blood cultures did not reveal any significant growth. Treponema pallidum particle agglutination test was negative. Typhidot was positive for both IgM and IgG antibodies, the antibiotic was then shifted to ceftriaxone 2gm/IV every 24 hours. Salmonella infection was considered the likely cause of the prolonged history of fever. Gram stain of the aortic wall did not show any microorganisms. However, there was heavy growth of Salmonella species on the tissue culture, sensitive to ceftriaxone, amoxicillin, ciprofloxacin and trimethoprim sulfamethoxazole, which confirmed our diagnosis. Histopathology showed severe atherosclerosis with calcification and dissection (Figure 4 &5). Defervescence ensued after ceftriaxone was started. He was then discharged improved and on out-patient antibiotic therapy. On follow up after six weeks patient was able to return to activities of daily living and completed ceftriaxone 2gm/IV once a day with no complications. Case timeline is found on Figure 6.

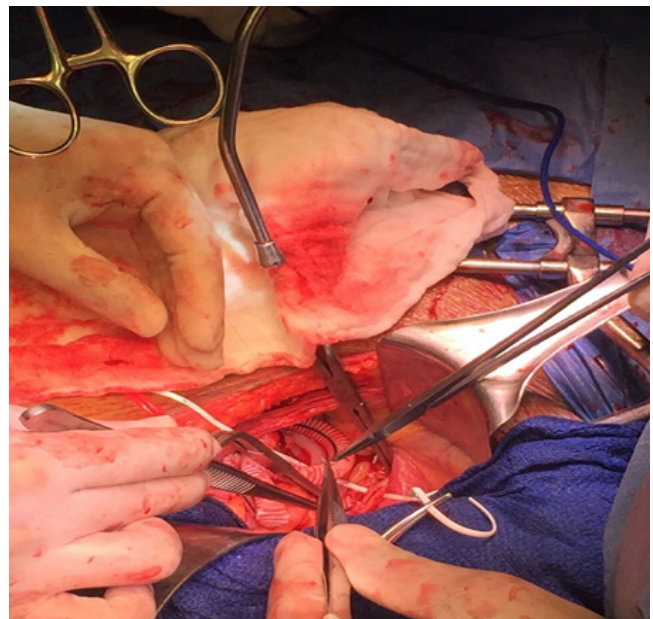


Figure 3. Bifurcation of prosthetic graft at the aorto external iliac tunneled to the left retroperitoneum

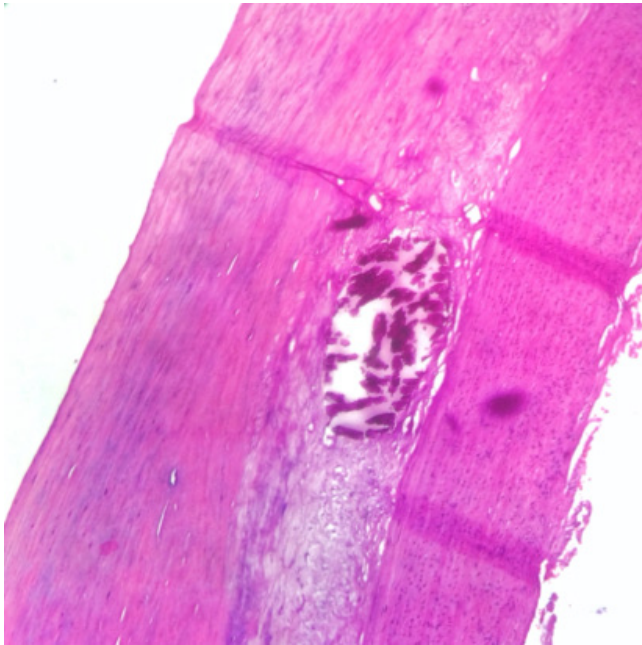


Figure 4. Vessel wall with areas of fibrosis, calcified atherosclerotic plaque and patchy areas of smooth muscle nuclei loss (H&E 100x)



Figure 5. Fragmentation and splitting of elastic fibers (Von Gieson Elastic 100x)

Discussion

Infected aortic aneurysm accounts for less than one percent of all aneurysm undergoing surgery. It can have a fulminant course with frequent aneurysm rupture (>50%) and a high mortality rate of up to 50%.¹ The classic triad includes fever, abdominal, back or chest pain and a pulsatile tender mass.² A high index of suspicion is needed in order to diagnose and treat patients before complications arise. Blood cultures are requested when an infectious cause of aortitis is considered. Staphylococcus aureus, Streptococcus species and Salmonella typhi are the most commonly

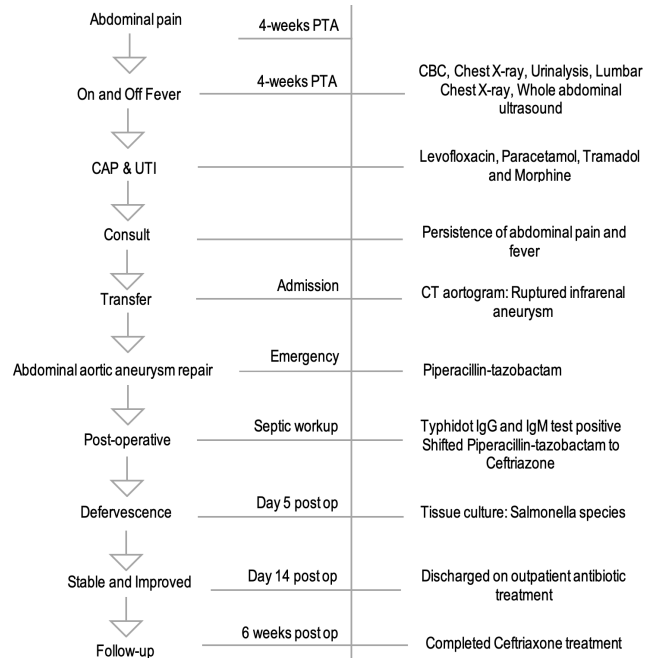


Figure 6. Case timeline summary

isolated organisms.³ Culture-negative cases can confound the diagnosis. This setting is common among those who were given empiric antibiotics before blood cultures were taken, similar to our case. Many studies have already reported cases of mycotic aneurysms with negative blood culture results.⁴⁻⁷ These cases may account for misdiagnosis and deaths confirmed through autopsy. Furthermore, the sensitivity of blood culture for Salmonella was reported to be only 66% (95% CI 56–75%) compared to bone marrow culture. The standard in diagnosis of salmonella infection in the study of Mogasale et al.⁸ is bone marrow culture. In our case, typhidot was used to support our suspicion, the positive IgM, IgG antibodies are consistent with a recent and old salmonella infection. The test is a rapid dot-enzyme immune assay, which detects antigen of Salmonella enterica serotype Typhi.^{9,10} However, the utility of the test is not clear, different studies done showed conflicting results of its sensitivity and specificity compared to either blood or bone marrow cultures.¹¹⁻¹⁴

For mycotic aneurysm, the isolation of the organism from the aorta or aortic thrombus is still the confirmatory test.¹ To our knowledge, no studies have reported the use of typhidot IgM and IgG in this kind of case.

Soravia-Dunand et al. reported early surgical intervention as the treatment of choice since it greatly increases survival.¹⁷ A mortality rate of 40% was reported in their study among those who underwent both medical management and surgical intervention, compared to medical management alone which has a significantly higher mortality rate of 96%.¹⁵ Endovascular aortic repair was done in one case report on a patient with severe comorbidities with good outcome. This was performed on a patient who had good response to

antibiotics and did not present with signs of gross purulence or fistula.¹⁶

Hsu et al. studied the clinical outcomes and risk factors of infected aortic aneurysm. Advanced age, non-salmonella infection and no operation were reported to be the major determinants of mortality.¹⁷ All reported cases recommend the prompt initiation of empiric antibiotics and should be continued for six to eight weeks with frequent follow-ups.¹⁸⁻²³

Conclusion

A ruptured mycotic aneurysm, although rare should be considered as one of the differential diagnosis in an adult diabetic male presenting with the usual symptoms of fever, abdominal and back pain with or without tender pulsatile mass. The typhidot test may be a valuable tool for the rapid diagnosis of salmonella as the etiologic agent for the rupture of the mycotic aortic aneurysm. It can lead to early and proper initiation of antibiotics aside from the standard blood, aorta and aortic thrombus cultures.

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