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Case Report

Streptococcus anginosus bacteremia: a septic IVC thrombus and a large empyema requiring decortication

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ABSTRACT

A previously healthy 39 year old male presented with complaints of cough, fever, abdominal pain and chills. The patient was found to be in active sepsis with hypotension on presentation so was resuscitated while a full septic work-up was ordered. Initial chest X-ray showed only increased broncho-alveolar markings and no consolidations, but blood cultures eventually revealed *Streptococcus anginosus* bacteremia. Intravenous antibiotics were started and infective endocarditis was ruled out. Computerized tomography scan of the abdomen with contrast revealed findings suggestive of a septic hepatic inferior vena cava thrombus and right lower lung findings suggestive of septic embolization and an empyema. Later on during admission, CT scan of the chest with contrast revealed a moderate-sized empyema of the right lung which eventually required decortication. Discovering such findings concurrently in a single patient is extremely rare, particularly an embolizing septic IVC thrombus with confirmed bacteremia. For this reason it is described in the following case presentation.

Keywords: Anginosus, Milleri, Bacteremia, Emboli, Empyema, Decortication

INTRODUCTION

Streptococcus anginosus (SA) is part of the anginosus group streptococci/streptococcus anginosus group (AGS/SAG) family, a subset of the viridans group streptococci. This gram-positive, catalase negative organism is notorious in causing invasive bacterial infections such as multiple abscesses with involvement of numerous organs.[1] This usually occurs by means of hematogenous spread/bacteremia, but another mechanism includes direct spread from a nearby source, such as brain abscesses developing in patients with mastoiditis or sinusitis.[1,2] These abscesses frequently occur in the liver, brain and lungs.[1,3] The main predisposing factor for such infections is immunodeficiency and breach in the normal mucosal barrier .[3] Although most disseminated infections are found in immunocompromised patients, severe and extensive infections have been seen in with immunocompetency, as evident in this case presentation. The most effective treatment of such infections is early administration of appropriate antibiotics.[4]

CASE REPORT

A previously healthy 39 years old male presented to the emergency department complaining of cough since two weeks. A dry and constantly present cough was described that was not related to body position changes or physical activity and interrupted the patient's sleep. Further history revealed that the cough was associated with a fever, chills and pleuritic type chest pain since the same duration, in addition to abdominal pain, which started shortly after. The abdominal pain was described as a severe, constant, generalized and sharp pain that did not radiate and had no exacerbating or relieving factors.

There was no history of night sweats, changes in weight or appetite, constipation, loose stools, vomiting, headache, lower limb pain, radiating chest pain, hemoptysis, hematemesis, melena or dyspnea. It was the first time ever experiencing such an episode. The patient worked an office job, had no significant past medical or surgical history, was not on any regular medication, had no recent travel history, did not smoke or use illicit drugs, occasionally drank alcohol, had no allergies, no close sick contacts and no family history of cancer. It was mentioned however, that almost a week prior to presenting, oral levofloxacin and amoxicillin was prescribed and taken by the patient for these symptoms, but they had no effect and the abdominal pain experienced increased.

On examination, vital signs showed hypotension (96/54 mmHg), a fever of 38.8°C, tachycardia (106 beats per minute) and normal oxygen saturation on room air. The patient was dyspnic and sweating but was well oriented. A regular pulse was palpable bilaterally distally and the patient had normal heart sounds with no murmurs and no jugular venous distension or lower limb edema. Respiratory examination was unremarkable and there were no signs of chronic liver disease, cyanosis, osteoarthropathy, palpable lymph nodes or abnormal skin lesions. The abdomen was non-distended, soft and had positive bowel sounds with generalized tenderness mostly in the right upper quadrant. No organomegaly could be appreciated. Surgical signs including rebound tenderness, Murphey's and McBurney's signs were negative. The patient did not have any meningeal signs and overall neurological examination was not significant.

Vigorous IV fluids, empiric IV ceftriaxone and vancomycin were started alongside a full septic work up including urine and blood cultures being ordered. Blood cultures were collected right before administration of empirical antibiotics. Blood tests were suggestive of an infection, with leukocytosis (15.0, $x10^3/\mu l$), elevated neutrophil count (12.6, $x10^3/\mu l$), high procalcitonin of 0.43 (µg/l) and a C-reactive protein of 234.3 (mg/dl). Slight thrombocytosis of 484 ($x10^3/\mu l$) and normocytic normochromic anemia was noted, with hemoglobin levels of 10.8 (g/dl). Coagulation profile revealed mild derangement with an elevated prothrombin time of 17.2 seconds, international normalized ratio (INR) of 1.34 and an activated partial thromboplastin time of 47.5 seconds. Liver function tests, amylase, lipase, lactate, arterial blood gas analysis and creatinine were normal while D-dimer levels were elevated at 1.5 (ug/ml).

A CXR was done that showed increased broncho-alveolar markings with no other abnormalities, abdominal X-ray and electrocardiogram (ECG) done were both normal. Due to persisting and worsening abdominal pain, CT scan of the abdomen with contrast was done, with results shown in (Figure 1-2). The findings were suggestive of a septic hepatic IVC thrombus, a right sided lung empyema and septic pulmonary emboli. The patient had no clinical findings suggestive of infective endocarditis and bed-side echocardiography showed no suspicious lesions. Eventually resuscitation efforts successfully normalized the patient's vitals and once stabilized the patient was admitted under the internal medicine team as a case of bacteremia complicated by secondary septic thrombus embolization and empyema for further work-up and treatment.

Figure 1: CT scan with contrast of the abdomen showing hypodense material containing small air pockets measuring 37x12 mm within the hepatic inferior vena cava (IVC). Air pockets in thrombus suggestive of septic etiology. Liver architecture, portal vein and mesenteric veins are normal.

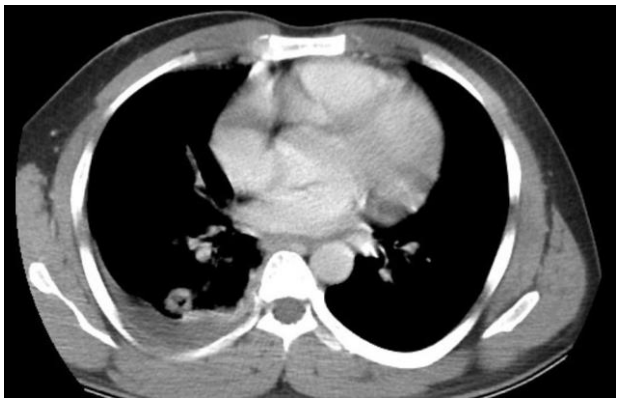

Figure 2: CT scan with contrast of the abdomen showing lower lung fields, the lower sections of the lung with a rounded soft tissue density nodule measuring 15 mm in the basal segment of right lower lobe with central cavitation. Cavitation in nodule suggestive of septic emboli. Minimal right-sided pleural effusion is also noted with thickening and enhancement of the pleura.

Soon after admission, the patient's two blood culture samples revealed the presence of streptococcus anginosus. To further investigate, departmental trans-thoracic and trans-esophageal echocardiographies (TTE, TEE) were done that did not reveal any pathological lesions, such as intra-cardiac vegetations or abscesses. This ruled out a possible primary cardiac focus of infection. The organism was later found to be resistant to

ceftriaxone, hence IV cefepime was started instead. Repeated multiple blood cultures collected since starting the initial IV antibiotics no longer showed bacteremia, even though the patient was still symptomatic. Further testing included a negative tuberculosis-spot (T-spot) test and a negative sputum stain and culture for acid-fast bacilli.

After consulting the vascular surgery team, the patient was started on a therapeutic dose of clexane™ for the IVC thrombus. The cardio-thoracic surgery (CTS) team were also involved, who initially suggested conservative treatment of the right-sided empyema. A few days later, the patient started to experience discomfort from the right side of his chest and was constantly tachycardic and dyspnic. Respiratory examination revealed significantly reduced air entry on the right middle and lower lobe areas of the chest with decreased vocal fremitus and resonance. Percussion revealed stony dullness in the same area with bronchial breathing present above the area. Due to this, a CXR followed by a CT-chest with contrast was conducted that can be seen in (Figure 3-4). A right-sided multi-locular moderate empyema had developed, small cavitating lung lesions could be seen and there was no change in the IVC thrombus size. Chest tube drainage was previously attempted but a lack of fluid drained was the result, likely as the empyema was loculated. Due to this, the decision was made after consent was acquired, to perform decortication on the affected lung by means of an open thoracotomy procedure by the CTS team.

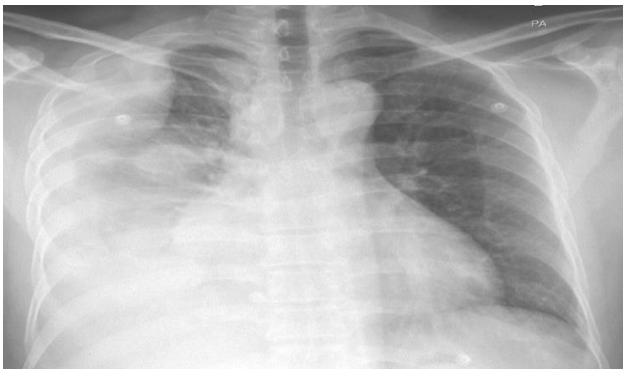

Figure 3: Chest X-ray, an encysted right large pleural effusion can be appreciated. Fissural encysted effusion is also seen with air space consolidation in the right middle and lower lung zones.

After stopping anti-coagulation for the procedure, the patient was taken to the operating theatre. An open thoracotomy was performed, revealing thickened pleura with multiple pus flakes that were removed during the process of decortication. Following this, a right-sided open chest tube was inserted into the affected lung that initially could not fully expand. Once decortication was complete, full expansion of the right lung lobes was achieved; hence the thoracic cage was closed while securing the chest tube in place. Samples and biopsies were taken from the pleura and the pleural space during the procedure, which were sent for microbiological cultures and to the histopathology lab.

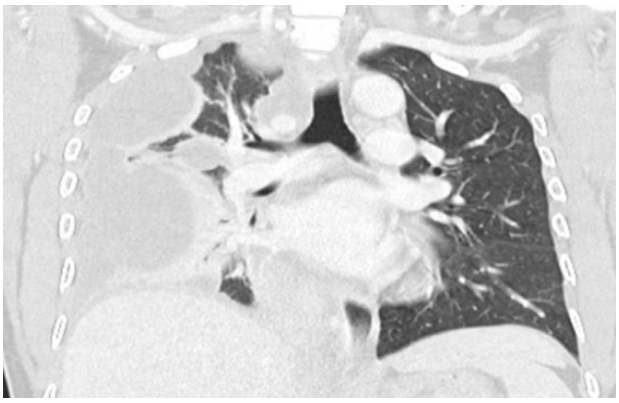

Figure 4: CT scan with contrast of the chest showing right sided moderate pleural effusion with loculation extending to the major and minor fissures causing pleural enhancement. The pulmonary artery and it's branches appear normal with no filling defects. Partial collapse of the right lower lung and small cavitary lesions are also seen.

Figure 5: Chest X-ray, day 4 post-decortication of right lung with chest tube insertion. Moderate right pleural effusion is seen extending along the right lateral costal margin. Right chest tube is seen with tip along medial aspect of the right lower lung zones. Lungs otherwise clear with no consolidations.

On the fourth post-operative day, the chest tube, which was draining fluid resembling moderate amounts of pus and some blood, was finally removed. Thankfully, a repeat CXR showed much improvement in the patient's lungs with good expansion (Figure 5). These finding's reflected the patient's clinical status at the time, as the patient no longer had complaints similar to the initial presentation and had stable vitals. Biopsies and samples collected were negative for any microorganism growth and final histopathological examination revealed necrotic tissue with hemorrhage, fibrin, granulation tissue and no evidence of malignancy. Additionally, drained pleural fluid analysis performed was suggestive of an exudative etiology. Soon after completing the course of antibiotics,

the tube was removed and the patient was discharged from the hospital free of complaints.

DISCUSSION

Streptococcus anginosus (SA), *Streptococcus intermedius* (SI) and *Streptococcus constellatus* (SC) together are referred to as the anginosus group streptococci/streptococcus anginosus group (AGS/SAG) family. The AGS, previous known as the milleri group streptococci, are a subgroup of the viridans streptococci, whom are gram-positive, catalase negative, non-motile facultative anaerobes. These organisms are part of the normal flora, often in the oropharynx, gastrointestinal system and urogenital system.[5] They are generally non pathogenic but can cause abscess formation in patients with decreased immunity such as in cancer patients, diabetics as well as those with poor oral cavity hygiene.[3] SA is mainly pathogenic due to the production of intermedilysin, which is an exotoxin produced by the organism and become more pathogenic with mucosal breakage as with trauma or surgery.[6,3] SA bacteremia however, usually originates from the oral cavity or gastrointestinal tract when mucosal integrity is breached.[7] There are many potentially fatal complications of SA bacteremia that include endocarditis, cardiac abscesses, meningitis, septic arthritis and abdominal abscesses.[7] A special feature of this bacteria is the ability of the organism to remain active within their abscesses, making them more pathogenic.[2] Of the AGS, SA and SC are most likely to produce deeply seated abscesses like hepatic and brain abscesses.[8] Empyema is considered to be the most common pulmonary complication of SA infection but other types of pulmonary involvement include mediastinitis and pulmonary abscesses.[9] Such pulmonary findings are described in this case report, where the patient developed an empyema that required decortication.

The following case depicts a rare clinical situation where SA bacteremia likely formed a septic thrombus focus in the IVC that embolized to the lungs, causing a large empyema requiring decortication. It is plausible that the septic emboli derived from another source, however with the presence of bacteremia, severe abdominal pain and an IVC thrombus found on CT, this seems most likely to be the origin. Although AGS are known to be associated with abscess formation, particularly in the lungs, actually discovering the organism in a blood culture concurrently with a septic IVC thrombus and a large empyema is extremely rare.[10] Articles have reported incidences of AGS causing abscesses and occasional thrombophlebitis previously, however positive pus/abscess cultures for the organism are often detected rather than bacteremia.[5,10] A rare case of AGS septic thrombophlebitis has been reported previously in the ovarian vein with extension, but not with such extensive consequences, positive blood cultures and the requirement of an invasive procedure during management.[10]

In regards to the management of pyogenic infections caused by SA, the most important component of management seems to be that appropriate antibiotics should be administered early. According to literature, most isolates are susceptible to penicillin group antibiotics, specifically amoxicillin.[2] Aminoglycosides are sometimes added for proper coverage in case of resistance.[2] The SA isolated in our presented case was resistant to ceftriaxone but not to cefepime or vancomycin. As a general rule of thumb, all SA blood stream infections should be treated early with parenteral antibiotics to prevent fatal consequences including multiple organ involvement and abscess formation. For this reason, deep-seated infections and abscesses should be searched for in cases of SA bacteremia. Although briefly utilized in management of the presented case, no clear recommended guidelines were found in regards to the use of anti-coagulation in treating SA associated thrombi. The necessity to follow-up such thrombi with scans to monitor efficacy of treatment is also unclear.[10] However, few studies have reported success with the use of therapeutic doses of anticoagulation for septic thrombophlebitis associated with AGS.[10] Furthermore, work-up for occult malignancies may be wise when encountering SA bacteremia, as colon carcinoma has been reported as an occasional association.[6]

CONCLUSION

Due to its potential to affect multiple organ systems, streptococcus anginosus bacteremia is an infection that requires a treating physician's utmost attention. Early treatment is crucial to prevent worsening of infection with complications such as the formation of infective collections including abscesses and empyemas.

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REFERENCES

1. Esplin N, Stelzer J, All S, Kumar S, Ghaffar E, Ali S. A case of streptococcus anginosus brain abscess caused by contiguous spread from sinusitis in an immunocompetent patient. Cureus. 2017;9(10):1-11.
2. Giuliano S, Rubini G, Conte A, Goldoni P, Falcone M, Vena A, et al. Streptococcus anginosus group disseminated infection: case report and review of literature. Infez Med. 2012;20(3):145-54.
3. Erdem I, Dogru M, Emir S, Ali R, Elbasan S, Mutlu R, et al. Unusual Presentation of Streptococcus anginosus With Severe Sepsis, Liver Abscess Secondary to Biliary Tract Perforation. J Med Cases. 2015;6(11):508-11.
4. Al-Saffar F, Torres-Miranda D, Ibrahim S, Shujaat A. How an opportunistic infection can mess with your brain and take your breath away: a rare case of simultaneous lung and brain abscess due to

streptococcus anginosus. Case Rep Infect Dis. 2015;2015:1-3.
5. Jimenez J, Vahdat K, Santiago I, Hernandez M, Isache C, Sands M. Thalamic bacterial abscess presenting with hemiparesis and expressive aphasia. ID Cases. 2018;13(417).
6. Rawla P, Vellipuram A, Bandaru S, Raj J. Colon carcinoma presenting as streptococcus anginosus bacteremia and liver abscess. Gastroenterol Res. 2017;10(6):376-9.
7. Palacio F, Lewis J, Sadkowski L, Echevarria K, Jorgensen J. Breakthrough bacteremia and septic shock due to streptococcus anginosus resistant to daptomycin in a patient receiving daptomycin therapy. Antimicrob Agents Chemother. 2011;55 (7):3639-40.
8. Finn T, Schattner A, Dubin I, Cohen R. Streptococcus anginosus endocarditis and multiple liver abscesses in a splenectomised patient. BMJ Case Rep. 2018;224-66.
9. Madrid-Carbajal C, Molinos L, García-Clemente M, Pando-Sandoval A, Fleites A, Casan-Clara P. Pleural effusion due to streptococcus milleri: case descriptions. Arch de Bronconeumol. 2014;50(9): 404-6.
10. Haidar A, Haddad A, Naqvi A, Onyesoh N, Malik R, Williams M. Streptococcus constellatus causing septic thrombophlebitis of the right ovarian vein with extension into the inferior vena cava. Case Rep Infect Dis. 2015;2015:1-5.

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