GROUP B STREPTOCOCCUS MYCOTIC ANEURYSM OF THE THORACIC AORTA: A CASE REPORT AND LITERATURE REVIEW

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Abstract. Group B streptococci are an uncommon cause of mycotic aneurysm. We report here the case of a mycotic aneurysm caused by *Streptococcus agalactiae*. A 67-year-old male presented to our hospital with a 2-week history of progressive hoarseness, weight loss, odynophagia. He denied fever or dysphagia. On examination he was afebrile with a normal pulse rate and blood pressure. He had a white plaque in the mouth. He had left vocal cord paralysis. His heart and lung sounds were normal. His white blood cell count in the blood was 10,330 WBC/mm$^3$ with 82% neutrophils. Computed tomography of his chest showed a saccular thoracic aortic aneurysm 4.9 cm in diameter that extended from the distal aortic arch to the proximal part of the descending aorta. The patient was presumed to have a mycotic aortic aneurysm. He was started on ceftriaxone empirically. A total aortic arch replacement was performed 3 days after starting antimicrobial treatment. Amplification and sequencing of the bacterial 16SrRNA gene from the resected aortic wall revealed *S. agalactiae*. Blood cultures were negative and tissue biopsy of the aortic wall revealed no organisms on Gram stain or bacterial culture. After surgery the patient was continued on 6 weeks of intravenous antimicrobial therapy. The patient improved and he went home in good condition. *Streptococcus agalactiae* can cause mycotic aortic aneurysm.

Keywords: group B Streptococcus, *Streptococcus agalactiae*, mycotic aneurysm, infected aortic aneurysm

INTRODUCTION

Mycotic aortic aneurysms are rare. The causative agents of infected aortic aneurysms vary by country; *Staphylococcus aureus* is the most common pathogen in western countries (Oderich *et al.*, 2001) and non-typhoid *Salmonella* is the most common pathogen in Asia (Hsu *et al.*, 2004). In Thailand, 70% of mycotic aneurysms are due to *Burkholderia pseudomallei* or non-typhoid *Salmonella* species (Anunna-n 시작*et al.*, 2008). The incidence of invasive infections caused by group B *Streptococcus* (GBS) among non-pregnant adults is increasing (Chaiwarith *et al.*, 2011), and several cases of mycotic aneurysm due to GBS have been reported (Ledochowski...
et al, 2014). We report here a case of mycotic aortic aneurysm caused by GBS in Thailand that was resolved with surgical and antibiotic therapy.

CASE REPORT

A 67-year-old Thai man with a history of poorly controlled diabetes mellitus type 2 was admitted to Siriraj Hospital, Bangkok, Thailand with a 2-week history of progressive hoarseness and odynophagia. The odynophagia was rated as 4 out of 10 in severity and occurred even with swallowing water. He had lost 10 kg of body weight in the month prior to presentation. He denied having fever, epistaxis, dysphagia, trismus, neck or ear pain, cough, hemoptysis, orthopnea, paroxysmal nocturnal dyspnea or edema. His symptoms were not associated with any specific position or movement. He is a retired government officer with a history of multiple sexual partners without condom use over a 40-year period. He had a 30 pack-year smoking history and drank alcohol daily for the past 30 years. His medications at presentation were metformin 1,700 mg/day and glipizide 10 mg/day.

On physical examination his temperature was 36.5°C, his pulse rate was 90/min, his blood pressure was 119/69 mmHg, his respiratory rate was 16/min, and his oxygen saturation was 96% on room air. He had white oral plaque in the mouth but no masses or ulcers. The heart and lung sounds were normal. He had no hepatosplenomegaly or lymphadenopathy and his neurological examination was unremarkable.

On laboratory investigation, his complete blood count revealed a hemoglobin of 11.5 g/dl, a leukocyte count of 10,330/mm³ with 81.8% neutrophils and 10.6% lymphocytes and a platelet count of 454,000/mm³. His HbA1C was 11.2%. His creatinine level was 0.73 mg/dl; his AST and ALT were 17 and 13 U/l, respectively; and his albumin level was 2.9 g/dl. His anti-HIV test was non-reactive. His chest radiograph was unremarkable. Laryngoscopy revealed left vocal cord paralysis. Esophagogastroduodenoscopy also revealed left true vocal cord paralysis without evidence of esophageal abnormalities.

Computed tomography of his chest with contrast (Fig 1) revealed large outpouching of contrast into a pseudoaneurysm surrounding the proximal descending thoracic aorta with a thick enhancing wall, suggestive of a mycotic aneurysm.
The aneurysm diameter was 4.9 cm.

His blood culture were negative. Transthoracic echocardiography revealed no evidence of infective endocarditis. He was started on intravenous ceftriaxone and surgery was performed three days later. The aneurysm was excised and a Gelweave™ graft was used to reconstruct and re-establish continuity of the aorta. Tissue biopsy of the aortic wall revealed no polymorphonuclear cells or bacteria on Gram stain or culture. Amplification and sequencing of the bacterial 16S rRNA gene revealed \textit{S. agalactiae} in the tissue of the aortic wall. Based on the PCR results, intravenous ceftriaxone was given for 6 weeks. At the 2-month follow-up visit post-hospitalization, the patient had improved significantly and was clinically in good condition.

**DISCUSSION**

\textit{Streptococcus agalactiae} is a gram-positive bacterium belonging to Lancefield group B (Edward and Baker, 2015). Group B streptococci (GBS), colonizes the vagina, gastrointestinal tract, and/or upper respiratory tract (Edward and Baker, 2015). GBS can cause postpartum infection and neonatal sepsis (Edward and Baker, 2015). \textit{S. agalactiae} is an emerging pathogen in young adults, the elderly, and patients with comorbidities such as diabetes mellitus, malignancies, and cardiovascular diseases (Edward and Baker, 2015). Common clinical manifestations of GBS infection include bacteremia, arthritis, cellulitis, and meningitis (Chaiwarith \textit{et al}, 2011; Edward and Baker, 2015). Although GBS is associated with a variety of infections, including endocarditis, mycotic aneurysm due to GBS is rare (Burnet \textit{et al}, 1990).

The term mycotic aneurysm was first used by William Osler in 1885 to describe vegetation on the internal surface of the aorta that looked like “fresh fungus”, and hence he coined the term “mycotic” (Edward and Baker, 2015). This term is now used to describe all types of infected aneurysms, except syphilitic aortitis. Causes of mycotic aneurysms include trauma, infection from a contiguous site, hematogenous seeding secondary to bacteremia, and embolization into the vasa vasorum, generally secondary to endocarditis (Chan \textit{et al}, 1989). In our case, bacterial endocarditis was ruled out, there was no evidence of skin or soft tissue infection, arthritis, or history of trauma. Therefore, hematogenous seeding from primary bacteremia is the most likely route of infection in the reported case. Impaired immunity caused by diabetes mellitus was the only significant risk factor identified in this patient.

The first case of mycotic aneurysm caused by \textit{S. agalactiae} was described by Blackett \textit{et al} (1989) in a patient without endocarditis. Our review of the English language literature for reports on mycotic aneurysm caused by \textit{S. agalactiae} revealed 12 case reports in the PubMed database (Table 1). The mean age of these 12 cases was 64 years and the most common complaints were pain (75%) and fever (67%). Some cases presented with symptoms of the aneurysm compressing an adjacent organ. The most common location involved by the mycotic aneurysm was the abdominal aorta. Blood cultures were positive in only half of patients, but tissue cultures were positive in all patients. A noteworthy point is the absence of endocarditis in all patients. Half the cases occurred in Asia.

Antibiotic therapy and surgical debridement (aneurysm excision) have been recommended to treat mycotic aneurysms (Valentine and Chung, 2012). Aneurysm
<table>
<thead>
<tr>
<th>Reference</th>
<th>Age in years, gender</th>
<th>Clinical presentation</th>
<th>Location</th>
<th>Hemoculture result</th>
<th>Tissue culture result</th>
<th>Infective endocarditis present</th>
<th>Type of surgery</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackett et al, 1989</td>
<td>61, male</td>
<td>Fever, lumbar pain</td>
<td>Abdominal aorta</td>
<td>Negative</td>
<td>Positive</td>
<td>No</td>
<td>Excision and grafting</td>
<td>Cured</td>
</tr>
<tr>
<td>Burnet et al, 1990</td>
<td>N/A</td>
<td>Hemorrhagic shock, acute limb ischemia</td>
<td>Femoral artery</td>
<td>Negative</td>
<td>Positive</td>
<td>No</td>
<td>Femoral clipping and amputation of limb</td>
<td>Cured</td>
</tr>
<tr>
<td>Akashi et al, 2000</td>
<td>61, female</td>
<td>Fever with dyspnea, pericarditis</td>
<td>Ascending thoracic aorta</td>
<td>Positive</td>
<td>Positive</td>
<td>No</td>
<td>Excision and grafting</td>
<td>Cured</td>
</tr>
<tr>
<td>Andreasen et al, 2001</td>
<td>40, male</td>
<td>Fever, abdominal pain</td>
<td>Abdominal aorta</td>
<td>Negative</td>
<td>Positive</td>
<td>No</td>
<td>Bypass surgery</td>
<td>Cured</td>
</tr>
<tr>
<td>Iwaki et al, 2006</td>
<td>59, male</td>
<td>Chest pain, dyspnea</td>
<td>Aortic arch</td>
<td>Positive</td>
<td>N/A</td>
<td>N/A</td>
<td>Excision and grafting</td>
<td>Cured</td>
</tr>
<tr>
<td>Chandrikakumari et al, 2008</td>
<td>69, male</td>
<td>Abdominal pain</td>
<td>Abdominal aorta</td>
<td>N/A</td>
<td>Positive</td>
<td>No</td>
<td>Excision and grafting</td>
<td>Cured</td>
</tr>
<tr>
<td>Yamamoto et al, 2009</td>
<td>50, male</td>
<td>Fever, low back pain</td>
<td>Abdominal aorta</td>
<td>Positive</td>
<td>N/A</td>
<td>N/A</td>
<td>Excision and grafting</td>
<td>Cured</td>
</tr>
<tr>
<td>Masuhara et al, 2010</td>
<td>59, female</td>
<td>Hemoptysis</td>
<td>Descending aorta</td>
<td>N/A</td>
<td>Positive</td>
<td>N/A</td>
<td>Excision and patchplasty</td>
<td>Cured</td>
</tr>
<tr>
<td>Thawiet al, 2012</td>
<td>74, male</td>
<td>Fever, lumbar pain</td>
<td>Abdominal aorta</td>
<td>Negative</td>
<td>Positive</td>
<td>No</td>
<td>Excision and grafting</td>
<td>Cured</td>
</tr>
<tr>
<td>Cozijnzen et al, 2013</td>
<td>66, male</td>
<td>Abdominal pain</td>
<td>Thoracoabdominal aorta</td>
<td>Positive</td>
<td>N/A</td>
<td>No</td>
<td>Excision and grafting</td>
<td>Cured</td>
</tr>
<tr>
<td>Ledochowski et al, 2014</td>
<td>86, male</td>
<td>Fever, abdominal pain</td>
<td>Abdominal aorta</td>
<td>Positive</td>
<td>N/A</td>
<td>No</td>
<td>Stent graft and bypass surgery</td>
<td>Cured</td>
</tr>
<tr>
<td>Matsuda et al, 2014</td>
<td>78, male</td>
<td>Dyspnea, pericarditis</td>
<td>Aortic arch, femoral artery</td>
<td>Positive</td>
<td>N/A</td>
<td>No</td>
<td>No surgery due to high risk</td>
<td>Dead</td>
</tr>
<tr>
<td>Present case</td>
<td>67, male</td>
<td>Hoarseness, weight loss</td>
<td>Descending aorta</td>
<td>Negative (Positive PCR)</td>
<td>Positive</td>
<td>No</td>
<td>Excision and grafting</td>
<td>Cured</td>
</tr>
</tbody>
</table>

N/A, not available; PCR, polymerase chain reaction.
excision and ligation, with or without arterial reconstruction, should be performed in low-risk patients. For high-risk patients in whom excision and ligation surgery cannot be performed, endovascular aneurysm repair (EVAR) should be considered for palliative treatment (Chan et al, 1989). Antibiotics are recommended for at least 6 weeks after surgery, and antibiotics should be given for 2–4 weeks prior to surgery (Valentine and Chung, 2012). If aneurysm excision and ligation surgery cannot be performed and EVAR is considered for palliative treatment during active infection, suppressive lifelong oral antibiotics should be given (Chan et al, 1989). In the 12 previous cases reported in the literature, surgery was performed in all but one. The most common antibiotic used was penicillin; the disease prognosis was satisfactory for all patients, except the patient that was too high-risk to undergo surgery.

In conclusion, we report here a case of infected aortic aneurysm caused by GBS, in which the patient responded satisfactorily to surgery and antibiotic therapy.

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REFERENCES


