

Streptococcus pasteurianus Mycotic Aneurysm of the Left Common Iliac Artery: Uncommon Manifestation of an Unusual Pathogen

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ABSTRACT

We report a case of 64-year-old diabetic man presented with a gradual-onset left hip pain for one week followed by high grade fever and progressive abdominal pain at left lower quadrant region with an equivocal peritoneal irritation sign. Computed tomography of abdomen revealed a mycotic aneurysm of the left common iliac artery with surrounding fluid collection, subsequently diagnosed as concealed rupture of mycotic aneurysm. His blood culture grew *Streptococcus pasteurianus* and high-dose penicillin G sodium was administered as a specific treatment. He was successfully treated with intravascular stent graft insertion and femoro-femoral crossover bypass. Echocardiography showed no vegetation. He was complicated by bilateral psoas abscesses, spondylodiscitis, epidural abscess and recurrent pseudoaneurysm of both common iliac arteries resulting in arterial bypass surgery. After a 69-day admission, he was improved and discharged from the hospital. To our knowledge, this is the first case of left common iliac artery infection caused by *S. pasteurianus*. (*J Infect Dis Antimicrob Agents* 2011;28:183-90.)

Note: This case had been presented and discussed in the Interhospital Case Conference on Infectious Diseases (ICCID), 18 March 2011, Bangkok, Thailand.

INTRODUCTION

Mycotic aneurysm is a rare medical condition but can be life-threatening. Even with a combination of surgical and antimicrobial therapy, the mortality

rate is as high as 16-44%.¹⁻² The most common pathogens causing mycotic aneurysm include *Staphylococcus aureus*,¹⁻⁵ nontyphoidal *Salmonella* spp.,²⁻⁶ and *Burkholderia pseudomallei*.⁷ Although

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Received for publication: May 23, 2011.

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Streptococcus spp. has been documented as a causative agent of mycotic aneurysm,^{1,6,8} *Streptococcus pasteurianus* (former *Streptococcus bovis* biotype II/2) has been rarely reported as a cause of this disease entity. Isolated iliac artery aneurysm accounts for less than 7% of all intra-abdominal aneurysms and was found in only 0.03% of the population in autopsy study.⁹ Furthermore, mycotic aneurysm of the iliac artery is much less common than that of abdominal or thoracic aorta.³

To our knowledge, there is no case report of mycotic aneurysm of the iliac artery caused by *S. pasteurianus*. We describe here the first report of a patient with mycotic aneurysm of left common iliac artery caused by this uncommon pathogen.

CASE REPORT

A 64-year-old man with a history of hypertension, hypercholesterolemia and poorly controlled diabetes mellitus was admitted to Siriraj Hospital with a 2-day history of high grade fever and left lower quadrant abdominal pain. One week prior to admission, the symptom began with a gradual onset of left hip pain which was aggravated by motion and fairly alleviated by taking acetaminophen. He denied history of trauma at hip area prior to his complaint. He also had neither dysuria nor diarrhea. He is a social drinker and smokes approximately 40 pack-years.

On admission, physical examination revealed his temperature was 38°C, heart rate was 92/min, blood pressure was 130/70 mmHg and respiratory rate was 24/min. He appeared acutely ill and mildly pale. Neither abnormal heart sound nor adventitious sound was heard by cardiac and pulmonary auscultation. His abdomen was mildly distended with hypoactive bowel sounds. There was moderate tenderness on palpation at both sides of lower abdomen which was more prominent on the left without sign of peritoneal

irritation. Neither tenderness nor limitation of range of motion of his left hip was detected on examination.

Complete blood count showed that white blood cell count was 24,860 cells/mm³ with 88% neutrophils, 9% lymphocytes, and 3% monocytes. Hemoglobin level was 8.5 g/dL and platelet count was 324,000 cells/mm³. His blood glucose was 333 mg/dL and HbA_{1C} was 9.0 %. Renal function test and liver function test were unremarkable except for a low serum albumin (2.8 g/dL). His chest radiograph showed increased cardiothoracic ratio, bilateral interstitial infiltration, and small amount of right pleural effusion. Bowel ileus without peritoneal free air was discovered in plain film of abdomen in supine and upright positions. Therefore, early sepsis with diverticulitis was suspected. Accordingly, two sets of blood were collected for aerobic culture using a BACTEC™ automated culture system (BD, MD, USA) and imipenem/cilastatin was given as an empirical treatment while blood culture results were pending.

Computerized tomography (CT) of abdomen discovered the leakage of contrast medium from the left common iliac artery with a 4-cm. soft tissue density surrounding and abnormal soft tissue shadow posterior to the left and right of iliopsoas muscles which was suggestive of collection or abscesses (Figure 1). The diagnosis of mycotic aneurysm of left common iliac artery with leakage and suspected abscesses formation was made. Abdominal computerized tomographic angiography (CTA) was performed to confirm the location and extension of the aneurysm. Multislice with tridimensional reconstruction confirmed the existence of aneurysm as shown in Figure 2, but active extravasation of contrast medium was not definitely demonstrated. The patient was successfully intervened by preoperative coil embolization of left internal iliac artery which caused obliteration of both anterior and

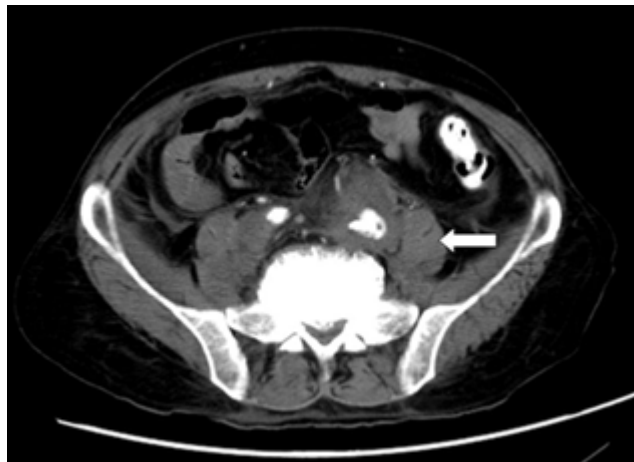


Figure 1. CT of abdomen at admission showed leakage of contrast medium from the left common iliac artery with a soft tissue density surrounding (4 cm in diameter) and abnormal soft tissue shadow posterior to both iliopsoas muscles.

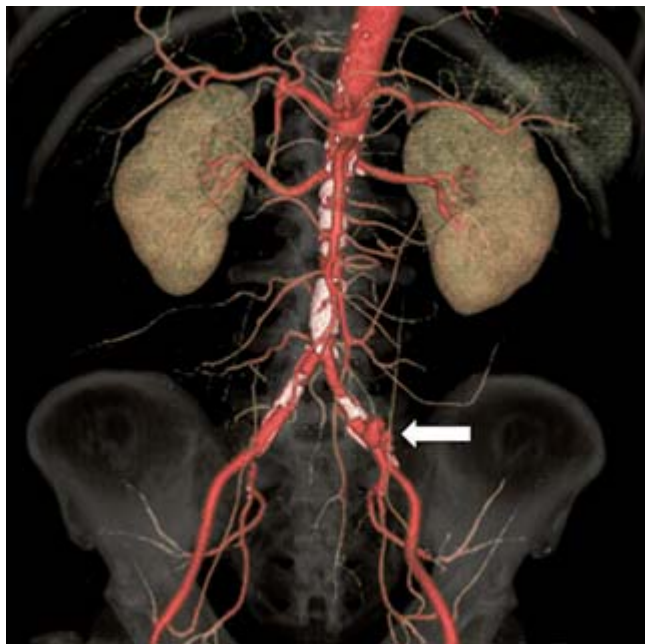


Figure 2. Multislice tridimensional reconstruction of abdominal CTA showed mycotic aneurysm at left common iliac artery. Atherosclerotic change along abdominal aorta and both common iliac arteries was also depicted.

posterior branches. Subsequently, he underwent intravascular stent graft insertion of the left common iliac artery with femoro-femoral crossover bypass surgery. However, open surgery was eventually achieved because there was a complete occlusion of stent graft. Consistent to the angiogram results, concealed rupture of saccular aneurysm of the left common iliac artery at approximately 3 cm. from aortic bifurcation was detected intraoperatively. The patient was successfully operated without immediate complication and unfractionated heparin was administered to prevent thromboembolism after surgery.

During the early postoperative period, the patient was clinically stable but still had fever. His body temperature was 38.0-38.5°C. Three days after admission, one of the two blood cultures grew an α -hemolytic streptococci. The organism was positive for bile esculin hydrolysis, contained group D-specific antigen, but negative for pyrrolidonyl arylamidase (PYR) and 6.5% NaCl tolerance tests. Therefore, it was identified as group D streptococci (GDS). Further identification of this GDS into species was carried out by using VITEK[®] 2 microbial identification system (BioMerieux, Durham, NC, USA). The result revealed that it was *S. pasteurianus*. The organism was susceptible to penicillin with the minimum inhibitory concentration (MIC) for penicillin of 0.094 µg/mL. Accordingly, antimicrobial was deescalated from imipenem/cilastatin to penicillin G sodium (PGS). Transthoracic echocardiographic study was subsequently performed and no evidence of infectious vegetation was found.

At the end of the first week after operation, he still had intermittent fever with complaint of unimproved left hip pain. Neither sign of surgical site infection nor other possible sources of infection was noted. Adjacent organ abscesses as the complication of mycotic

aneurysm was suspected and therefore abdominal CT was requested. As expected, bilateral psoas abscesses with multiple tiny abscesses in the pelvic cavity were found (Figure 3). However, these abscesses were too small to perform surgical intervention.

During the second week after operation, fever and left hip pain began to subside but he developed persistent low back pain without neurological deficit. Magnetic resonance imaging (MRI) of the L-S spine was performed but there were several limitations due to artifact from stent graft and coil as well as motion artifact. However, spondylodiscitis of L5 to S1 with phlegmon and epidural abscess extended from L4-5 intervertebral level to the lower end plate of S1 vertebra were discovered (Figure 4). Conservative treatment with intravenous penicillin was continued and fever was completely subsided with favorable progress during the third week of antimicrobial treatment. His subsequent blood culture became negative and serial C-reactive protein (CRP) was continuously decreased. Finally, considering the risk of colonic cancer associated with *S. bovis* infection, double contrast barium enema was performed to screen for gastrointestinal tract lesions. The result demonstrated only multiple colonic diverticula at the ascending colon and cecum without intraluminal filling defect.

One month after surgical and antimicrobial therapy, he had no fever with marked improvement of clinical signs and symptoms. Follow-up imaging revealed a well patent left femoro-femoral bypass graft with unchanged perianeurysmal soft tissue density and a focal dissecting aneurysm at proximal part of right common iliac artery which became larger when compared with the previous study. There was no significant change of the psoas and epidural abscesses. Pseudoaneurysms of both common iliac arteries were suspected. Therefore, right axillo-bifemoral artery

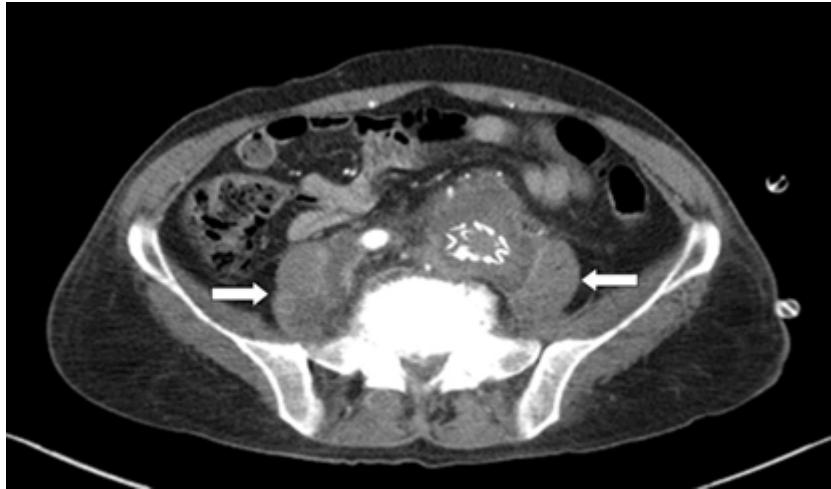


Figure 3. CT abdomen at the end of first week of treatment demonstrated bilateral psoas abscesses with multiple tiny abscesses in the pelvic cavity.

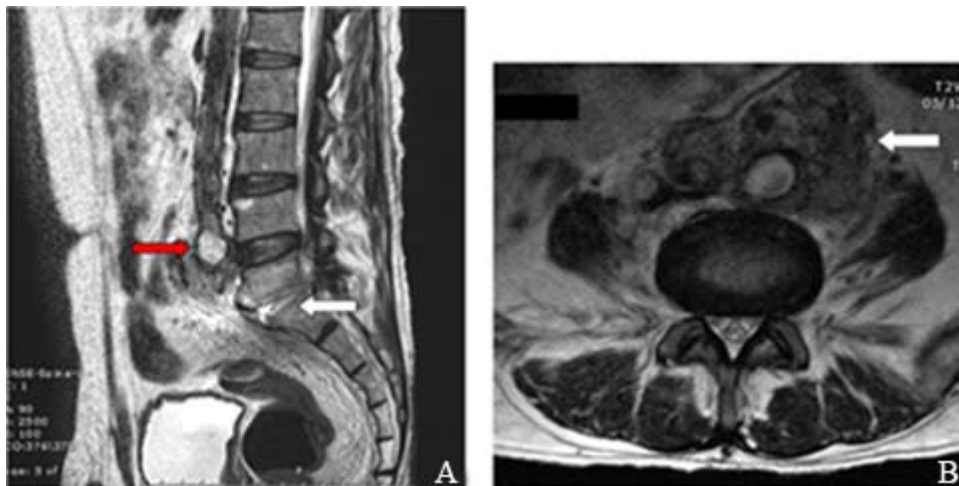


Figure 4. MRI of the L-S spine in T2W during the second week of treatment revealed
A. spondylodiscitis of L5 to S1 (white arrow) with phlegmon (red arrow) and
B. epidural abscess extended from L4-5 intervertebral level to the lower end plate of S1 vertebra.

bypass with ligation of abdominal aorta at the level below inferior mesenteric artery and distal common carotid artery were performed. The content of right common iliac pseudoaneurysm was found to be hemolyzed blood and this content as well as the aneurysmal wall were sent for bacterial and fungal culture and the results were no growth.

Intravenous PGS was switched to oral levofloxacin at day 51 as the patient was clinically stable and he was eventually discharged after 69 day of admission. He was doing well after discharge with normal laboratory tests. CT of lower abdomen 4 months later showed significant decrease in size of collection around the left common iliac artery

(from 3.8 x 4.8 to 0.9 x 0.7 centimeter), healed spondylodiscitis at L5-S1 intervertebral disc space and disappearance of epidural abscess.

DISCUSSION

In a review of more than 22,000 autopsies performed at the Boston City Hospital from 1902 to 1951, aortic aneurysms were found in 1.5% and mycotic aneurysms constituted only 2.6% of these lesions.⁸ In study at Mayo clinic, less than 1% of 7,274 patients who underwent repair of aortic aneurysm were diagnosed as mycotic aneurysm.¹⁰ Any artery can be infected but iliac artery is an uncommon location as described in many studies.^{2,3,11-13} *Salmonella* species and *S. aureus* seems to be the most common causative agents of mycotic aneurysm.¹⁻⁶ *Streptococcus* species is shown to be one of the common pathogens of mycotic aneurysm in some studies.^{1,6,8} *S. pasteurianus* (also named *Streptococcus gallolyticus* subsp. *pasteurinus*) belongs to the group D streptococci, and is previously recognized as *S. bovis* biotype II/2. The organism is the normal bowel flora in 5-10% of adults.¹⁴

Biochemical characteristics that could be used to differentiate *S. pasteurianus* from other species of GDS were shown in Table 1.

Clinical presentations of diseases caused by *S. pasteurianus* include bacteremia and systemic infections. To our knowledge, there are only a few reports describing mycotic aneurysm caused by *S. bovis* and most of them related to infective endocarditis.¹⁵⁻¹⁸ There are four different mechanisms that have been postulated for infection of the arterial wall; (1) being secondary to septic microemboli to vasa vasorum (embolomycotic aneurysms), (2) extension from a contiguous infected focus, (3) hematogenous seeding during bacteremia from a distant infection and (4) trauma to the arterial wall with direct contamination.⁸ The infection of arteries in our patient was most likely due to a preexisting psoas abscesses or hematogenous spreading during bacteremia as evidence of endocarditis was not observed.

It has been known that there is a strong link

Table 1. Biochemical characteristics of the isolate from this case and the four species of group D streptococci.

Characteristic	Our isolate	<i>S. pasteurianus</i>	<i>S. gallolyticus</i>	<i>S. infantarius</i>	<i>S. lutetiensis</i>
Production of:					
β-Galactosidase	+	+	-	-	-
APPA	-	-	-	+	-
Acid production from:					
amygdalin	+	+	+	-	+
galactose	+	+	+	-	+
mannitol	-	-	+	-	-
salicin	+	+	+	-	+
trehalose	+	+	+	-	-
pullulan	-	-	+	-	-

between *S. bovis* infection and bowel disease. Colonic carcinoma has been reported in up to 50% of patient with bacteremia or endocarditis.¹⁴ However, there was evidence showing that 94% of *S. bovis* bacteremia associated with colorectal cancer was biotype I (*S. gallolyticus*) while only 18% was associated with biotype II (*Streptococcus infantarius* and *S. pasteurianus*).¹⁹⁻²⁰ Another study reported that *S. bovis* biotype I is associated with colonic neoplasia and bacterial endocarditis in adults while biotype II is related to invasive infection in neonates and infant as well as bacteremia in adults.²¹ However, most of the studies describing the correlation between *S. bovis* and colonic carcinoma did not distinguish the different biotypes, the patient is advised to be investigated for bowel pathology, particularly cancer, after diagnosis of *S. bovis* bacteremia.²⁰ Tumors have been reported years after an episode of bacteremia.²²⁻²³ Hence, patients with normal bowel investigation, like in this case, should still be considered as a group at risk for developing colonic cancer and, therefore, repetition of barium enema or colonoscopy should be encouraged.

In summary, we report a case of mycotic aneurysm of left common iliac artery caused by *S. pasteurianus*. This case highlights the invasiveness of a group D streptococcus that causes vascular infection in a diabetic patient without underlying gastrointestinal disease.

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