

# Mycotic Aneurysm of the Common Iliac Artery Due to *Salmonella Paratyphi A*: A Case Report

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Mycotic aneurysms are rare complications of *Salmonella* infection. Such aneurysms usually involve the aorta; however, it occasionally involves the iliac arteries.<sup>1</sup> Arterial trauma and depressed host immunity are important risk factors for the development of these lesions.<sup>2</sup> Diagnosis is frequently delayed because the clinical manifestations are nonspecific. Surgical resection of the aneurysm with a bypass graft combined with bactericidal antibiotics are essential for cure.<sup>3</sup> Two cases of *Salmonella* mycotic aneurysm of the common iliac artery have been reported previously.<sup>4,5</sup> I herein describe a fatal case of mycotic aneurysm of the left common iliac artery due to *Salmonella para typhi A*.

## Case Report

A 55-year-old female known to have diabetes mellitus, hypertension and sarcoidosis and maintained on prednisolone 5 mg daily and insulin, was admitted with a one week history of left buttock pain radiating to the thigh for which she was seen in the emergency room several times and was only treated with analgesics. On the day of admission, the pain became worse with left-sided lower abdominal pain. She collapsed at home and was brought to the hospital. One month prior to admission the patient had an episode of fever and diarrhea lasting for two days which resolved without treatment. Physical examination on admission revealed a pale, diaphoretic patient. Blood pressure was 120/70 mm/Hg, pulse rate 112/minute, temperature 36.4°C. Abdominal examination revealed guarding with severe tenderness in the left lower quadrant, an expanding tender mass 15 x 15 cm in diameter in the left iliac fossa, and weak pulses in the left lower limb. Laboratory investigations revealed a hemoglobin of 8.3 g/dL, white blood cell count 6000/mm<sup>3</sup>, platelet count 38,000/mm<sup>3</sup>, random blood sugar 20.5 mmol/L, serum creatinine 137 µmol/L, blood urea nitrogen 6.3 mmol/L, Na<sup>++</sup> 148 mmol/L, K<sup>+</sup> 3.3 mmol/L, CO<sub>2</sub> 10 mmol/L,

calcium 3.08 mmol/L. Chest x-ray was normal. An emergency surgery done on the same day revealed a ruptured left common iliac artery aneurysm with large retroperitoneal hematoma with penetration into the left psoas muscle. An aortoiliac dacron graft was applied. The resected aneurysm was 7 cm in its maximum diameter. Microscopic examination of the aneurysm showed that the wall was replaced by hyalinized fibrocollagenous tissue with foci of calcification. The intima showed mural thrombi and cholesterol clefts. The adventitia contained numerous chronic and acute inflammatory cells. Bacteria were not seen on Gram's stain; however, culture grew *Salmonella para typhi A* sensitive to ampicillin, ciprofloxacin and chloramphenicol. On the same day of surgery, the patient was started on ceftriaxone 2 grams every 24 hours which was changed to ciprofloxacin 200 mg every 12 hours on the fourth postoperative day when the culture results were available. Her postoperative course was complicated by acute renal failure, disseminated intravascular coagulation and she expired on the fourth postoperative day.

## Discussion

*Salmonella* infections may be divided into five categories: gastroenteritis, enteric fever, bacteremia, localized infections, and chronic carrier state.<sup>6</sup> The most important localized infections outside the gastrointestinal tract are endovascular infections, osteomyelitis and meningitis. *Salmonella* vascular infections can involve the aorta, coronary and peripheral arteries, prosthetic valves and vascular grafts. Involvement of the aorta, particularly the abdominal aorta, occurs with much greater frequency than peripheral arteries. Mycotic aneurysms are uncommon, representing only 2.5% of all aneurysms.<sup>7</sup> *Salmonella* is cited as being the most common cause of mycotic aneurysm, accounting for 18% to 50% of cases.<sup>8</sup>

Most patients with *Salmonella* mycotic aneurysms have pre-existing atherosclerotic disease at the site of the subsequently infected aneurysm, although *Salmonella* has been reported to invade even healthy intima, leading to intravascular infection.<sup>1</sup> Risk factors for development of mycotic aneurysm include arterial trauma from any cause accounting for 29% of cases, depressed immuno-

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competence (DM malignancy, alcoholism, collagen vascular disease, AIDS, steroids, etc.) 24%, concurrent sepsis 17%, endocarditis 17%, congenital cardiovascular defects 10% and primary 3%.<sup>2</sup> The frequency of transient bacteremia in patients with *Salmonella* enterocolitis is less than 5%; however, this percentage increases in children and persons with major underlying diseases.<sup>6</sup> Cohen et al.<sup>1</sup> reported a 25% incidence of endothelial infection in patients with *Salmonella* bacteremia who are above 50 years of age.

Isolated aneurysms of the iliac arteries are rare with a reported incidence of 0.4% of all intracorporeal aneurysms.<sup>9</sup> The majority of these aneurysms are atherosclerotic although congenital, traumatic, and infectious etiologies have been reported. Mycotic aneurysms of the iliac arteries due to *Salmonella* are very rare. Literature review from 1966 using a Medline computer search system has revealed that only five cases of *Salmonella* mycotic aneurysm of the iliac arteries have been reported, two involving the external iliac arteries,<sup>4,5</sup> one involving the internal iliac artery<sup>10</sup> and two involving the common iliac artery, both caused by *Salmonella enteritidis*.<sup>11,12</sup> Our case will be the third case involving the common iliac artery and is caused by *Salmonella paratyphi* A. The clinical manifestation of mycotic aneurysm involving the common iliac artery includes fever, buttock or back pain, abdominal pain, and a pulsatile abdominal mass. Buttock or back pain radiating to the thigh is regarded as a typical symptom of common iliac artery aneurysm, exactly the symptoms the patient presented in the emergency room. Routine laboratory studies offer little aid in the diagnosis; however, persistent *Salmonella* bacteremia without an obvious focus of infection should raise the suspicion of mycotic aneurysm. Computed tomographic scan (CT) is currently considered the modality of choice for establishing diagnosis. In addition to demonstrating the size and extent of an aneurysm, CT scan also demonstrates leak and perianeurysmal hemorrhage in a noninvasive manner. If the infection is due to gas-forming organisms, one may see the presence of gas on CT scan. Although angiography can demonstrate the aneurysm and active leak, it has the disadvantages of being invasive and is unable to demonstrate extraluminal abnormalities.

Therapy of mycotic aneurysms consist of surgical resection of the aneurysm with a bypass graft in combination with at least six weeks of antibiotics.<sup>3</sup> The choice of antibiotic should be guided by sensitivity tests; however, it has been suggested that bacteriostatic drugs such as chloramphenicol may not be adequate to render tissues more suitable for grafts preoperatively or adequately treat residual infection postoperatively.<sup>13</sup> Bactericidal antibiotics have proven to be more effective agents.<sup>14</sup> Antibiotics alone are ineffective. The prognosis is poor. Mortality in the three reported cases including this patient

was 67%. Causes for this poor prognosis include delayed diagnosis, old age, and the presence of underlying illness that make them high surgical risk patients. Our patient had a history of diarrhea and fever lasting a few days one month prior to admission; this could have been a *Salmonella* gastroenteritis associated with bacteremia with localization of the organisms in the left common iliac artery. Being diabetic, on steroids, with atherosclerotic vascular disease all predisposed her to the formation of the mycotic aneurysm. Diagnosis was delayed until rupture of the aneurysm had already occurred. She was treated by resection of the aneurysm with a bypass graft in combination with antibiotics. Ciprofloxacin was chosen because it is bactericidal and has good tissue penetration.<sup>15</sup> However, her course was complicated by acute renal failure, disseminated intravascular coagulation and eventually she expired on the fourth hospital day. When compared with the other two cases reported previously, this case was similar to them in many respects. All were old, presented with back or buttock pain on the same side of the aneurysm, and in all the aneurysm had already been ruptured at the time of surgery; however, the other two cases were caused by *Salmonella enteritidis* and in them, diagnosis could be established radiologically before surgery, while in this patient the diagnosis was only confirmed at surgery. Assuming the episode of fever and diarrhea which occurred one month prior to admission in our patient was *Salmonella* gastroenteritis, treatment of this episode with antibiotics, although not recommended because of the risk of prolonging fecal excretion and inducing resistance, could have prevented this catastrophic outcome. The finding that more than 90% of the reported cases of *Salmonella enteritidis* occur in patients above 50 years<sup>6</sup> of age, especially those with depressed host immunocompetence, treatment of *Salmonella* gastroenteritis in these patients may be indicated although this subject remains controversial.

In conclusion, mycotic aneurysm of the common iliac artery is extremely rare. Clinical manifestations are nonspecific. Keeping a high suspicion index and utilization of radiologic modalities such as computed tomographic scan and angiography to make an early diagnosis and a combination of prompt surgical intervention and bactericidal antibiotic therapy based on sensitivity data are essential for survival.

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