SHORT REPORT

Rupture of Internal Iliac Aneurysm due to Salmonella Infection

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Introduction

A solitary infected internal iliac artery aneurysm is a rare but life-threatening condition unless treated surgically. To our knowledge, only three cases have been reported in the English literature.1–3

Although an infected aneurysm rapidly progresses to rupture and prompt surgical intervention is mandatory, early diagnosis is sometimes difficult. In addition, the surgical procedure of resection of an infected internal iliac aneurysm is complicated, since they are situated deep in the pelvis and are adherent to the iliac vein and/or ureter.

We report a case of Salmonella-infected ruptured aneurysm of the internal iliac artery associated with cholecystolithiasis, which was successfully treated by resection of the aneurysm and gallbladder after establishing an extra-anatomic bypass. We discuss the importance of prompt surgical management including removal of the possible source of Salmonella infection.

Case Report

A 71-year-old man was referred to another hospital with the main complaint of lower back pain. Computed tomographic (CT) scan showed a solitary 32 × 35 × 50 mm aneurysm of the right iliac artery and right hydronephrosis. He had a high-grade fever up to 38 °C during this period. Blood culture yielded Salmonella O-4. He had an episode of hypotension and syncope, and was transferred to our hospital for further treatment.

His past medical history included asymptomatic cholecystolithiasis, which was noted on annual examination and followed without specific treatment. He had had no episodes suggestive of food poisoning such as diarrhoea and vomiting.

On admission, his height was 161 cm and his weight was 66 kg. Heart rate was 108 beats/min and blood pressure was 150/80 mmHg. Body temperature was 38.4 °C. Consciousness was clear. Physical examination revealed tenderness and rebound tenderness of the lower abdomen. No pulsatile abdominal mass was palpable. Laboratory data showed an increased inflammatory reaction; white blood cell count of 21.3 × 109/l, and C-reactive protein (CRP) of 14.9 mg/dl. CT scan with contrast-enhancement showed a 35 × 45 × 50 mm right internal iliac aneurysm surrounded by haematoma, indicating that the aneurysm had rapidly enlarged and ruptured (Fig. 1). Cholecystolithiasis was also detected. These findings and the clinical history led to the diagnosis of an infected ruptured aneurysm of the right internal iliac artery, and an emergency operation was performed.

Because his haemodynamic condition was stable, after establishing extra-anatomic bypass from the left external iliac artery to the right common femoral artery, the aneurysm together with the right common and the external iliac artery were resected. Although there was marked perianeurysmal adhesion, no accumulation of pus was observed. The retroperitoneal infected field was packed with omentum. Cholecystectomy was performed concomitantly to remove the possible source of Salmonella infection. Culture of the arterial wall and blood yielded Salmonella O-4, but that of the stone was not obtained because of contamination.

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Fig. 1. Four consecutive slices of CT scan showing the enlarged right internal iliac artery measuring 35 × 45 × 50 mm. Arrows indicating the normal-sized external iliac artery overriding the enlarged internal iliac artery.

He received intravenous ceftriaxone for 2 weeks, followed by oral levofloxacin for 3 months. Postoperative blood, urine and stool cultures were all negative. The postoperative course was uneventful, and he has been free from any signs of graft infection for 9 months.

Discussion

Solitary infected aneurysm of the internal iliac artery is quite a rare disorder, and only four cases including ours have been reported (Table 1) in the English literature.\textsuperscript{1-3} The symptoms of infected aneurysm include fever (77%) and abdominal or back pain (92%).\textsuperscript{4} In addition, anatomically specific symptoms may occur in the case of iliac artery aneurysm. Hydronephrosis often occurs due to compression of the ureter (75%), as well as oedema of the lower extremity due to compression of the iliac vein (75%).\textsuperscript{1-3} However, neither of these symptoms is pathognomonic of infected aneurysm of the internal iliac artery. A pulsatile mass is a relatively specific symptom, but is positive in less than half of cases (46%).\textsuperscript{3}

Indices of inflammatory response such as white blood cell count and CRP are usually increased. Blood culture is helpful in the diagnosis of infected aneurysm and for the selection of appropriate antibiotics, and was positive in all of the four cases. However, it takes a few days to obtain the result and does not rule out other infection.

CT scan was diagnostic in three out of the four cases of solitary infected aneurysm of the internal iliac artery. It provides much information including the site of the aneurysm and the presence of inflammation. It should be performed in order to plan the type of operation unless the patient is in a shocked state.

Surgical resection with antibiotic administration is essential for infected aneurysms. Whether in-situ bypass or extra-anatomic bypass has a better outcome in infected abdominal aortic aneurysm is still controversial.\textsuperscript{5-9} In the case of solitary infected aneurysm of the internal iliac artery, however, extra-anatomic bypass is the treatment of choice so long as vital signs remain stable, for the following two reasons:
Surgical treatment of choice in Salmonella-infected aneurysmectomy, concomitant cholecystectomy may be the consideration that concomitant cholecystectomy does not result in interrupted lower extremity perfusion.

On the other hand, in-situ bypass should be considered as an alternative to obtain haemostasis in the presence of a shocked state.

Salmonella is one of the most common organisms found in infected aneurysms, and is associated with 10% of all infected aneurysms, although a significant decrease in its incidence has been observed since 1965.10,11 Salmonella infection usually occurs through the oral route. Cultures of stool (65%) or blood (85%) are frequently positive in the absence of gastroenteritis in cases of Salmonella-infected aneurysms.6 A chronic carrier state, which is usually associated with Salmonella-infected gallstones, is known to predispose to bacteraemia.12 Although several cases of Salmonella-infected aneurysm treated with both aneurysmectomy and cholecystectomy have been reported,13,14 the effect of cholecystectomy was not certain in these cases. However, Barthel reported a patient with an infected aneurysm caused by Salmonella, who underwent cholecystectomy with a good recovery.15 Taking into consideration that concomitant cholecystectomy does not increase complications in elective aneurysmectomy, concomitant cholecystectomy may be the treatment of choice in Salmonella-infected aneurysm.16,17

Table 1. Summary of the cases with solitary infected aneurysm of the internal iliac artery.

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Age/sex</th>
<th>Signs and symptoms</th>
<th>Organism</th>
<th>Operative procedure</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purnell, R. A.1</td>
<td>1990</td>
<td>71</td>
<td>Male</td>
<td>Oedema of the L/E Fever Anorexia Nonpulsatile mass shock</td>
<td>Salmonella enteridis</td>
<td>Aorto-femoral bypass with Dacron graft</td>
</tr>
<tr>
<td>Hassan, D.1</td>
<td>1996</td>
<td>56</td>
<td>Male</td>
<td>Oedema of the L/E Fever Abdominal pain</td>
<td>Staphylococcus aureus Pseudomonos aeruginosa</td>
<td>Extra-anatomic bypass</td>
</tr>
<tr>
<td>Tatebe, S.2</td>
<td>1996</td>
<td>64</td>
<td>Male</td>
<td>Oedema of the L/E Fever Anorexia Pulsatile mass</td>
<td>Klebsiella pneumoniae</td>
<td>Extra-anatomic bypass with Dacron graft</td>
</tr>
<tr>
<td>Present case</td>
<td></td>
<td>71</td>
<td>Male</td>
<td>Fever Back pain</td>
<td>Salmonella O-4</td>
<td>Extra-anatomic bypass with Dacron graft</td>
</tr>
</tbody>
</table>

L/E: lower extremity, N.S.: not stated.

(a) Crossover bypass can be performed easily in an operative field isolated from the focus of infection. (b) The complicated procedure of resection of the infected aneurysm, situated deeply in the pelvis and firmly adherent to surrounding structures, can be accomplished without interrupting lower extremity perfusion.

References