

# *Salmonella* urinary tract infection: a vascular emergency

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We report on the case of *Salmonella* arteritis with aneurysm formation of the left common iliac. Extrinsic compression of the left ureter resulted in ureteral obstruction and *Salmonella* bacteremia secondary to pyelonephritis. An excision was performed, followed by an extra-anatomic bypass with an autologous superficial femoral vein. *Salmonella* septicemia after acute pyelonephritis in a patient aged over 50 years should raise the suspicion index regarding the possibility of microbial arteritis with aneurysm formation, which is a vascular emergency.

Since William Osler described mycotic aneurysms in 1885, the classification of these pathologies has been refined. Microbial arteritis with aneurysm formation is the most common type of mycotic iliac aneurysms encountered, accounting for up to 66% of cases.<sup>1</sup> Since the era of antibiotic drugs, the infectious agents responsible are *Staphylococcus aureus* and *Salmonella* species in 25% and 15%, respectively. *Salmonella* microbial arteritis with aneurysm formation in the iliac position is rarely seen. We report on the case of a patient with *Salmonella* microbial arteritis with aneurysm formation of the common iliac artery resulting in secondary ureteral obstruction. This pathology occurred after *Salmonella* pyelonephritis, which is a rare clinical presentation.

## Case report

A 68-year-old man, known for rheumatoid arthritis under corticosteroid therapy, presented with pain in the left hip. A bone scan showed stasis in the left ureter.

Endovenous pyelography confirmed left ureteral dilation secondary to ureteral obstruction at L5–S1. A urine culture confirmed *Salmonella* urinary tract infection.

After 30 days, he exhibited hyperthermia, pain in the left side and gross hematuria. Ureteroscopy with retrograde pyelography showed obstruction of the left ureter at L5–S1 and the presence of pus. He then developed *Salmonella*-induced septic shock treated with intravenous antibiotherapy.

An abdominal CT scan revealed extrinsic compression of the left ureter at the sacral level by an aneurysm of the left common iliac artery (Fig. 1). Arteriography of the lower limbs confirmed the saccular aneurysm formation starting 1.5 cm from the aortic bifurcation and ending at the left iliac bifurcation (Fig. 2).

Percutaneous nephrostomy was performed before proceeding with left ureterolysis. We performed resection



FIG. 1. Pelvic CT scan showing left iliac aneurysm with median mural thrombus and presence of the double-J catheter on the left anterolateral aspect of the aneurysm.

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## Notes de cas

of the microbial arteritis with aneurysm formation and a right-to-left femoro-femoral autologous bypass with reversed rightfemoral vein. After 3 years of follow-up, the patient remains asymptomatic with normal abdominal ultrasound testing.

### Discussion

Since the types of infected aneurysm were first described, there has been a change in the breakdown of prevalence for each type.<sup>2</sup> Moreover, the aging of the population means an increase in the prevalence of atheromatous diseases, which increases the population of people who are likely to develop microbial arteritis with aneurysm formation. This pathology usually occurs after septicemia, which seeds atheromatous plaque and produces local infection of the artery wall, leading to an aneurysm. *Salmonella* bacteremia in people aged 50 years and over can lead to infection of the vascular endothelium in 25% of cases. This infection may reach as high as 35% in people aged over 65 years.<sup>3</sup> This disease also carries a high mortality rate of 33% to 75%.<sup>2</sup> For these reasons, we believe that our patient developed *Salmonella* arteritis with aneurysm formation after bacteremia that

was documented earlier in its development, despite the negative culture from the aneurysm. The culture is negative in 25% of cases, anyway.<sup>2</sup>

Microbial arteritis is located in the iliac artery in 2% to 18% of cases.<sup>4</sup> The clinical presentation of iliac aneurysm is different to that of the aortic location. Most often, patients are asymptomatic; however, when there are symptoms, they include abdominal pain, genitourinary symptoms and pain in the back or hip. Urinary tract obstruction may be part of the mode of presentation.

Among the extraintestinal manifestations of salmonellosis, infection of the urinary tract is infrequent. Pyelonephritis and cystitis arise in 1%–2% and 2%–3% of cases, respectively.<sup>5</sup> Moreover, it occurs when there is a predisposition, such as an occult urological problem or immunosuppression. Our patient was therefore predisposed to this rare complication of salmonellosis because he was under corticosteroid therapy and had left ureteral obstruction.

The literature is relatively consistent regarding the fundamental principle for treating infected aneurysms: the aneurysm must be excised, extensive local debridement performed, appropriate an-

tibiotherapy administered and revascularization performed when indicated. However, selecting the type of reconstruction and vessel to use remains controversial. Recently, Müller and colleagues<sup>4</sup> proposed in situ reconstruction when there is low-grade infection (absence of pus) and extra-anatomic reconstruction when there is high-grade infection. Extra-anatomic reconstruction was performed on our patient, given the proximity of the aneurysm to the aortic bifurcation (roughly 0.5 cm per operatory) and significant adjacent inflammation, making tissue quality mediocre for anastomosis. Regarding the vessel to use for reconstruction, no definite recommendation has been published, and we used an autologous vessel with the aim of preventing graft infection.

In conclusion, care must be taken when a patient exhibits the following combined elements: *Salmonella* urinary tract infection, ureteral obstruction, *Salmonella* sepsis and age over 50 years. Microbial arteritis with aneurysm formation must then be ruled out because it is a vascular emergency.

**Competing interests:** None declared.

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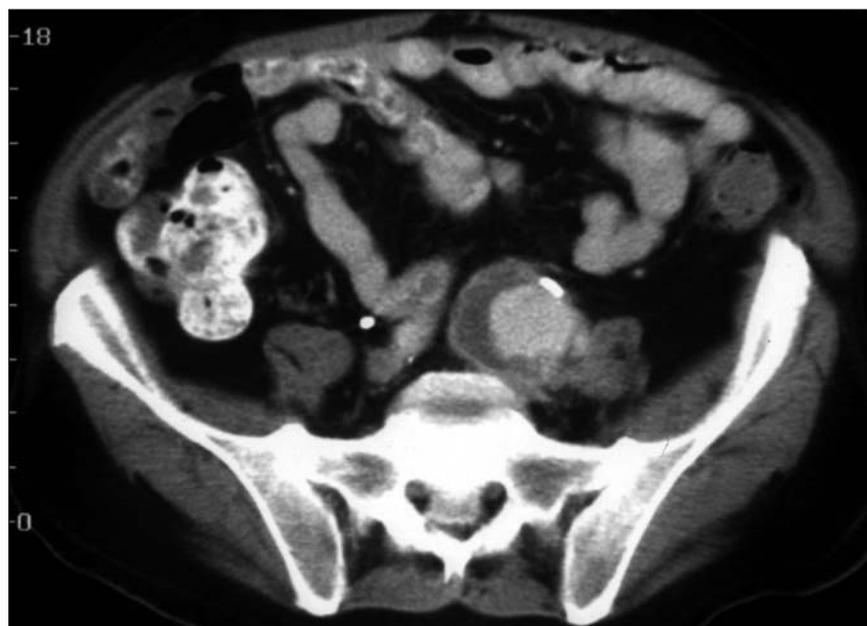


FIG. 2. Angiograph of lower limbs: anteroposterior view.