

# Nontyphoidal Salmonella causing Mycotic Aneurysms and subsequent Vascular Graft Infection: A Case Report

Bernard Dankyi MD <sup>1,2</sup>, Sandi Dunn MD <sup>1,2</sup>, Zainab Saeed MD <sup>1,2</sup>, Vincent Santi MD <sup>1,2</sup>, Aneta Tarasiuk-Rusek MD <sup>1,2</sup>

1. University of Central Florida College of Medicine/ HCA HEALTHCARE GME Consortium
2. HCA Florida Ocala Hospital Internal Medicine Residency Program

## Abstract

Nontyphoidal Salmonella (NTS) gastroenteritis can lead to bacteremia in up to 8% of cases, and out of these, 5% to 10% of patients will develop disseminated infections <sup>13</sup>. NTS can cause mycotic aortic aneurysms and vascular graft infections, which can be fatal if undiagnosed and consequently untreated <sup>13</sup>. Symptoms are usually vague and non-specific, including fever, chills, chest pain, or back pain. Here we describe a patient who presented to the emergency department complaining of recurrence of severe abdominal pain after recent abdominal aortic aneurysm grafting. Further work-up revealed sepsis secondary to Salmonella bacteremia serovars C/D and aortitis.

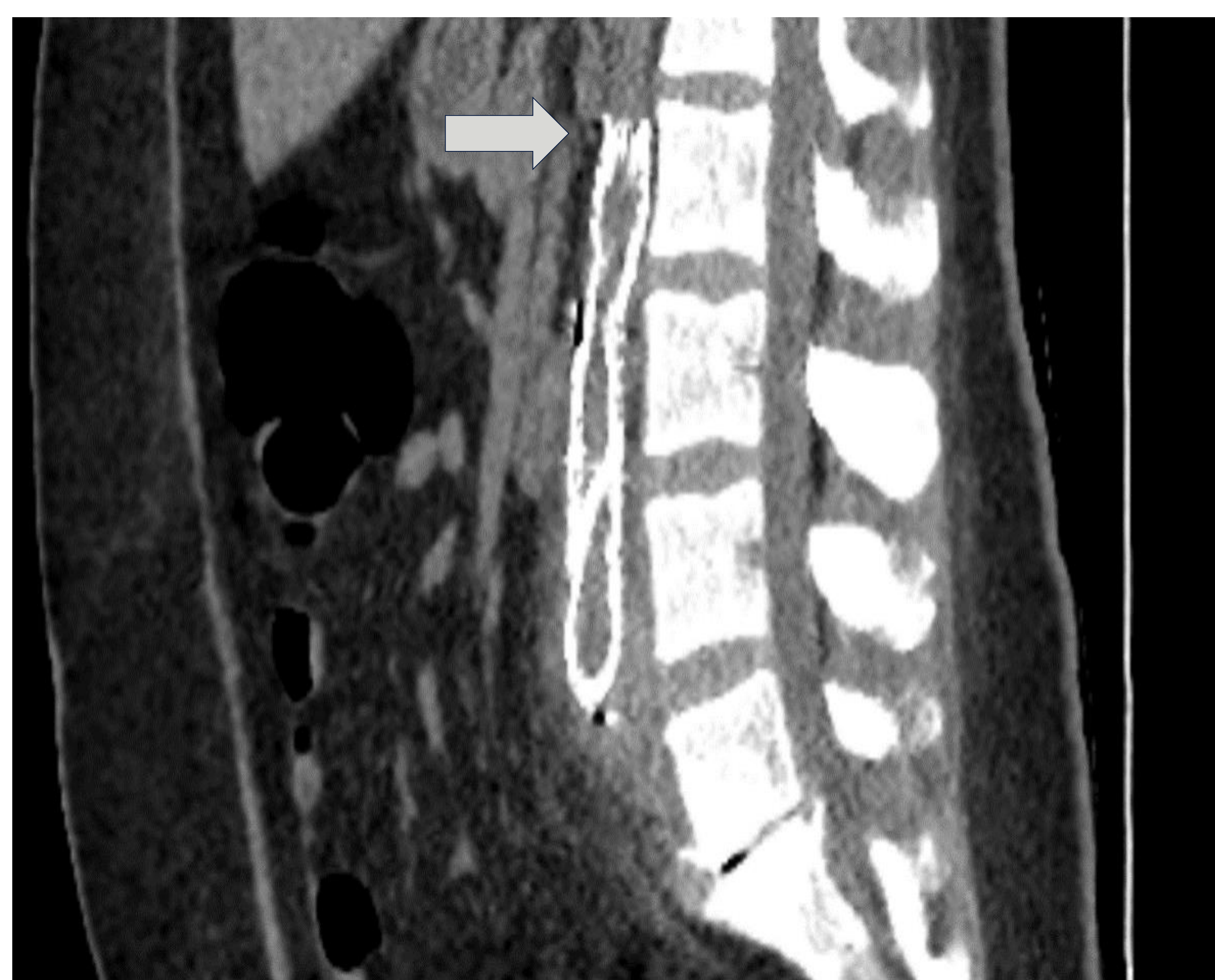
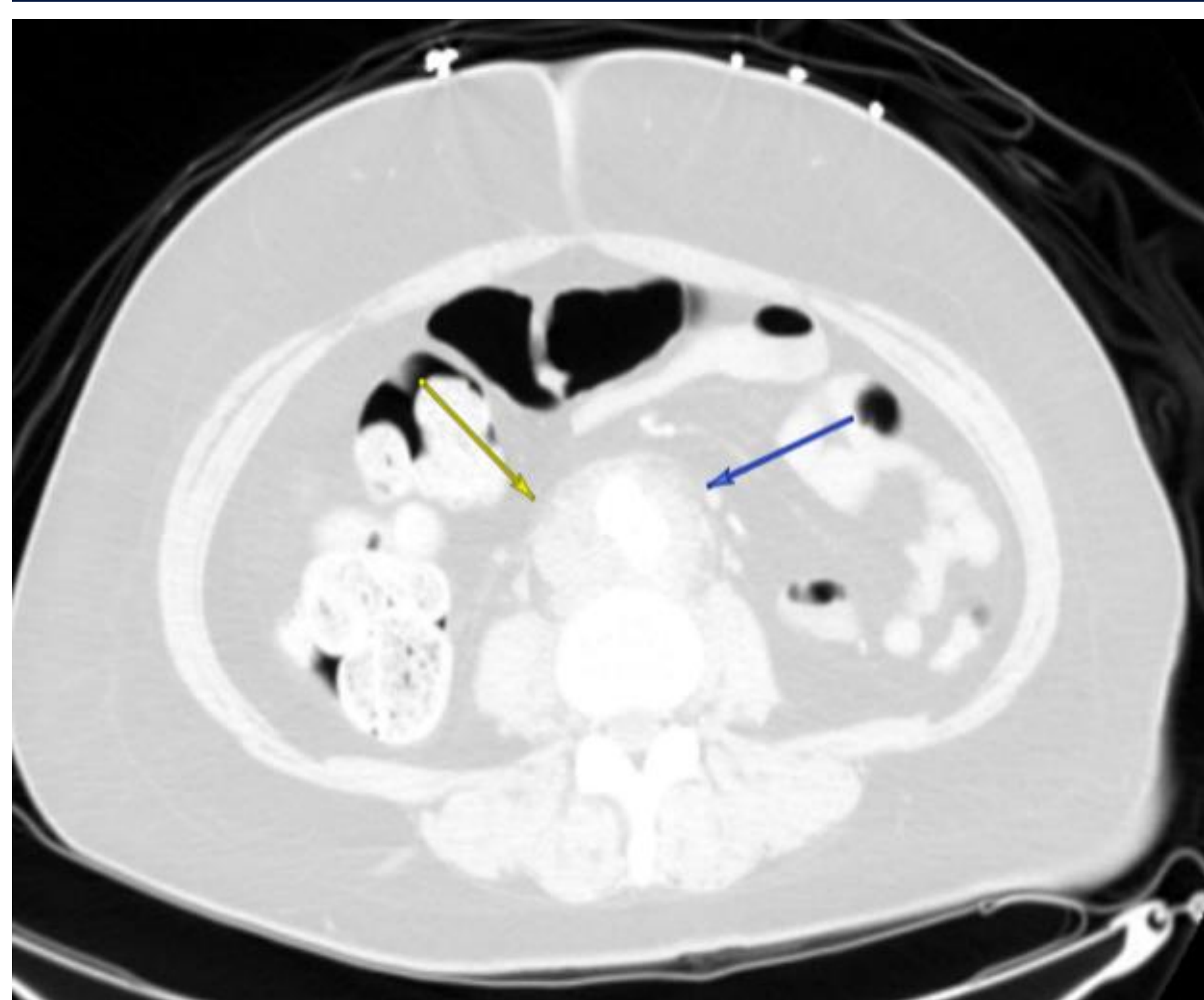
## Case Presentation

A 41-year-old white female, current 36-pack-year cigarette smoker, presented to the hospital after an outpatient CT scan of the abdomen showed a right groin “mass.” Before the presentation, the patient reported persistent generalized abdominal pain that was waxing and waning for 3 months and progressively worsening over time. On admission, the pain was described as belt-like pressure, radiating to the back, with episodic sharp and stabbing sensation graded at 10/10 pain scale. The patient was unable to describe a specific trigger for the pain or relieving factors. The pain was coupled with intermittent blood in the stool. On a repeat CT scan of the abdomen with contrast, the patient was found to have an aortic and right iliac aneurysms. The vascular surgery team was consulted. The patient underwent an aortic bi-modular endovascular graft placement, with an extension limb graft into the right external iliac and left common iliac artery. The patient was discharged home two days later.

In follow-up, two weeks after the endovascular graft placement, patient returned to the ED with worsening abdominal pain. The patient had a temp of 97.6, HR 119, RR 20, and BP 102/65. The patient’s labs showed lactic acid of 4.8, Na 133, and K 3.3, AST 39, ALT 53, Alk Phos 314, troponin < 0.012, and WBC of 27 with 89.3% neutrophils. The patient was admitted to the hospital meeting sepsis criteria, blood cultures were obtained, and the patient was started on IV fluids and broad-spectrum antibiotics: vancomycin and cefepime IV. Patient’s blood cultures resulted positive for *Salmonella* species, and subsequently patient was treated with ceftriaxone IV and ciprofloxacin PO. Further identification revealed *Salmonella* serotypes C/D. Patient was transferred to a tertiary center for removal of the graft material and open repair of the mycotic aneurysms.

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## Images



## Discussion

Enteric fever, caused by NTS species, is rare and caused mostly by the ingestion of contaminated food sources in the setting of travel to areas with poor sanitation <sup>5, 6, 12, 16</sup>. In the United States, the vast majority of cases are ruled as travel-related, however, every year there are several NTS outbreaks documented by CDC and traced to its suspected sources of raw meat like chicken, seafood, soft cheeses, onions, or prepackaged salads <sup>2, 8, 16</sup>. Our patient had no travel history, however, she did admit to possible household and occupational exposures. Our patient did experience diarrheal illness progressing to night sweats, chills, as well as fatigue weeks before her abdominal pain started. These symptoms with chest and back pain should prompt further investigation of possible salmonellosis with suspicion for disseminated disease, including vascular aneurysms <sup>6, 7</sup>. In our case, abdominal pain was radiating to the back, and its nature was suggestive of a vascular cause. The thorough epidemiological history in this case effectively helped rule out iatrogenic causes of possible salmonellosis and conclude that the mode of infection was ingestion of contaminated food.

Salmonella species are the leading cause of mycotic aneurysms in Salmonella endemic areas of the Indian subcontinent, Central America, and Africa <sup>7, 15</sup>. Given that only about 5% of all Salmonella enteritis results in bacteremia, there are relatively few case studies in the literature describing common risk factors or more specific description of suggestive symptoms <sup>1, 7, 13, 16</sup>. NTS-caused mycotic aneurysms are even more sporadic <sup>7, 9, 13</sup>.

The cases collected thus far suggest that Salmonella caused aneurysms most commonly affect males over 60 years old with a history of hypertension, diabetes, or atherosclerosis <sup>3, 7, 15</sup>. Additionally, several cases describe immunocompromise as an additional risk factor <sup>3, 10</sup>. Our case is unusual because the patient did not meet any of the risk criteria described in the literature thus far, and was not immunocompromised.

Without treatment, mycotic aneurysms will rupture in 50% of cases and are fatal in up to 44% of cases <sup>9</sup>. In addition to antibiotics, the two treatment options for a mycotic aortic aneurysm are an open or endovascular aneurysm repair (EVAR) <sup>4, 7, 9, 14</sup>. Open surgical repair is preferred for the treatment of mycotic aneurysms as studies have shown that EVAR is associated with a higher chance of recurring bacterial infection given retained graft material <sup>4, 9, 11, 14</sup>. Once the cause of the mycotic aneurysm is established, the infection needs to be treated with a prolonged antibiotic course and surgical intervention to prevent the progression and dissemination of infection <sup>1, 8, 9, 14</sup>. In this case, because a mycotic aneurysm was not suspected initially, EVAR was used to repair the aortic and iliac aneurysms eventually leading to worsening symptoms, sepsis with NTS bacteremia, and presentation to our hospital.

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