



Delayed Recurrence of Group D *Salmonella* Mycotic Aneurysm of the Abdominal Aorta Presenting as an Aorto-duodenal Fistula

Misha Witz MD¹, Jonathan Lehmann MD¹, Ali Shnaker MD¹, Bat-Sheva Gotesman MD²
and Ze'ev Korzets MBBS³

Units of ¹Vascular Surgery and ²Infectious Diseases and ³Department of Nephrology and Hypertension, Meir Hospital,
Sapir Medical Center, Kfar Saba, Israel

Affiliated to Sackler Faculty of Medicine, Tel Aviv University, Ramat Aviv, Israel

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Mycotic aneurysms are localized abnormal outpouchings of the vessel wall that develop secondary to an infective process. The abdominal aorta is one of the most common sites of mycotic aneurysm formation [1,2]. Coincident with the change of etiology from endocarditis to arterial trauma, *Staphylococcus aureus* has emerged as the most common pathogen. However, *Salmonella* organisms have been reported to occur, at a prevalence ranging from 10% to 35% [2,3]. Aortic mycotic aneurysms are a fulminant infectious process that frequently leads to rupture and hemorrhagic shock with consequent significant morbidity and high mortality.

We report a case of a mycotic aneurysm of the infrarenal abdominal aorta due to group D *Salmonella*, which ruptured and was successfully repaired by aneurysmectomy and an *in situ* Dacron tube graft. Two years later, the patient presented with massive upper gastrointestinal bleeding as a result of recurrent *Salmonella* aortitis of the graft that had eroded into the duodenum.

Patient Description

A 61 year old man was admitted because of massive hematemesis. He was a heavy smoker and suffered from arterial hypertension and non-insulin-dependent diabetes mellitus. Two years previously he had undergone emergency repair of a ruptured infrarenal aortic aneurysm in a

hospital abroad. Aneurysmectomy was performed and an *in situ* Dacron graft inserted. *Salmonella* was cultured from both blood and the aneurysm and the patient was prescribed prolonged antibiotic therapy. The exact *Salmonella* species and the duration of antibiotic treatment are unavailable.

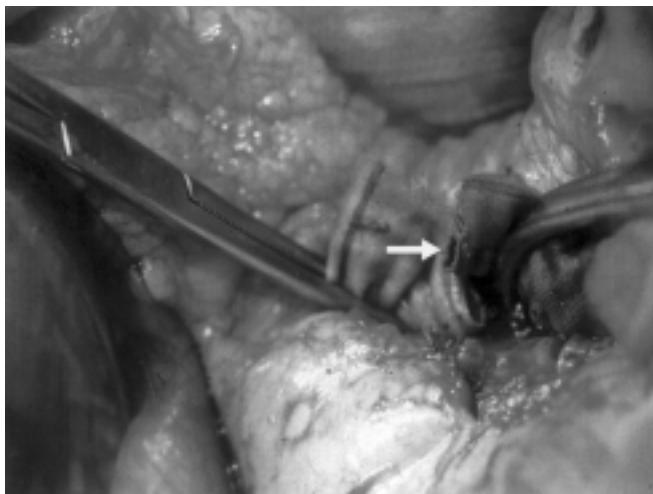
On the first day of his current admission, a sole temperature peak of 39°C was documented. The patient's condition initially appeared to stabilize. He underwent gastroscopy to the fourth part of the duodenum as well as colonoscopy, but they failed to reveal the source of bleeding. Abdominal angiography was reported as normal. Computerized tomography of the abdomen showed evidence of peri-aortitis at the site of the graft with no demonstrable leak. After 24 hours a further episode of hematemesis and melena occurred, with the patient going into hemorrhagic shock. Following volume resuscitation, he was rushed to the operating room. At operation, a fistula was found between the distal duodenum and the proximal aortic graft anastomosis [Figure A]. The graft was resected and the proximal and distal ends of the aorta oversewn. Revascularization was accomplished via a left axillo-bifemoral bypass [Figure B]. Although blood cultures were negative, *Salmonella* group D was isolated from cultures of the resected graft. Intravenous aztreonam (4.5 g/day) and ampicillin (3 g

t.i.d.) were administered for 2 weeks, after which antibiotic therapy was continued orally with ciprofloxacin 750 mg b.i.d. for a further 4 weeks. The postoperative course was uneventful.

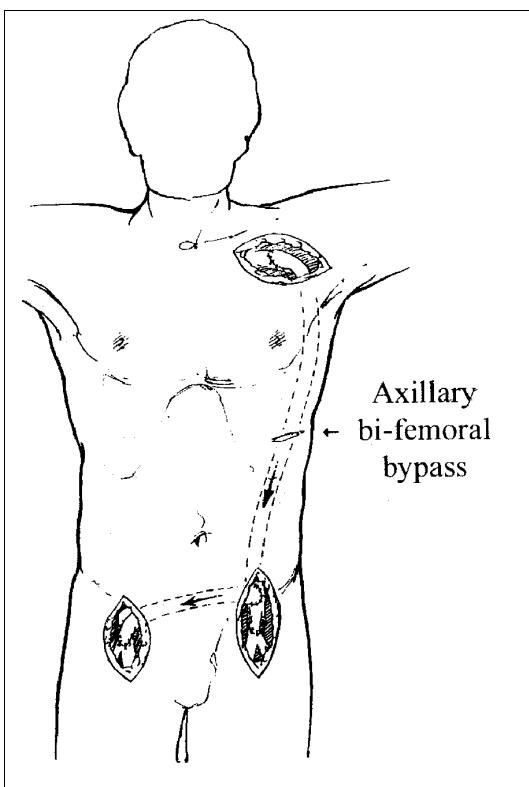
The patient has now been followed as an outpatient for 2 years. His graft remains patent. No episodes of *Salmonella* infection have thus far occurred. He suffers from severe intermittent claudication due to infra-inguinal occlusive arterial disease and is being considered for peripheral bypass grafting.

Comment

Mycotic aneurysm of the aorta constitutes a surgical emergency, particularly if accompanied by rupture, as so frequently happens. Rupture occurs due to rapid expansion of the aneurysm, which often remains undiagnosed up to the point of rupture. Suggestive clinical features are an ongoing or relapsing bacteremia associated with back or abdominal pain. Non-typhoidal *Salmonella* organisms were the most common pathogen prior to 1965, and are lately superceded only by *Staphylococcus aureus* [2]. In fact, Benenson et al. [3], having found a 10% prevalence in a retrospective 10 year review of *Salmonella* bacteremia, propose that patients over 50 with non-typhi *Salmonella* bacteremia in the presence of risk factors for atherosclerosis be evaluated for possible endovascular infection.



[A] Ruptured aortic graft



[B] Schematic drawing of the left axillo-bifemoral bypass

Surgical management of mycotic aneurysms is controversial. The question is whether *in situ* Dacron replacement or ligation and extra-anatomic reconstruction should be performed [4]. Ultimately, the surgical procedure for each patient should be individualized. Part and parcel of treatment is the prolonged use of high dose bactericidal antibiotics.

Our patient's course is unique not least due to the fact that he has twice survived a ruptured aortic mycotic aneurysm. Interestingly, recurrent *Salmonella* arteritis of the graft occurred 2 years following repair of his first rupture and during that period he was symptom-free. Mycotic aneurysm of the graft led to rupture and penetrance into the duodenum, which manifested as massive gastrointestinal bleeding. Notably, gastroscopy, colonoscopy and angiography failed to reveal the source of bleeding. The only clue was changes consistent with peri-aortitis at the site of the graft seen on CT. The surgical procedure for the patient's second rupture involved extra-anatomic reconstruction – namely, the establishment of an axillo-bifemoral bypass. After a follow-up of 2 years, this bypass graft remains patent.

Our case demonstrates that *Salmonella* mycotic aneurysm can recur after a prolonged silent period. Frequent follow-up of these patients is therefore mandatory, with the maintenance of a high index of suspicion. Early surgical intervention and long-term antibiotic therapy can lead to a successful outcome.

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Correspondence: Dr. Z. Korzets, Dept. of Nephrology and Hypertension, Sapir Medical Center, Kfar Saba 44281, Israel.
Phone: (972-9) 747-2517
Fax: (972-9) 741-6918
email: zeev@clalit.org.il

Capsule

No nausea in acute renal colic

A systematic review was done to compare treatment with opioids versus non-steroidal anti-inflammatory drugs (NSAIDs) in patients with acute renal colic. Overall, data analysis of 20 randomized controlled trials showed that NSAIDs achieve slightly better pain relief, reduce the need for further analgesia following

the first treatment, and cause less vomiting than opioids. The authors conclude that NSAIDs should be the first-line analgesics in patients with acute renal colic.

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E. Zimlichman