**Prevotella intermedia** infection causing acute and complicated aortitis—A case report

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**ABSTRACT**

**INTRODUCTION:** Aortitis is a general term that refers to all conditions involving an inflammation of the aortic wall. This case report describes the surgical approach of a patient with infectious and symptomatic aortitis caused by the rare vector *Prevotella intermedia*.

**PRESENTATION OF CASE:** A 44-year old male patient was admitted with fever and general discomfort after a period of sore throat in a non-teaching hospital. After two weeks he developed acute abdominal and back pain accompanied by sweating and elevated infection parameters. Computed tomography angiography revealed atherosclerotic changes of the infrarenal aorta with a locally contained rupture of the aorta alongside peri-aortal signs of inflammation (and aortitis aspects). An urgent aortic reconstruction was performed according to Nevelsteen. The blood cultures turned out positive for *Prevotella intermedia*. Postoperatively the patient received antibiotics for six weeks. The patient recovered uneventful from this infection and surgical procedure.

**DISCUSSION:** A complicated and acute aortitis is a rare but potentially life-threatening disease. The aetiology can be ordered into two main groups; inflammatory and infectious. Diagnosis is based upon symptoms, biochemical values, microbiological results and imaging modalities. Treatment depends on aetiology and should be discussed in an experienced multidisciplinary setting. Infectious aortitis should be treated with antibiotics for at least six weeks with close monitoring of the patient’s clinic and biochemical values, even after surgery.

**CONCLUSION:** *Prevotella intermedia* is a rare causative agent for aortitis. Acute aortitis is a challenging clinical entity which should be managed in an equipped medical center by an experienced multidisciplinary team.

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1. Introduction

Aortitis is a general term that refers to all conditions involving an inflammation of the aortic wall. Aortitis shows different aetiologies, related to various histological patterns. The clinical presentation varies from life-threatening conditions to asymptomatic or atypical presentations. Treatment depends on the aetiology of aortitis [1]. This article describes an acute surgical intervention for aortitis caused by a rare micro-organism with an unusual presentation. Currently, to the best knowledge of the authors, the vector *Prevotella intermedia* causing an acute and symptomatic aortitis has not been described. This case report is written in line with the recommendations of the consensus-based surgical case reporting guideline development (SCARE guidelines) [2].

2. Presentation of case

A 44-years old male patient was admitted to a non-teaching hospital because of general discomfort and fever without an apparent focus. The blood tests revealed elevated inflammation parameters and hitherto undiagnosed diabetes mellitus. He had no medical history and was not using any medicines at the time. Two weeks before admission, he was suffering from a sore throat accompanied by fever. The general practitioner started antibiotics (lenoxymethylpenicillin 500 milligrams 3 times daily) under suspicion of a laryngitis. At presentation in the emergency department he complained about mild abdominal pain. Physical examination of the abdomen showed no abnormal findings. His blood pressure was 149/107 mm Hg and his heart frequency 122 beats
per minute. His temperature was 39.9 °Celsius. Beside the sore throat the patient complained about headache and myalgia. He had vomited twice. The patient was admitted and other antibiotics (amoxicillin/clavulanic acid 500/125 milligrams three times daily and ciprofloxacin 500 milligrams twice daily) were prescribed. After four days a computed tomography (CT)-scan of the abdomen was performed, which showed an aberrant abdominal aorta with suspicion of retroperitoneal fibrosis. Hereon prednisolone (60 milligrams once a day) was started. The fever and high infection parameters remained. After ten days in the hospital with antibiotics and prednisolone the patient developed an acute violent abdominal pain, back pain and sweating. There were clinical signs of shock. However, his vital signs remained more or less stable without fever (blood pressure: 163/98 mmHg, heart frequency 109 BPM, temperature 36.4 °Celsius). Physical examination of the abdomen demonstrated diffuse pain without peritonitis. The attending general surgeon examined the patient and ordered an immediate abdominal CT-scan with suspicion of a ruptured aorta or a gastrointestinal perforation. This showed aortitis with signs of rupture without aneurysm formation. The patient was rapidly transferred to the emergency department of Medical Center Leeuwarden, a teaching hospital in the northern part of the Netherlands (the province of Friesland).

After arrival rapid additional diagnostics and immediate treatment were initiated. The laboratory results are listed in Table 1. Subsequently, a quick computed tomography angiography (CT-A) of the total aorta was obtained. This revealed atherosclerotic changes of the infrarenal aorta with a local contained rupture of the aorta with peri-aortic signs of inflammation and aortitis (retroperitoneal fibrosis with retroperitoneal gas). There was no aortic aneurysm (Fig. 1).

Table 1

| Test                          | Value   | Reference |
|-------------------------------|---------|-----------|
| Hemoglobin                    | 8.0     | 8.5–11.0 mmol/L |
| C-reactive protein            | 279     | <5 mg/L |
| Red blood cell count          | 3.86    | 4.3–6.0 × 10¹²/L |
| White blood cell count        | 27.1    | 4.0–10.0 × 10⁹/L |
| Thrombocytes                  | 462     | 150–400 × 10⁹/L |
| Glucose                       | 12.9    | 4.0–7.8 mmol/L |
| Sodium                        | 127     | 135–145 mmol/L |
| Potassium                     | 4.2     | 3.5–5.0 mmol/L |
| Creatinine                    | 40      | 50–110 mmol/L |
| Estimated glomerular filtration rate | >90   | >60 ml/min |
| Urem                          | 3.2     | 2.5–7.5 mmol/L |
| Lactate dehydrogenase         | 166     | <250U/L |
| Aspartaat aminotransferase    | 14      | <40U/L |
| Alanine aminotransferase      | 13      | <50U/L |
| Alkaline phosphatase          | 127     | <120U/L |
| Gamma-glutamyl transferase    | 96      | <50U/L |

An urgent operation for aortic reconstruction was performed with the use of an autologous graft from the right superficial femoral vein, according to Nevelsteen [3]. Fig. 2 shows the venous interposition graft in the aorta. Peroperatively the contained rupture of the aortic wall dorsally was confirmed as seen on CT-A, after the aorta was clamped and opened retroperitoneal purulent fluid could be released. The fluid was taken for cultures. The operation was carried out by two experienced vascular surgeons. The patient received narcosis and is operated in supine position. After surgery the patient was transferred to the ICU. He showed a rapid recovery and was transferred to the surgical ward after four days. The peroperative cultures of the removed aortic wall and the retroperitoneal purulent fluid tested positive for Prevotella intermedia. The blood cultures taken before transfer subsequently also demonstrated Prevotella intermedia. To investigate the aetiology of the infection, a dental examination by a dental surgeon and a transthoracic heart ultrasonography by a cardiologist were conducted. No infection source could be determined. Markers for inflammatory vasculitis also turned out to be negative. Serology for syphilis and Coxiella burnetii turned out to be negative.

Postoperatively, the patient was treated with antibiotics (amoxicillin/clavulanic acid 1000/200 milligrams four times daily and metronidazole 500 milligrams three times daily) for two weeks intravenously. After this period, antibiotics were switched to oral clindamycin (600 milligrams three times daily) for another four weeks. During this period infection parameters were closely monitored and decreased to normal value. Ultimately the patient recovered uneventfully from the surgery. No impairing edema on
3. Discussion

Aortitis encompasses all infectious or non-infectious conditions in which there is an abnormal inflammation of the aortic wall. It might be accompanied with aortic dilatation (aneurysm), fibrous thickening, ostial stenosis of major aortic branches or dissection. This can result in aortic insufficiency or rupture if not treated adequately [4]. Because of the broad spectrum of possible causes of aortitis, the incidence as a distinct entity is poorly studied [1]. In a study of 1204 surgical aortic specimens, 168 (14%) had inflammation and 52 (4.3%) were classified as having idiopathic aortitis [5]. Vasculitis as cause of aortitis has an incidence of 1–3 new cases per million per year [1].

Pathological examination of the aorta can reveal various histological patterns, related to different aetiologies. The possible infectious aetiologies are listed in Table 2 [1].

The most common reported pathogens in aortitis are Salmonella species and Staphylococcus aureus [6]. Other possible pathogens are listed in Table 2. In the patient of this case, the peroperative cultures turned out to be positive for Prevotella intermedia. This is a gram-negative pigmented species commonly found in oral flora and oral-associated infections [7]. To the knowledge of the authors there is to date no other description of an acute infectious and symptomatic aortitis caused by this micro-organism. In retrospect, there might have been a relation between the sore throat the patient suffered from two weeks earlier and the presentation of his infectious aortitis. It was hypothesized that this clinical presentation was caused by migration of the micro-organisms to a place with adhesive opportunities like the atherosclerotic aortic wall.

The clinical signs and symptoms of an aortitis can be non-specific and sometimes may mimic other diseases [1]. Sometimes obvious symptoms appear during complications, like in this particular case. Non-specific clinical manifestations include pain, fever, weight loss and general status alteration [1]. The patient’s clinical history, symptoms, physical examination, laboratory tests in combination with additional imaging can diagnose aortitis [1]. When aortitis is expected it should be confirmed with a CT-angiography or magnetic resonance imaging (MRI, vascular: MRA). In this case it was decided to make a CT-angiography because it is a rapid diagnostic method. Positron emission tomography scans (PET) can demonstrate signs of inflammation of the aorta. The outcome of the scans, clinical presentation and laboratory findings should be critically reviewed by a multidisciplinary team, as in this case, to assess the risk of rupture and discuss potential therapeutic approaches [1].

The combination of biochemical parameters, microbiology result, clinical presentation and imaging modalities should distinguish between inflammation and infection of the aortic wall [1]. In this case there was an infectious aortitis based upon the positive blood cultures, highly elevated blood infection parameters and changes of the aortic wall with signs of gas in the surrounding edema.

According to a recent review about aortitis, an experienced multidisciplinary team should be involved in diagnosing and management of this serious disease, including a vascular surgeon,

### Table 2
Presently known/identified micro-organisms causing infectious aortitis.

| Infectious aortitis |
|---------------------|
| Bacterial           |
| – Escherichia spp.  |
| – Salmonella spp.   |
| – Staphylococcus spp. |
| – Streptococcus pneumonia |
| – Treponema pallidum (syphilis) |
| – Mycobacteria (i.e., mycobacterium tuberculosis) |
| – Others: Campylobacter fetus, Listeria monocytogenes, Pasteurella multocida, Brucella melitensis, Haemophilus influenza, Clostridium septicum, Burkholderia pseudomallei, Nocardia asteroides, Coxiella Burnetii. |
| Fungal              |
| – Candida           |
| – Aspergillus       |
| – Cryptococcus      |
| – Paracoccidioidomycosis. |

![Fig. 3. Time line case report [2].](image-url)
a cardiologist, an internal medicine/rheumatology specialist, an infectious disease specialist and a medical microbiologist [1].

The treatment of infectious aortitis consists of antibiotics and invasive treatment of the complications, like surgical intervention for aneurysmal dilatation, vessel stenosis or aortic dissection or rupture [1]. Antibiotics must be effective against the causative infectious agent and its antibiotic sensitivity pattern. When cultures are non conclusive (yet), the therapy should at least cover all common pathogens known to cause aortitis, like *S. aureus* and gram-negative rods, like *Salmonella* [6,8]. The optimal duration of antibiotic therapy is still unknown and also depends on other factors such as presence of prostheses in the aortic wall. However, at least six weeks of antibiotic treatment is generally recommended to assure eradication of the pathogen(s). Preferably the first two weeks antibiotics should be administered intravenously [6,8]. A longer course should be considered if symptoms persists or biochemical inflammation parameters are still elevated [6]. In cases of an aortic repair with foreign-body material antibiotic therapy should be continued during a long time, and mostly life-long [1,9]. The patient in this case was treated with a venous interposition graft and therefore two weeks of intravenous antibiotics followed by four weeks of oral antibiotics was sufficient.

This retrospective study of a rare case may contribute to awareness when doctors are confronted with patients with infectious and acute symptomatic aortitis caused by vectors such as *Prevotella intermedia*.

### 4. Conclusion

Acute aortitis is a rare but potentially life-threatening disease. The aetiology can be ordered into two main groups, according to the presence or absence of an infectious agent [1]. This report presents a case of an acute and complicated infectious aortitis with a rare pathogen, called *Prevotella intermedia*. This emphasizes the importance of an accurately approach of a patient with an indistinct presentation. Besides, this case stresses the importance to refer patients with a suspected aortitis to a vascular center with experience in the medical and surgical treatment of this specific and potentially mortal disease. The diagnosis and treatment options and effects should be closely monitored, considered and reassessed with an experienced multidisciplinary team.

### Conflicts of interest

There are no conflicts of interest.

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### Ethical approval

Not necessary.

### Consent

Informed consent from the patient was obtained for writing this case report and using pictures.

### Author contribution

C. Boersma: data interpretation, writing the paper.
L.M. Kampschreur: involved in writing.
H. Buter: involved in writing.
B.M. Doorenbos: involved in writing.
P. Klinkert: involved in writing.
G.G. Koning: idea, study concept, data interpretation, writing the paper, supervisor.

### Guarantor

1. Catharina Boersma.
2. G.G. Koning.

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