



An angry cat causing *Pasteurella multocida* endocarditis and aortic valve replacement—A case report

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ABSTRACT

INTRODUCTION: Cat bite infections usually involve a mix of anaerobic and aerobic bacteria including species of *Pasteurella*, *Streptococcus*, *Staphylococcus*, *Bacteroides*, and *Fusobacterium*. We report a case of *Pasteurella multocida* infection from cat bites leading to endocarditis and subsequent aortic valve replacement.

PRESENTATION OF CASE: A 70-year-old male was admitted because of fever, tachycardia, and malaise. He had a history of alcohol abuse and was living alone with a cat in a rural area. A sepsis of unknown origin was suspected, and intravenous treatment with gentamicin and cefotaxime was initiated. Blood cultures yielded *Pasteurella multocida*, and the patient history revealed repeated cat bites. After four days, the patient was discharged with oral penicillin V treatment. Two weeks later, the patient returned with fever and a new systolic murmur. An aortic valve endocarditis was diagnosed, and it became clear that the patient had not completed the prescribed penicillin V treatment. The patient underwent a biological aortic valve replacement with debridement of an annular abscess, and the postoperative course was uneventful.

DISCUSSION: Endocarditis due to *Pasteurella* is extremely rare, and there are only a few reports in the literature. Predisposing factors in the present case were alcohol abuse and reduced compliance to treatment.

CONCLUSION: Cat bites are often deep, and in rare circumstances can lead to life-threatening endocarditis. Proper surgical revision, antibiotic treatment, and patient compliance are necessary components in patient care to avoid this complication.

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1. Introduction

Infectious endocarditis is an infrequent but persistent reason for acute valve surgery. The most common causative bacterial agents are staphylococci, streptococci, and Enterococci [1]. The majority of patients are treated with intravenous antibiotics, and remission of infection is often accomplished. The indications for acute surgery are mainly heart failure caused by aortic or mitral regurgitation, uncontrolled infection, or prevention of thromboembolism [1].

Pasteurella multocida is a Gram-negative, facultative anaerobic coccobacillus and a common member of the oral bacterial flora of cats and dogs. In humans, it can cause skin and wound infections after bites and scratches. It is commonly treated with amoxicillin or

penicillin V, and sepsis in humans caused by *Pasteurella multocida* is a rare disease [2–4]. We therefore report a case of native aortic valve endocarditis caused by *Pasteurella multocida* from cat bites. The report follows the CARE guidelines [5].

2. Presentation of case

A 70-year old man was admitted to our hospital because of fever, tachycardia, and diarrhoea. He had a four-week history of weakness, fatigue, and low nutritional intake combined with alcohol overconsumption and smoking. He was living alone with a cat in a rural area.

At admission, the patient was febrile (39.2 °C), heart rate was 150 beats per minute, respiratory rate was 28 breaths per minute, and blood pressure was 130/90 mmHg. No obvious murmurs could be heard at auscultation and no wounds or scratches were observed. Laboratory findings were as follows: C-reactive protein 111 mg/L, haemoglobin concentration 151 g/L, leukocyte count $9.7 \times 10^9/L$, thrombocyte count $69 \times 10^9/L$, and serum creatinine 123 $\mu\text{mol/L}$.

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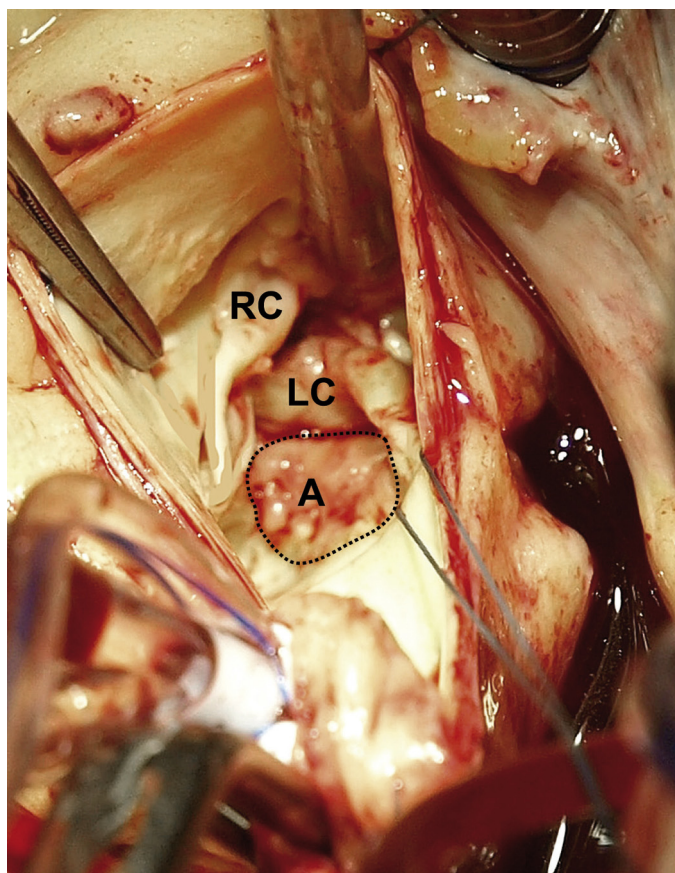


Fig. 1. Aortic valve at surgery with bacterial vegetations and abscess formation at the base of the left coronary cusp. RC = right coronary cusp; LC = left coronary cusp; A = abscess.

A sepsis of unknown origin was suspected, and intravenous treatment with gentamicin and cefotaxime was initiated.

After two days, the patient was afebrile, and blood cultures yielded *Pasteurella multocida*. The resistance pattern yielded a low minimum inhibitory concentration for penicillin. The patient history revealed that the patient's cat was intermittently aggressive, resulting in repeated bites on the hands and forearms. The diagnosis was established as a *Pasteurella multocida* sepsis caused by bites from a domestic cat, and the patient was discharged after four days with a regimen of penicillin V orally for ten days.

After two weeks, the patient was readmitted because of fever, lethargy, and circulatory instability. Laboratory tests showed C-reactive protein 71 mg/L, haemoglobin concentration 145 g/L, leukocyte count $13.7 \times 10^9/L$, thrombocyte count $7 \times 10^9/L$, and serum creatinine $442 \mu\text{mol/L}$. A recurrent sepsis was suspected, and treatment was initiated with tobramycin and cefotaxime. A new systolic murmur in the right second intercostal space was present, and transeosophageal echocardiography showed an 11×13 mm vegetation on the aortic valve, a moderate aortic valve stenosis, and a grade II/III aortic insufficiency. It became clear that the patient had not taken the prescribed antibiotic regimen of penicillin V after discharge, and a preliminary diagnosis of *Pasteurella multocida* endocarditis was made. Intravenous treatment with ampicillin was initiated, and repeated evaluations of the aortic valve were conducted. After two weeks of treatment, an abscess had formed in the aortic root and aortic insufficiency had increased, indicating a need for aortic valve surgery.

At surgery, endocarditic vegetations on the margins of the aortic cusps were present. After removal of the aortic valve, an abscess was observed in the annulus of the left coronary cusp (Fig. 1). Exten-

sive debridement of infectious tissue was performed, the abscess was closed with pericardial tissue, and a 23 mm porcine aortic valve was implanted (Hancock II, Medtronic Inc, Minneapolis, MN, USA).

The postoperative course was uneventful apart from a decubital sacral wound, and cultures from the aortic valve cups were negative. The patient was treated postoperatively with cefotaxime combined with ciprofloxacin for two weeks, followed by two weeks of piperacillin-tazobactam and ciprofloxacin to treat the pathogens in the infected decubital wound. Postoperative echocardiography showed a well-functioning tissue aortic valve with no signs of endocarditis or abscess.

3. Discussion

Infections caused by *Pasteurella multocida* in humans usually consist of skin infections and cellulitis due to bites or scratches, but airborne infections have been reported [2]. Endocarditis due to *Pasteurella multocida* is extremely rare [3]. Most serious infections by *Pasteurella multocida* are linked to predisposing factors such as immunosuppression, diabetes mellitus, or liver dysfunction [3]. In our case, alcohol overconsumption and secondary liver dysfunction together with inadequate adherence to prescribed antibiotic medication were predisposing factors explaining the aggressive infection.

Cat bite infections usually involve a mix of anaerobes and aerobes including species of *Pasteurella*, *Streptococcus*, *Staphylococcus*, *Bacteroides*, and *Fusobacterium* [6,7]. Around 30–40% of cat bites on the hands become infected, due to the comparably deep penetration and small skin opening; antibiotic treatment is recommended for all bite wounds [6]. In our patient, repeated hand and forearm bites and scratches were reported, but no wound or abscess formation could be observed.

Approximately half of all patients with left-sided infective endocarditis ultimately need surgery because of complications [1]. The three main indications for surgery are heart failure, uncontrolled infection, and prevention of thromboembolism [1,8]. In our patient, surgery was postponed two weeks during antibiotic treatment and repeated echocardiographic evaluation. The final indication for surgery was heart failure with progressive aortic insufficiency and an aortic root abscess formation suggesting uncontrolled infection.

4. Conclusion

Cat bites contain a mixture of pathogenic bacteria, and often have a deep penetrance. Although most bites are easily treated with revision and antibiotics, in certain compromised patients cat bites can lead to sepsis due to *Pasteurella multocida*, and, in rare cases, to life-threatening endocarditis. The learning points from this report are as follows:

1. In patient with cat bites, proper surgical revision is necessary.
2. Antibiotic treatment and patient compliance are necessary components to avoid complications. If reduced compliance is suspected, hospitalization during treatment should be considered.
3. Special consideration should be given to patients with diabetes mellitus, ongoing immunosuppression, or alcohol overconsumption.

Consent

The patient's family have consented to this report.

Conflicts of interest

None declared.

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Ethical approval

Ethical approval is not necessary according to local regulation as this case report does not involve research. The family of the patient, who is now deceased, have given full consent to the publishing of this report.

Author contributions

Anders Ahlsson: data collection, interpretation, writing of the paper.

Örjan Friberg: interpretation, writing of the paper.

Jan Källman: interpretation, writing of the paper.

Guarantor

Anders Ahlsson.

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