

# PASTEURELLA MULTOCIDA SEPTICAEMIA FOLLOWING A DOG BITE

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## ABSTRACT

*Bite wounds are often mistakenly considered innocuous. However they are frequently complicated by infection which may be serious.*

*We describe a case of Pasteurella multocida septicaemia with myopericarditis following a dog bite. Treatment of the infection as well as active support of myocardial function led to a successful outcome.*

*Keywords: dog bite, pasteurella multocida, septicaemia, myopericarditis*

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## INTRODUCTION

A dog bite is a fairly common occurrence, and many patients do not seek medical attention. However, it may give rise to local cellulitis and occasionally to serious systemic complications. This case report describes a patient who developed life-threatening septicaemia due to *Pasteurella multocida* infection following a dog bite.

## CASE REPORT

A 42-year-old man who was previously in good health was admitted to hospital two days after being bitten on the left hand by a dog. He was ill with fever, rigors, prostration and confusion. There was swelling, redness and tenderness of the left ring finger. The body temperature was 39°C. The patient was toxic looking, restless and disorientated. The pulse rate was 100/min. The blood pressure was 120/80 mmHg. The respiratory rate was 30/min. Blood cultures were obtained. A diagnosis of septicaemia secondary to a hand wound infection was made and treatment was instituted with intravenous gentamicin, ceftriaxone and metronidazole.

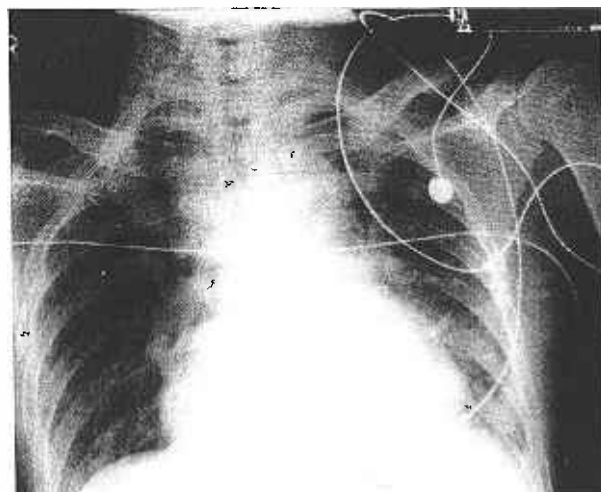
Over the next 24 hours, there was haemodynamic deterioration with increasing breathlessness, a rising tachycardia, hypotension (BP 70/50 mmHg), elevation of the venous pressure to the angle of the jaw and clinical evidence of heart failure. Circulatory support and treatment of the heart failure was instituted. This required careful monitoring of the administration of diuretics, fresh frozen plasma, platelets and inotropic agents.

Laboratory investigation revealed a haemoglobin of 12.0 g/dl, a white cell count of  $21.2 \times 10^9/L$ , and a platelet count of  $40,000/mm^3$ . The urea was 12.7 mmol/L, sodium 141 mmol/L and potassium 4.1 mmol/L. On blood gas analysis, the pH was 7.431,  $pO_2$  61.1 mmHg,  $pCO_2$  20.7 mmHg and the bicarbonate 16.6 mmol/L. The prothrombin time was 17 secs (control 13 secs).

The partial thromboplastin time was 40 secs (control 28 secs). There was a rise of the serum cardiac enzymes. The creatine kinase (CK) was 2968 U/L, the aspartate aminotransferase (AST) was 222 U/L and the lactic dehydrogenase (LDH) was 950 U/L.

The chest X-ray (Fig 1) showed an enlarged cardiac shadow and pulmonary congestion.

Fig 1 - Chest X-ray showing enlarged cardiac shadow and pulmonary congestion



Serial ECG's (Fig 2a, b and c) demonstrated the development of widespread ST segment elevation indicative of acute pericarditis.

Echocardiographic findings were those of poor myocardial contractility and the presence of a pericardial effusion.

Three blood cultures grew *Pasteurella multocida* which was sensitive to penicillin G, ampicillin, ceftriaxone, gentamicin, amikacin and aztreonam.

There was gradual improvement in the patient's condition and he made a full recovery. No residual cardiac decompensation was detected at follow-up.

## DISCUSSION

A dog bite is a fairly common occurrence, and is often considered innocuous both by the patient and by the physician. However, there is now greater awareness of the magnitude of the infectious complications of a dog bite. A dog's teeth can exert a pressure of 250-500 psi<sup>(1)</sup> causing crush injury and much devitalised tissue. The average dog's mouth harbours many different species of bacteria<sup>(1)</sup>. The potential for infection following a dog bite is therefore great. Infection is usually caused

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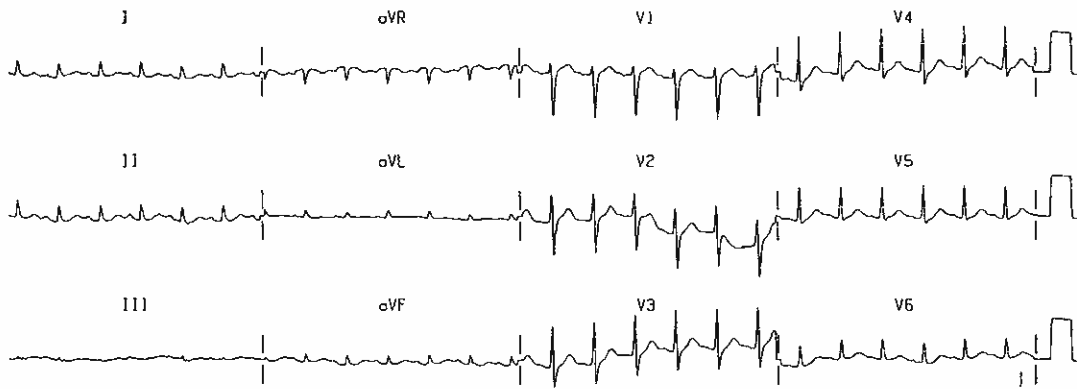
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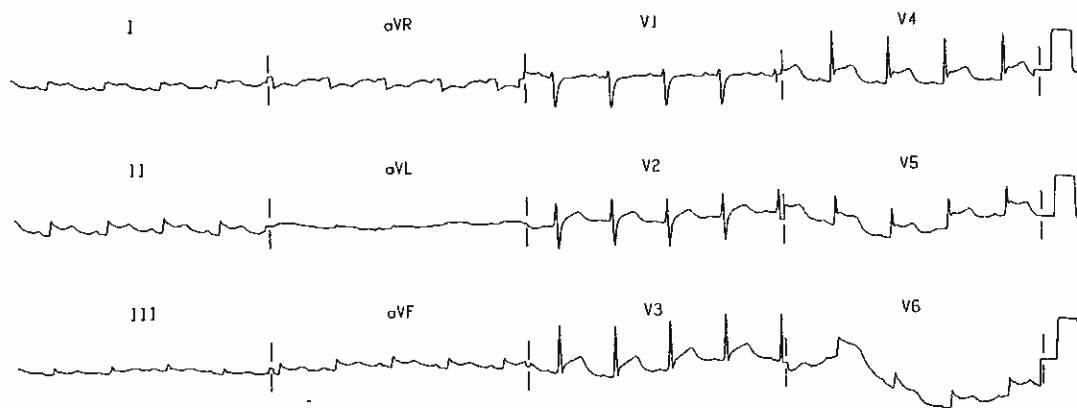
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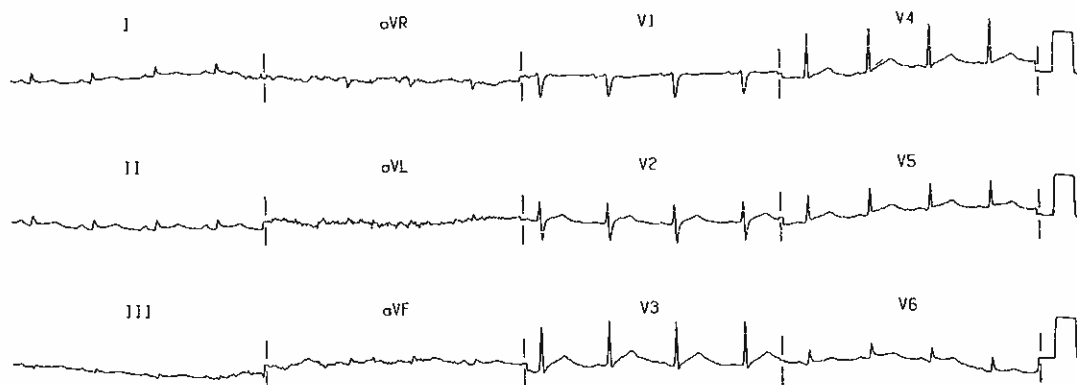
**Fig 2a - Day 1: Sinus tachycardia rate 148/minute**



**Fig 2b - Day 2: Widespread ST segment elevation indicative of acute pericarditis**



**Fig 2c - Day 3: ST segments have returned to the isoelectric line**



by organisms from the dog's oral flora. The most significant one is *Pasteurella multocida* which has been isolated in up to 50% of infected dog bites<sup>(2)</sup>.

*Pasteurella multocida* is a gram negative cocco-bacillus which is distributed worldwide and has been recovered from the nasopharynx and gastrointestinal tract of many domestic and wild animals, eg cattle, sheep, cats, dogs, lions, in birds like chicken, turkeys and ducks as well as in humans. Carriage rates are quite high: 70-90% in cats, 50-60% in dogs<sup>(3)</sup>. The organism can be pathogenic in many species of animals giving rise to haemorrhagic septicaemia, pneumonias and chicken cholera<sup>(3)</sup>.

Human infection usually results from animal bites, but may occur following animal exposure without any obvious history of bite, presumably from animal scratches. It has also rarely been reported in the absence of animal exposure. Although dog bites account for the majority of animal bites, most *Pasteurella* infections are caused by cats<sup>(4)</sup>.

Infection by *Pasteurella multocida* usually causes focal soft tissue cellulitis and purulent discharge<sup>(4)</sup>. Sometimes there may be accompanying lymphangitis and lymphadenitis. Wounds close to joints or bones may be complicated by septic arthritis, osteomyelitis, tenosynovitis or local abscesses<sup>(5-7)</sup>. Septicaemia resulting from *Pasteurella multocida* infection is a

rare event in itself<sup>(8)</sup>, and the cases described are usually in immunocompromised patients with hepatic cirrhosis or malignancy<sup>(9-12)</sup>. The reported complications of *Pasteurella multocida* septicaemia include endocarditis, meningitis and brain abscess. There have been single case reports of purulent pericarditis<sup>(13)</sup>, and infection of a prosthetic vascular graft<sup>(14)</sup>. The mortality from *Pasteurella multocida* septicaemia is around 37%<sup>(9)</sup>. Among infections not related to animal bites, the most common is pulmonary pasteurellosis occurring most often in patients with underlying chronic lung disease, bronchogenic carcinoma or bronchiectasis<sup>(15)</sup>.

Our patient developed *Pasteurella multocida* septicaemia which was complicated by acute pericarditis and pericardial effusion. In addition, there was myocardial involvement, as evidenced by the elevated cardiac enzymes, poor contractility on echocardiogram and the presence of cardiac decompensation.

A dog bite therefore may not be as harmless as it appears, and the potential for septicaemia from *Pasteurella multocida* or other organisms must not be overlooked. It is therefore imperative that wound toilet, surgical debridement, anti-tetanus toxoid and antibiotic treatment be administered promptly. *Pasteurella multocida* infection is sensitive to most antibiotics including penicillin which is the antibiotic of choice.

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