The management of animal and human bite wounds

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Every year, large numbers of people are bitten by animals, and a smaller number by humans. The consequences can be serious. However, better health education to help prevent bites and teaching a bite-avoidance strategy when someone is being treated for a bite may help to reduce the problem. This article discusses treatment options and the possible complications of bite wounds.

Most bite wounds are caused by dogs, cats or humans. In the UK dog bite wounds account for 0.5–2 per cent of new attendances at A&E departments (Chaudhry et al, 2004; Smith et al, 2003) – an estimated 200,000 cases a year. However, several studies have shown that less than 50 per cent of bites are reported (Ostanello et al, 2005; Medeiros and Saconato, 2004; Kahn et al, 2003). Wounds in adults are usually on the arms or legs and in children on the face or scalp.

What makes animals bite?

In over 70 per cent of cases people are bitten by their own pets or by an animal known to them (Medeiros and Saconato, 2004). It appears that most dog bites, if not other animal bites, result mainly from the victim’s behaviour (Kahn et al, 2003). Medeiros and Saconato (2004) found that children under five years old were significantly more likely than older children to have provoked an animal before being bitten.

Dogs are more likely to inflict bites that require medical attention (Fig 1), and it is estimated that they account for about 80–90 per cent of animal bites (Ostanello et al, 2005; Chaudhry et al, 2004). Cats are responsible for nearly 20 per cent of bites, and rabbits, guinea pigs, hamsters, rats and mice cause a small percentage (Ostanello et al, 2005). Although human bites are relatively uncommon, they can have serious consequences.

The peak incidence of dog and cat injuries is in the summer months between May and August, according to Ostanello et al (2005), while Bhattacharjee et al (2000) conclude that the full moon is associated with a significant increase in animal bites to humans.

Gender and age

Dog bite injuries are more common in males and younger individuals, with the highest incidence occurring in those aged 20–29 years. Bites are most common on the lower extremities, although children under nine have a significantly higher risk of being bitten on the head, face and neck. Cat injuries are more than twice as common in females as in males, and the highest incidence is in those aged between 60 and 69 years (Ostanello et al, 2005).

Human bites are most common in children and can be the result of playing or fighting with other children but they may also indicate abuse (Broder et al, 2004). In adults they are more likely to be the result of sexual or physical assault. There are more male than female victims in most age groups.

Potential complications

In the UK the main complications of animal bites are related to infection but rabies is an additional problem in many countries.

Infection

Animal and human mouths contain a mixture of aerobic and anaerobic organisms. The most commonly isolated bacteria are *Pasteurella multocida*, followed...
by streptococi, staphylococci, moraxella, corynebacterium and neisseria (Medeiros and Saconato, 2004). Mellor et al (1997) note that local or systemic infections after a bite are more likely in patients who are immunocompromised by haematological malignancy, splenectomy or cirrhosis.

Bower (2003) notes that even minor bites can penetrate a tendon sheath, joint capsule, bone or nerve, resulting in more serious complications such as septic arthritis and osteomyelitis. These complications are more common with cat bites because the narrow, sharp feline incisors can puncture tissue and penetrate a bone or joint.

Dog bites are associated with a risk of crush injury, and infection in the resultant devitalised tissue is often a problem. Approximately 15–20 per cent of dog bite wounds become infected and it is not possible to predict when or if this will occur with any certainty (Bower, 2003). Patients often present with swelling and a grey malodorous discharge, usually within 24 hours of sustaining a bite injury.

Cat-scratch disease can result from cat bites and scratches. The infection usually presents with an erythematous inoculation papule 8–10 days after the injury, followed by adenitis (inflammation of the lymph glands) and fever. The infection usually resolves within two months, although severe infections may require treatment with tetracycline (Bower, 2003).

**Human bite wounds**

Human oral flora include *Streptococcus viridans*, *Staphylococcus aureus* and *Eikenella corrodens*. Infection following a bite can lead to cellulitis, osteomyelitis and septic arthritis. About five per cent of people presenting with human bite wounds require amputation because the vascular blood flow to the wound is compromised or there are complications associated with infection (Bower, 2003).

Injuries to a clenched fist are regarded as more serious than occlusal injuries, such as a bite to an arm, because the metacarpophalangeal joint is in flexion during a punch, allowing the teeth to penetrate the joint space easily. The wound may appear small but when the fist is unclenched the tendons retract and infection can be carried under the skin (Bower, 2003).

**Tetanus**

Wounds containing devitalised tissue, dirt and saliva are at risk of contamination with *Clostridium tetani*, the bacteria that cause tetanus. Bower (2003) recommends that all crush injuries and wounds that are deeper than 1cm are considered at risk of this infection. Tetanus prophylaxis should be given according to Department of Health guidelines (DoH, 2004).

**Rabies**

This disease is carried by animals including dogs, foxes and bats, and may be contracted as a consequence of being bitten or scratched by a rabid animal. Although it is not a problem in the UK, it should be considered when patients have been bitten abroad.

**Hepatitis B and HIV**

These infections can be spread by bite wounds if the person who bites carries the virus.

**Cleaning and closing the wound**

Careful and thorough cleaning is one of the most important factors in the care of bite wounds. Medeiros and Saconato (2004) note that there are no reliable studies related to debridement, irrigation and decontamination measures, but there is consensus in the literature that such measures are likely to be beneficial. Smith et al (2003) suggest that rigorous cleaning and closing the wound

**REFERENCES**


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The literature indicates that prophylactic antibiotics only reduced infections of the hand (Broder et al, 2004; Chaudhry et al, 2004; Medeiros and Saconato, 2004). There is only limited evidence but, when all causes and sites of bites inflicted by mammals were combined, antibiotics did not seem to reduce the infection rate.

Partial thickness bite wounds have a low rate of infection, as do facial, head and neck wounds. Bite wounds in children are less likely to become infected (Smith et al, 2003), therefore unless there is some other reason to prescribe them, antibiotics are probably not necessary in these cases. Smith et al (2003) recommend that patients are instructed on recognising the signs of infection and advised to return to A&E or to see their GP only if they occur.

Clearly, patients who present with an infected bite wound will require antibiotics and, as indicated above, there is some evidence for prescribing them prophylactically for bite wounds of the hand. Infection is more likely in patients who are immunocompromised and in those who present for treatment more than eight hours after injury with a wound that has not been adequately cleaned. Correira (2003) believes antibiotic prophylaxis should also be prescribed for patients with wounds in which there is a high risk of infection developing.

Choice of antibiotics

Correira (2003) emphasises the need for treatment with antibiotics for bites containing beta-lactamase-producing aerobic and anaerobic organisms, including the Pasteurella species in animal bites and Eikenella corrodens in human bites.

Bower (2003) recommends the use of penicillin and co-amoxiclav (a beta-lactamase inhibitor). Some of the newer cephalosporins or cefuroxime axetil may be used in patients who are sensitive to penicillin (Goldstein et al, 2002). Antibiotic therapy will be needed for 3–5 days for wound infection, 10–14 days if cellulitis is present and longer when there are complications such as osteomyelitis (Bower, 2003).

Conclusion

The prevention of animal bites should be encouraged, and Ostanello et al (2005) believe that better health education may reduce the problem. Medeiros and Saconato (2004) found that an educational programme for schoolchildren increased precautionary behaviour related to dogs. Also, teaching a bite-avoidance strategy when someone is being treated for a bite will help to avoid future similar injuries.

A review conducted by Chaudhry et al (2004) concluded that the management of dog bite wounds in the UK is not entirely evidence-based. It is important to clean all bite wounds rigorously, and to determine which ones should be considered for primary closure.

Guided reflection

Use the following points to write a reflection for your PREP portfolio:

- Identify your place of work and why this article is relevant to you;
- Write about the last time you dealt with a bite injury;
- What new information have you learnt about the management of bites?
- How would this information change the way you treat a patient following a bite?
- Describe how you will follow up this new learning.

References


(2004) reviewed 74 papers and concluded that bite wounds on the hand should be left open and that non-puncture wounds elsewhere may be treated safely with primary closure after thorough cleaning. Chaudhry et al (2004) found that most A&E departments close bite wounds to the face. Bower (2003) agrees that these wounds heal well when sutured but suggests that they should be sutured by a plastic surgeon to limit scarring.

Medeiros and Saconato (2004) found insufficient evidence to determine whether primary wound closure had any effect on infection rates. The best advice seems to be to leave the wound open or to consider delaying primary closure of infected wounds, puncture wounds and wounds that are more than 24 hours old (Bower, 2003) and to ensure that all other wounds are irrigated and meticulously debrided before suturing. The use of skin-closure strips is not advocated as a wound closure method as they can lead to seroma formation (a collection of serous fluid) and subsequent infection (Smith et al, 2003).

Administering antibiotics

There is debate about whether prophylactic antibiotics should be given to every patient with an animal bite wound. Because wound infection cannot be predicted with any certainty (Smith et al, 2003), the maxim ‘better safe than sorry’ has often been followed. Mellor et al (1997), for example, recommend antibiotic prophylaxis for all animal bite victims.

However, Chaudhry et al (2004) believe prophylactic antibiotics are over-used, with associated cost implications, and current literature suggests they should be used with caution. Smith et al (2003) note that limiting antibiotic prescribing to those with infected wounds would have cost benefits and avoid the unnecessary treatment of large numbers of patients.

Bower (2003) found that up to half of cat bites and scratches result in infection and that the signs are usually evident after 12 hours, while in dog bites (where the infection rate is only 2–3 per cent, according to Chaudhry et al, 2004) signs of infection are not usually evident until 24 hours after the bite occurs.