Management of human bite injuries of the hand

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On the basis of experience at the Ottawa Civic Hospital over the past 10 years, a classification of and protocol for the management of human bite injuries of the hand are presented. Early exploration of such wounds under local anesthesia improves the outcome by facilitating adequate cleansing of the wound and enabling deep structures to be visualized. In this way the risk of major sepsis and of the disability so frequently associated with these innocent-looking injuries can be reduced.

Les morsures humaines à la main font l'objet d'une classification et d'un protocole thérapeutique fondés sur l'observation des cas traités depuis 10 ans à l'hôpital Civic d'Ottawa. Le débridement précoce des plaies sous anesthésie locale permet d'en assurer la propreté et d'explorer les tissus profonds. On diminue de sorte le risque infectieux grave et les pertes fonctionnelles qui résultent souvent de blessures qui de prime abord ont semblé bénignes.

Human bite injuries of the hand have been recognized as a major cause of disability since the first reports appeared in the medical literature early in this century. Since that time many case reports and comprehensive reviews have drawn attention to the unique characteristics of the severe infections so often associated with these injuries. Mann and colleagues' review of 20 years' experience includes the most complete bibliography currently available on this subject.

The injury usually occurs when an assailant strikes a person in the face and suffers a penetrating injury of the hand on the victim's anterior teeth. The innocent-looking puncture wounds frequently progress to acute necrotizing soft-tissue infections that are fulminant in their course and devastating in their consequences.

Two major factors appear to account for the typical clinical features of these injuries: (a) the unfavourable bacteriologic agents in the mouth, including various anaerobes and frequently *Staphylococcus pyogenes,* and (b) the frequency with which these injuries penetrate joint or peritendinous synovium, which is poorly protected on the dorsum of the hand by a thin layer of skin and loose areolar connective tissue or paratenon.

Clinical features

Over the past 10 years there has been a marked increase in the incidence of human bite injuries and associated infections seen at the Ottawa Civic Hospital. My colleagues and I, as well as other investigators, have found that the results of treatment are much better in patients who present or are referred for treatment soon after the injury has occurred. We developed and eventually modified a protocol for the management of human bite injuries on the basis of the following clinical observations:

- Many patients present well within the "golden period" (i.e., 6 to 8 hours after the injury) with obvious or even advanced signs of sepsis.
- Patients presenting with sepsis are at a high risk of suppurrative arthritis, tenosynovitis and osteomyelitis despite appropriate antibiotic therapy.
- The wounds are usually small and therefore cannot be adequately cleaned or explored without extension.
- Patients who presented early without signs of sepsis but, despite adequate antibiotic therapy, later suffer major septic complications usually had an unsuspected or undetected laceration of a joint, tendon or tendon sheath.
- Patients tend to be noncompliant, often failing to take the prescribed antibiotics or taking them too late to prevent major sepsis. They are unreliable in keeping follow-up appointments and are often ethanol abusers.

Treatment protocol

We developed a treatment protocol in an attempt to reduce the high incidence of complications associated with human bite injuries. It is hoped that the simple classification upon which the protocol is based will enable primary care physicians to identify patients at the highest risk of severe septic complications and thereby encourage early referral to a hand surgeon.

Patients are divided into two major groups according to whether they present early or late for treatment. For inclusion in the "early" group the patient must present within 3 hours after the injury and have none of the classic signs of sepsis,
principally erythema and exudation. All other patients are included in the “late” group. All the patients in the “early” group are then subdivided into those with superficial and those with deep wounds.

Early presentation

Superficial wounds are defined as scratches or abrasions that do not penetrate the full thickness of the skin. They rarely lead to severe infection and can be managed on an outpatient basis without the need for a surgical referral.

The wound should be scrubbed thoroughly following the administration of a local anesthetic, if necessary, then the hand should be immobilized in the position of function with a volar plaster of Paris slab, applied lightly and covered with a tensor bandage from the fingertips to the mid-forearm. A short course of high-dose therapy with cloxacillin (0.5 g four times daily for 3 days) should be prescribed. The hand should be kept elevated and the wound inspected within 24 hours.

Superficial noninfected wounds are the only human bite injuries that, in our view, should be treated without surgical intervention. Patients who return to hospital within 24 hours with established sepsis are treated according to the principles for “late” presentation.

Deep or full-thickness skin wounds are associated with the highest incidence of septic complications, even when they are treated early. Their outcome, in our experience, depends primarily on whether the wound has penetrated an underlying joint, tendon or peritendinous synovium. To determine the wound’s severity we treat all such wounds as follows:

- Local analgesia is obtained by infiltration or digital block with 2% lidocaine, and the wound(s) is extended to at least 2 cm in length.
- A swab is taken and submitted for aerobic and anaerobic culture and sensitivity testing.
- The wound is irrigated copiously with 3% hydrogen peroxide.
- The wound is explored, usually with the use of a digital or brachial tourniquet, to establish whether joint or tendon damage has occurred.

Management at this point depends on whether the deep structures are found to be intact. If they are intact the wound is left open and the hand dressed and splinted as described earlier. Oral therapy with cloxacillin, 500 mg, and phenoxymethyl penicillin (penicillin V), 300 mg, each four times daily, is prescribed. A single equivalent parenteral dose is administered at this time to compensate for the delay so often encountered when prescriptions are written in the emergency department. Tetanus vaccine is given, and the patient is discharged after being asked to return in 24 hours.

If the wound has penetrated a joint or tendon or both, the structures are opened further, irrigated with 3% hydrogen peroxide, left open and dressed and splinted. We have found continuous wound irrigation with antibiotic solutions to be cumbersome and unnecessary; instead, patients with such injuries are admitted to hospital and given intravenously benzylpenicillin (penicillin G), 1 million IU, and cloxacillin, 1 g, every 6 hours starting immediately.

Late presentation

All patients with human bite injuries who present with established sepsis usually undergo exploration and drainage of the wound. They require the same dressing, splinting and antibiotic treatment as those in the “early” group. Many will also need arthroscopy or drainage of the tendon sheath, or both, and some may eventually require sequestrectomy or amputation.

Summary

There are three points that should be emphasized in the management of these injuries. First, an x-ray film of the hand should always be made when the patient is first seen in order to detect fractures or embedded tooth fragments. Second, patients who are allergic to penicillin merit special consideration since the second-choice antibiotics seem to be less effective. We use erythromycin, preferably, or a cephalosporin. We have not encountered any allergic reactions to cephalosporins given orally among patients who are allergic to penicillin.

Finally, we strongly disagree with the conservative approach to the management of human bite injuries advocated by some authors. The absence of clinical evidence of suppuration is not, in our view, an indication for giving the patient oral antibiotic therapy on an outpatient basis. If such a policy is followed, patients in whom joint or tendon damage has occurred will not receive adequate treatment.

References