

Pig bite injuries and infection: report of seven human cases

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SUMMARY

Six patients developed local infection after being bitten or gored by swine. Wounding was often deep and occurred characteristically on the posterior aspect of the thigh. Severity of infection varied from simple wound infection with discharge and slough to cellulitis and abscess formation; pathogens included haemolytic streptococci, pasteurellae, *Bacteroides* sp., *Proteus* sp. and *Escherichia coli* and were usually isolated in mixed culture. A patient with *Pasteurella aerogenes* infection appears to be the first reported in England. A seventh patient developed *Streptococcus milleri* septicaemia after wounding himself while cutting teeth from piglets. It is suggested that a course of broad-spectrum antibiotics should be given as part of the initial treatment when patients present with the more severe pig bite injuries.

INTRODUCTION

Dogs are the most common cause of biting injuries leading patients to attend hospital Accident and Emergency departments in the United Kingdom; more than 2000 such patients were recorded in one-year studies in both Liverpool and Leeds (Robinson, 1976; Hervey, 1977). Reports of bites inflicted by other species of animal have been much fewer: in the Leeds study (Hervey, 1977), of 2460 bites seen in the city 58 were inflicted by cats, 24 by horses, 16 by rats, 41 by other pet rodents but only 1 by a pig, ranking in rarity alongside bites by a lion, a monkey and a ferret.

In other countries large wild animals and venomous snakes and spiders may inflict dangerous biting injuries and the issue there is complicated by concern for transmissible viruses such as rabies and simian herpesvirus B. Occasional reports have described unusual attacks, such as that of a rooster which pecked a young child in the head, resulting in fatal brain abscess (Berkowitz & Jacobs, 1987).

There appears to be no published report particularly describing the bites and goring injuries from pigs and the infections that develop from them. There is a high level of pig farming in North Yorkshire and Humberside and I have reviewed the records of seven patients with serious bites presenting for hospital treatment at Northallerton, Harrogate and York; five of these cases occurred within the last 8 months. This paper gives details of the injuries and infections in these patients.

CASE REPORTS

Patient 1 A 50-year-old man was gored by a boar's tusk in the posterior aspect of the lower thigh producing a 6 cm laceration with deep penetration, rupturing the biceps femoris muscle. He was admitted to hospital and treated with a course of ampicillin and flucloxacillin, the wound was cleaned with povidone iodine, hydrogen peroxide and cetrimide, debrided and closed with secondary sutures. On the fifth day after the injury the wound was inflamed and discharging, the patient had an oral temperature of 38.8 °C, haemoglobin 13.0 g/dl and a circulating white blood cell count of $9.1 \times 10^9/l$. A wound abscess broke down and the pus yielded *Streptococcus agalactiae* (Lancefield group B, type II). He was treated by wound drainage and packing with eusol and paraffin gauze, without further antibiotics. He made a steady recovery and the wound healed within 2 months.

Patient 2. A 20-year-old man lacerated his hand while cutting teeth from piglets. Soon afterwards he became ill and was admitted to hospital complaining of a week's history of epigastric pains, malaise, vomiting, anorexia and rigors. Examination showed no localized signs of infection but he had a hectic fever up to 40.8 °C; peripheral blood showed haemoglobin 11.0 g/dl, white cell count $10.7 \times 10^9/l$ with marked toxic granulation in the neutrophils, ESR 80 mm/h. bilirubin 23 $\mu\text{mol/l}$ (normal 0–17), alkaline phosphatase 221 u/l (normal 36–92) and elevated levels of hepatic transferase enzymes (AST 83 i.u./l, ALT 78 i.u./l, gamma GT 113 i.u./l). Tests were negative for infection with hepatitis A and B viruses. Three set of blood cultures yielded alpha-haemolytic *Str. milleri* and he was treated successfully with intravenous penicillin G and gentamicin for 8 days. No abscesses developed and repeated liver function tests gave normal results.

Patient 3. A 25-year-old male pig farmer was gored in the thigh by a boar's tusk producing a 2.5 cm laceration to the skin. This was sutured but 2 days later he felt dizzy and hot (oral temperature 38.5 °C) and he developed cellulitis around the wound which spread to a diameter of 25 cm. He was admitted to hospital and peripheral blood showed haemoglobin 15.8 g/dl and white cell count $11.0 \times 10^9/l$: wound and blood cultures were taken after antibiotics had been given and showed no growth. He made a good recovery on treatment with penicillin, flucloxacillin and metronidazole.

Patient 4. A 20-year-old female pig farm manager presented to the Accident and Emergency department with a large foul-smelling wound with cellulitis on the back of the thigh where she had been gored the previous day by a boar. A swab of pus from the wound yielded *Str. equisimilis* (Lancefield group C, T-antigen non-typable), *Pasteurella aerogenes*, *Proteus sp.* and *Escherichia coli*. The wound was cleaned with hydrogen peroxide and eusol and she was given amoxycillin, penicillin, metronidazole and a boosting dose of tetanus toxoid. After 5 days a cavity had formed in the wound which was packed with a framycetin tulle dressing. Recovery was then uneventful and the wound healed within 4 weeks.

Patient 5. A 53-year-old meteorologist was gored by a boar on his son's farm producing a deep Y-shaped 12 × 8 cm laceration involving muscle on the posterior aspect of the thigh, just below the gluteal fold. The wound was cleaned with hydrogen peroxide and cetrimide, sutured and he was given a course of ampicillin and flucloxacillin. Twelve days after the accident a 5 × 5 cm swelling appeared

beside the injury and the wound had developed a 5 × 8 cm slough and was discharging purulent fluid. A swab yielded *Proteus* sp. and *Bacteroides* sp. The wound was explored, drained and packed with gauze soaked in acriflavine; he was treated with ciprofloxacin and metronidazole and made a good recovery over 6 weeks.

Patient 6. A 28-year-old man was bitten by a pig in the back of the thigh suffering a loss of skin and subcutaneous tissue measuring 5 × 2.5 cm, with muscle herniation through a fascial tear. The wound was washed and cleaned with hydrogen peroxide, then sutured and he was given intramuscular penicillin. One week later the wound was indurated and discharging; cultures yielded *B. fragilis* and a scanty growth of a coliform organism. He had developed enlarged inguinal lymph nodes and fever of 37.8 °C. A piece of wheat husk was removed from the wound and he was given a course of metronidazole; after some superficial sloughing the wound healed satisfactorily.

Patient 7. A 32-year-old man was bitten on the thigh by a pig producing a deep laceration 5 cm wide. The wound was sutured and he was given intramuscular penicillin. A few days later he returned with a fever of 37.5 °C and an infected wound discharging offensively-smelling fluid. A wound swab yielded *P. multocida*, *Bacteroides* sp. and a coagulase-negative staphylococcus. The sutures were removed, promoting drainage, and he was treated with ampicillin and flucloxacillin. The wound then healed with the formation of a superficial slough.

DISCUSSION

Farmers say that pigs are usually indifferent or playful with their owners but the animals are strong and can occasionally inflict serious injuries. The boar with its very sharp tusks is the more dangerous animal inflicting slicing or tearing injuries down into the muscle with a risk of damage to major nerves and blood vessels; even a small cut at the surface may be deep. The sow can also bite away pieces of skin and subcutaneous tissue. The commonest site of injury to man is the posterior aspect of the thigh, due to the height of the animals and their unseen approach from behind.

Surgical management of these wounds follows traditional lines of securing haemostasis, providing irrigation, good wound toilet and debridement and repair of damaged tissues. Whether the suturing of bites wounds other than those on the face should be immediate or delayed remains a matter of controversy (Rest & Goldstein, 1985). The high risk of infection from inoculated organisms requires an assessment of tetanus immunity, with boosting or a primary course of active and passive immunization if necessary, and prescription of appropriate antibiotics to cover inoculated pyogenic organisms (Edlich, Spengler & Rodeheaver, 1983; Rest & Goldstein, 1985). The collection of a wound swab or tissue for bacteriology at an early stage may be helpful in the management of any later complications.

In many of the patients described here wound infection arose despite the use of antiseptic solutions and routine antibiotics such as penicillin, ampicillin and flucloxacillin. A variety of organisms was found, presumably originating from the mouths of the animals in most instances, including alpha- and beta-haemolytic streptococci, pasteuriae, *Bacteroides* sp., *Proteus* sp., *E. coli* and coliform

organisms, often in mixed culture. The range of pathogens in these patients may have been partly selected by the antibiotics given to them.

A very wide range of alpha- and beta-haemolytic streptococci has been found in healthy and diseased pigs (Ross, 1972). *St. equisimilis* (Lancefield group C), which may be regularly found in the animal (Stableforth, 1959), was isolated from the wound of patient 4; the isolate was T-antigen untypable in the scheme developed by Efstratiou (1983), a characteristic result for animal as against human strains. Patient 1 developed a wound abscess with *Str. agalactiae* where he had been gored by a boar and patient 2 developed *Str. milleri* septicaemia after an injury while working in the mouths of pigs. This latter organism has a reputation for causing deep abscesses (Parker, 1978); our patient had impaired liver function at the height of his illness but this resolved completely without abscess formation on prompt antibiotic treatment. In the series of *Str. milleri* infections described by Parker & Ball (1976), 5% of patients had bacteraemia without evidence of endocarditis or purulent disease in internal organs. Group L streptococci may be present in the mouth of the pig (Olsen, 1957) but these organisms have not yet been reported from infected bites. We have found them in clinically infected wounds of pig handlers and processors (Barnham & Neilson, 1987) and they may mimic *Strep. pyogenes* in their appearances and laboratory test results.

In a 12-year study of pasteurilla infections in man reported to the Public Health Laboratory Service Communicable Disease Surveillance Centre (Young, 1988) only 5 of 3700 reports were known to be related to pigs; these were bites or goring wounds and in one patient the wound infection with *P. multocida* progressed to meningitis. *P. multocida* can be found in the mouth of the pig and may produce respiratory infections in the animal (Blood & Henderson, 1974). *P. aerogenes* has been found in pigs but very rarely in human infection; four of eight human isolates referred to the Centers for Disease Control, Atlanta were from swine bite wounds (Weaver, 1985). Rest & Goldstein (1985) listed aerogenic pasteurillae amongst the organisms isolated from dog bite wounds. The infection of patient 4 with *P. aerogenes* appears to be the first yet reported from England.

The infections in this small series of patients ranged from simple wound infection with discharge and slough to cellulitis, abscess formation and septicaemia. The patients responded to surgical drainage of the wounds and secondary courses of appropriate antibiotics but healing often took several weeks and there was residual scarring. In view of the high incidence and severity of infection with a variety of organisms in these patients, despite good initial management and routine antibiotic treatments, it might be wise to give such patients a course of more powerful broad-spectrum antibiotics, including anti-aerobe activity, when they first present.

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