A clinical trial using co-trimoxazole in an attempt to reduce wound infection rates in dog bite wounds

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Summary: One hundred and thirteen patients were entered into a randomized, prospective double-blind, placebo controlled trial to assess the use of co-trimoxazole in reducing wound infections after dog bites. Although there was a reduction in the wound infection rate from 13.8% in the placebo group to 5.5% in the treatment group this did not reach statistical significance ($P = 0.135$). If hand wounds are considered separately, no infections occurred in the treatment group and a benefit seems likely.

Introduction

Dog bite wounds are a common problem seen in accident and emergency departments. Prevention of tetanus and rabies where appropriate, together with adequate cleansing of such wounds, are universally accepted measures. The prophylactic use of antibiotics in an attempt to reduce wound infections is controversial. Previous studies have failed to show any conclusive benefit from the routine use of antibiotics in such wounds (Callaham, 1980; Elenbaas *et al.*, 1981).

Recent review articles in the *British Medical Journal* (Snook, 1982) and the *Lancet* (Anon, 1983) have advocated their use in certain wounds, while accepting that further information was required. This prospective, randomized, double-blind placebo controlled trial was undertaken to further evaluate the routine use of antibiotics in patients with dog bite wounds.

Patients and methods

Patients treated in the accident and emergency department for dog bite wounds were randomly allocated to receive either a 5 d course of co-trimoxazole 960 mg twice daily, or a placebo. Children less than 12 y of age took half the dose. Patients with superficial abrasions, those having other medical problems requiring antibiotic treatment or allergies to co-trimoxazole, and children less than 3 y of age were excluded. Details of the patient's age and sex and of the wound site (hand, face or elsewhere), type (puncture or laceration)

and age at presentation were recorded.

Wounds were re-assessed 1 week later and those considered to be infected had a swab sent for bacterial culture. Statistical analysis of results was by the Chi² test and Fisher's exact test. The trial was approved by the Hospital Ethical Committee.

Results

One hundred and thirteen patients were included in the study. Among those excluded was 1 patient who already had a digital volar space infection resulting from a dog bite 2 d before presentation and in whom antibiotics clearly could not be withheld. Fifty eight received placebo and 55 received co-trimoxazole. The groups were well matched in terms of age and sex, and site, type and age of wound.

Thirty five patients failed to attend for the 1 week follow up and these wounds have been included in the non-infected group because it is reasonable to suppose that they would have returned had infection ensued. There were fewer wound infections in the co-trimoxazole treated patients than in those given placebo, but this difference failed to achieve statistical significance (see Table I). When wounds at different sites were assessed separately, those at sites other than the hand are seen to follow the same pattern as the whole group. With hand wounds, however, there was a significantly higher proportion of lacerations and the reduced number of wound infections seen in the co-trimoxazole treated patients reaches marginal statistical significance (Table II).

Eleven patients developed clinically diagnosed wound infection, 3 in the co-trimoxazole treated group

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Table I Incidence of wound infections

	Total number	Non-infected	Infected
Placebo	58 (100)	50 (86.2)	8 (13.8)
Co-trimoxazole	55 (100)	52 (94.5)	3 (5.5)*

Figures in parentheses are %.

95% confidence limits for the proportion infected were 6.5%–25.4% for the placebo group and 1.1%–15.1% for the treated group.

* $P = 0.135$

and 8 in the placebo group. Of the 3 in the co-trimoxazole treated group, *Escherichia coli* was isolated from one, no pathogen was isolated from a second, and culture was not performed in the third. In the placebo treated group there were 4 *Staphylococcus aureus* infections, 1 mixed infection with *Proteus* and *Bacteroides*, in 2 no pathogens were cultured and in 1 no specimen was taken.

Discussion

Dog bite wounds are common, but a large percentage are minor, superficial abrasions. There is a small but definite morbidity and mortality associated with infection in the more serious lacerated and puncture wounds (Fiala *et al.*, 1977; Jarvis *et al.*, 1981).

Previous reports (Callaham, 1980; Snook, 1983) have considered patients aged over 50 y, those with puncture wounds and hand wounds, and those delaying presentation to medical attention for over 24 h to be at high risk. We chose to use co-trimoxazole for our study because most of the organisms causing infection in dog bite wounds are sensitive to it (Snook, 1982) and it is relatively inexpensive and commonly available.

The infection rate of 13.8% seen in our placebo treated group concurs with a range of 6% to 13% noted in other studies (Callaham, 1978; Aghababian & Conte, 1980).

The difference in wound infection rates between treatment and placebo groups failed to reach statis-

Table II Infection in hand wounds

	Total number	Non-infected	Infected
Placebo	24 (100)	20 (83.3)	4 (16.7)
Co-trimoxazole	23 (100)	23 (100)	0 (0)*

Figures in parentheses are %.

95% confidence limits for the proportion infected were 4.7%–37.4% for the placebo group and 0–14.8% for the treated group.

* Fisher's exact test $P = 0.0595$.

tical significance ($P = 0.135$). The probability of a type 2 error was estimated at 0.65, making the result inconclusive, as it would be inappropriate to interpret non-significance as implying no difference between the groups. Three hundred and seventy patients in each group would be required to test the observed difference with a probability of type 2 error of 10%.

In the sub-group of patients with hand wounds the difference in infection rates reached marginal significance (Fisher's exact test $P = 0.06$). The probability of a type 2 error was estimated at 0.55. It seems likely that there is therefore a real difference between the two groups. The higher incidence of lacerations in these patients may possibly be related to the thinner skin on the dorsum of the hand and its likelihood of tearing when the victim withdraws it from attack.

We failed to grow pathogenic organisms from 3 infected wounds but we feel that clinical evidence of infection is a more reliable indicator. Any wound surface contains bacteria and their mere presence on culture is no proof of infection.

In conclusion, we feel that the routine treatment of dog bite wounds with antibiotics is not justified, but that hand wounds should be considered for such treatment.

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