ORIGINAL ARTICLE

Barking up the wrong tree? A survey of dog bite wound management

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1 November 2002**Objectives:** Several trials have been published examining the role of antibiotics in dog bite wound management. A meta-analysis of these suggests that there is very little benefit to routine antibiotic prescription in these patients. All papers however incorporated rigorous wound care regimens involving large volume irrigation.**Methods:** The authors undertook a telephone survey to investigate wound care and prescribing practice in bite wound management in accident and emergency and minor injury units in the Yorkshire region.**Results:** Twenty one departments were contacted. Only 10% of departments routinely irrigate these wounds. Antibiotics are prescribed routinely in 71%.**Conclusions:** Management of dog bite wounds would not seem to be evidence based in most departments in this sample.

Dog bite wounds account for 0.5%–1% of all emergency department attendances (an estimated 200 000 cases per year).¹ There is debate on the use of antibiotics in the initial management of these wounds, many practitioners would prescribe them routinely on first presentation.² The published literature does not support this position. A recent meta-analysis of published randomised controlled trials demonstrated only a small decrease in infection rates in antibiotic treated patients.³ Routine use of antibiotics results in a large number of patients being exposed to side effects and risk of sensitisation with no benefit. There are also benefits to the population from limiting antibiotic prescribing. Most studies report rigorous initial wound care, this would seem to be more effective than antibiotic prophylaxis.

This paper examines the presence of evidence based protocols and methods of wound care in regional accident and emergency (A&E) and minor injury units (MIU).

METHODS

A telephone survey was undertaken of all A&E departments and MIU in the Yorkshire region by one of two investigators (MRS, AW). In each department the nurse in charge was asked for department demographics, details of existing protocols for the management of dog bite wounds and wound care techniques routinely practised. A standardised patient scenario was presented: "A patient with a 2 cm open wound on the calf as a result of a dog bite attends your department

approximately one hour post injury." Details of the patient management were requested. If certain issues were not raised, direct questions were posed. Issues covered included methods of wound cleaning, wound closure, follow up, and antibiotic prescription.

RESULTS

Twenty one departments were contacted, of which 14 were A&E departments (average annual attendance 60 929) and seven were MIU (average annual attendance 14 250).

Emergency nurse practitioners were practising in 13 (93%) of the A&E departments and three of the MIU (43%).

Thirteen departments had existing written protocols for the management of dog bite wounds.

The results are summarised in table 1.

Wound cleaning techniques varied considerably. In 14 departments this entails wiping the wound with a saline (or betadine in one department) soaked swab. Five departments "wash" the wound and only two would routinely irrigate such wounds.

Departments in which wound closure would be considered did not routinely use local anaesthetic in wound management. This suggests that wound closure by steristrips is more common than suturing.

Fifteen departments routinely use antibiotic prophylaxis for all wounds, co-amoxiclav was the antibiotic of choice in 13.

Table 1 Current management of dog bite wounds

	Yes		No		Occasionally	
	Number	%	Number	%	Number	%
ENP in department	14	67	7	33	N/a	
Existing protocol	13	62	8	38	N/a	
Routine antibiotics	15	71	5	24	1	5
Local anaesthetic use	1	5	19	90	1	5
Debridement	2	10	18	85	1	5
Wound closure	3	14	13	62	5	24
Microscopy swab	0	0	21	10	0	0
Follow up	12	57	2	10	7	33

Other antibiotics used include flucloxacillin (two departments), erythromycin (four departments), and metronidazole (one department).

Follow up in the department is arranged for 90% of these patients usually between 24 and 72 hours from presentation.

DISCUSSION

Antibiotic use

Eight randomised trials have been published examining the use of prophylactic antibiotics in the management of dog bite wounds.^{4–11} Most studies were of reasonable quality although most involved only small numbers of patients. Some had high drop out rates, and randomisation details are not consistently given. None of them detected a statistically significant difference between the control group and the antibiotic treated group, although there was a trend towards benefit. Absolute risk reduction with antibiotic use varied from –9 to 16. A published meta-analysis of these studies demonstrated a 0.58 relative risk for infection in patients treated with antibiotics routinely.³ The overall infection rate in the control group was 16%. Thus with antibiotic prescribing only 6.7% of all patients treated will benefit. The results are skewed by the high infection rates in one study⁵—if this is excluded the overall infection rate in controls is 9% and benefits from antibiotic treatment seen in only 3.8% of patients.¹² A randomised controlled trial to investigate the issue further would need very large numbers of patients as the incidence of wound infection in these studies is low. A small decrease in infection rates may be proved, but routine antibiotic prescription would entail treating large numbers of patients unnecessarily.

Wound care

All but one study reported a strict wound care protocol involving large volume, high pressure irrigation with normal saline, and debridement if appropriate. In most papers, wounds are irrigated with saline or povidone iodine solution. Volumes vary, but were typically in the region of 250 ml upwards. In the departments in our study standard bite wound management is variable but large volume irrigation is rare. In one published study irrigation was clearly shown to be of benefit—12% of irrigated wounds became infected compared with 69% of those that were not (“statistically significant at 99% confidence level”).¹³ However, most of the second group were puncture wounds for which irrigation is difficult.^{11 14}

Which antibiotic?

A recent paper reported the results of routine microbiological cultures from all infected cat and dog bite wounds in 18 hospitals.¹⁵ Common organisms in dog bite wounds were *Pasteurella* (present in 50%), *Streptococcus* (46%), *Staphylococcus aureus* (20%), *Fusobacterium* (32%), *Bacteroides* (30%), *Porphyromonas* (28%) and *Prevotella* (28%). An appropriate first line antibiotic choice would be flucloxacillin and penicillin. Only one published RCT examined the use of co-amoxiclav compared with placebo—this trial had very high rates of infection, but did show a benefit with antibiotic use.⁵ One trial of questionable quality compared co-amoxiclav with penicillin, with or without dicloxacillin.¹⁶ There was no difference in infection rates, but a significantly higher incidence of side effects in the co-amoxiclav group, ranging from minor skin reactions, diarrhoea and vomiting to anaphylaxis.

Prescription of antibiotics is also costly—a five day course of co-amoxiclav currently costs around £10.

Wound culture

Wound culture at initial presentation has not been shown to be helpful in non-infected wounds as subsequent wound infection cannot be predicted, and those that become infected frequently show only a mixed culture or no growth initially. In one study, culture of infected wounds in the antibiotic

prophylaxis group demonstrated sensitivity to the prescribed antibiotic, and the infection settled after further local wound care.¹⁷

Low risk wounds

Partial thickness wounds have a negligible rate of infection and antibiotics should not be considered.⁴ Bite wounds in children also demonstrate a much lower rate of infection, as do facial wounds in both adults and children. In the published RCTs, where results in the under 16s were available, all papers show an increase in infection rates in those treated with antibiotics—absolute risk reduction ranges from –1 to –5.5%. Head and neck wounds have a very low infection risk.^{5 8 10}

Wound closure

In one study patients were randomised to primary wound closure or none.¹⁸ No antibiotics were given. No difference in infection rates was seen between the two groups. In the same study it was felt that the use of steri strips led to an increase in seroma formation and subsequent infection and formal wound closure with sutures was preferred. Better cosmetic results may be obtained with adequate wound care and closure at first presentation. In the published RCTs, no increase in wound infection rates was seen in sutured wounds.

Debridement

Dogs’ teeth exert up to 400 psi pressure and wounds have a large element of crush injury with devitalised tissue.¹⁹ Debridement of lacerations is very important and wounds that have been debrided typically show the lowest infection rates. Callahan reported an infection rate of 2% in wounds that had been debrided and 62.5% in those that had not.^{7 13} To facilitate adequate irrigation and debridement, local anaesthesia should be used routinely.

Puncture wounds

Puncture wounds are common and are high risk because of the difficulty in ensuring adequate wound toilet. Most of the studies did not permit analysis of puncture wounds as a distinct group and so management advice is difficult. Factors to consider include patient age and comorbidity and wound site.

Follow up

Currently, most departments routinely follow these patients up. To limit antibiotic prescribing and see all patients at two or three days would not therefore represent a significant staff implication. Patients could perhaps be given more detailed instructions on signs of infection and advised to return to the department and routine follow up may not be necessary.

Conclusion

Wound care would not seem to be evidence based in most departments in the study. There is no reason to suspect this is a local phenomenon. Although there is little evidence to support antibiotic use in the initial management of dog bite wounds, prescription of prophylactic antibiotics is still widespread. This represents a significant cost both in terms of development of resistance and side effects. Limiting antibiotic prescribing to infected wounds would have significant cost benefits. We have included a suggested protocol for management of these wounds (appendix 1, available to view on the journal web site <http://emjonline.com/supplemental>).

A copy of the appendix is available to view on the journal web site (<http://emjonline.com/supplemental>).

Contributors

Jane Brenchley initiated the study and conducted the literature search. Michael Smith and Alison Walker undertook the telephone survey. Alison Walker and Jane Brenchley wrote the paper. Guarantor: J Brenchley

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