Management of infection in open wounds

There is an often-quoted rule that dictates that any open wound that is older than six hours should be considered infected. However, we do not know for certain that this is in fact the case, and how often we worry about ensuing infection and dispense antibiotics, knowing that this is not best practice?

The definition of an infected wound is not clear. Is an infected wound one that has a positive culture from a swab, or one that has intracellular bacteria present on cytology, or is an infected wound one that cannot heal without further treatment such as lavage, debridement and antibiotics?

Many definitions (other than cytology) would require a day or two to wait for the answer – what do we do in the meantime with the wound?

Much of the data regarding wounds comes from publications on human wounds or experimental animals and it is probably not appropriate to assume that these data work in the veterinary field. After all, if “cats are not small dogs”, why should dogs be regarded as “small humans”?

The infected wound – should I treat with antibiotics?

Not all infections are equal – in some situations, there are bacteria present, but they are normal commensal organisms often found on the skin of normal dogs and cats.

These bacteria are detectable, but are not causing delayed wound healing, contributing to pain or inflammation and do not need to be treated. A healthy granulating wound is highly resistant to the establishment of a clinically significant infection and even if bacteria are present, they do not need specific treatment.

Infection with opportunistic bacteria, however, is important – there is a clue in the name. These bacteria, such as multi-resistant organisms, pseudomonas or proteus, are thriving in an unhealthy environment and contributing to the deterioration of the wound healing process, causing inflammation, swelling, exudate and damage to proliferating tissues.

However, in some circumstances these infections may still be resolved without recourse to antibiotics.

Looking at the wound that is older than six hours, it may be considered “infected” but it does not necessarily need antibiotics. Where there is little contamination, no necrotic material or any other factor that might facilitate opportunistic bacterial infection, good wound management may suffice to prevent this colonisation becoming clinically significant.

In this circumstance, a single dose of antibiotics during the disruption of the tissues during lavage and debridement might be appropriate, but it may not be necessary to continue that antibiotic treatment in the following days.

Regular removal of contaminated exudate by changing the dressing daily – or even twice-daily – may suffice to resolve subclinical infections.

Where there is heavy contamination, necrotic or avascular tissue, then treatment with antibiotics based on culture of a tissue sample would be appropriate to prevent the expected clinically significant infection developing.

Traumatic wounds do not always become infected – even if they are days old, so this rule is not as clear-cut as it may seem at first glance. Many animals injure themselves and come back days or weeks later, with a healed, or healing healthy wound. They do not all come back with wounds that have uncontrolled and severe infection (although some will).

The honey contains bactericidal properties supporting its use in wounds and it has become very popular. However, surgical debridement and dressing for three days resulted in a healthy granulating wound, healed normally over several weeks.

Do infected wounds always need antibiotics?

Wounds infected with multi-drug-resistant strains of bacteria are challenging to treat. Often the range of antibiotics that would be effective are limited, toxic, or not licensed for use in animals.

I would question whether antibiotics are always indicated in the presence of appropriate wound management. Thorough lavage, debridement and frequent dressing changes may be sufficient to resolve the infection, without the use of antibiotics.

Infections are more clinically significant in the face of different types of wound contamination (clay or loam for example versus sand or grit), and in the presence of gross or microscopic necrotic tissue.

Infection is also more likely to become established in the presence of inflammation – for example underlying bone sequestra, unstable fracture or poor bandage management (irregular changes, soaked dressings, etc.).

When would you use antibiotics?

I would always try to use antibiotics based on the results of a culture and sensitivity – try to take a tissue sample for culture, as this is more likely to be representative of the infection that is causing the problem rather than a surface contaminant.

If the infection is causing inflammation and swelling of the tissue surrounding the wound, pyrexia and signs of systemic infection, or the animal is immunosuppressed in some way, then it is likely to need systemic antibiotics.

Topical antibiotics are unlikely to remain at appropriate concentrations on the wound surface for long – the infection causes profuse exudate and this will dilute and wash out the topical treatments.

What other options are there for suspected infections or severe multi-drug-resistant infections?

There are occasions when you know it is the correct clinical decision not to give antibiotics, but you feel uneasy that you could have missed something – or you are waiting for a culture result. In this situation, simple steps can help reduce the impact of the infection or even treat the infection.

The use of Manuka honey as a wound dressing has become very popular. There are some data supporting its use in wounds and it is available as a veterinary licensed product.

The honey contains bactericidal properties.

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