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Surgical nursing management: cat bite abscess

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ABSTRACT: This article will look at the short-term surgical management of a cat with a cat bite abscess (CBA), requiring surgical debridement of the wound and drain placement. Planning is an important skill in surgical nursing which can reduce anaesthetic duration and lead to improved surgical outcome. Extensive preparation was required in this case, including solutions for skin scrub and lavage along with equipment for surgery and anaesthesia. Lavage is explored including the use of isotonic solutions, pressures and technique. Hartmann's is recommended for wound lavage with the use of a 20 ml syringe and an 18–19-gauge needle. Chlorhexidine solutions should be used with caution. Post-operatively patients with drains should have sterile absorbent dressings and Elizabethan collars to prevent ascending infection and premature drain removal. However, neither were possible in this case due to the position of the wound and management with T-shirts were necessary.

Keywords: cat; abscess; surgical; lavage; debridement

Introduction

Signalment

Romeo, 11-year-old neutered male, domestic short-haired cat, weighing 4.6 kg (Figure 1).

History and presentation

Romeo was presented with an open wound on his right latero-ventral neck. The owner reported lethargy the day before but he was brighter today. Romeo was predominantly an outdoor cat.

Physical examination

On examination, heart rate (HR) was 184 beats per minute and pulses were good. The wound had a large area of hair loss, three puncture wounds and necrotic skin at the centre.

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Diagnosis

The Veterinary Surgeon (VS) gave a diagnosis of a burst CBA based on visual inspection of the wound. Surgery was advised to debride the wound and place a Penrose drain.

Aetiology

CBAs are commonly seen in practice due to the territorial nature of cats (Love, Malik & Norris, 2000). Cat bites are penetrating wounds that instil microorganisms such as *Pasterella multocoda* (Fossum et al., 2007; O'Dwyer, 2007) deep in the tissue layer, while maintaining a predominantly closed wound (Aldridge, 2013; Love et al., 2000). Hair and skin debris penetrating the wound, and tissue damage caused by the teeth, devitalises tissue, creating an ideal environment for bacteria growth, thus forming an abscess (Fossum et al., 2007; O'Dwyer, 2007).

Treatment

Romeo had eaten that day, so cefovecin (Convenia, Zoetis) was administered at 8 mg/kg subcutaneously (SC). Cephalosporins are indicated for wounds as they have broad-spectrum activity against Gram-positive and Gram-negative bacteria (Fossum et al., 2007). Meloxicam (Metacam, Boehringer) 0.3 mg/kg NSAID analgesic was administered SC. Romeo may have benefitted further from a full or partial opioid agonist, which are indicated for bite wounds (O'Dwyer, 2012). A pain score model may have been useful as pain is associated with an increased risk of



Figure 1. Eleven-year-old Romeo fully recovered.



Figure 2. Equipment prepared prior to anaesthetization: size 40 blade clippers; disposable gloves; 5 g sachet lubricating jelly; plain gauze swabs; chlorhexidine 50:50 solution with warm water; Hartmanns 500-ml bag; 20 ml-syringe; 19-G needle.

infection and delayed wound healing (Crompton, 2010).

The owner advised that she was going on holiday and that a neighbour would bring him back the following morning starved.

Pre-operative nursing

The following day Romeo was admitted for surgery. As the wound was categorised as infected, Romeo was the last patient on the surgical list and his procedure was carried out in the pre-room. It is not recommended to perform dirty and infected procedures in theatre

(O'Dwyer, 2012; Rosewell, 2015), although wound management should still be carried out aseptically to protect the wound from further contamination (Aldridge, 2013).

Equipment was prepared before the patient was anaesthetised to minimise anaesthetic duration. Equipment prepared included items for skin scrub, lavage (Figure 2), debridement and drain placement (Box 1).

A multimodal analgesic approach is recommended for bite wound patients (O'Dwyer, 2012), so buprenorphine

Box 1. Surgical equipment required for debridement and drain placement

Small standard surgical kit

- Plain swabs
- Towel clips
- 1 scalpel handle size 3
- 1 rat tooth forceps
- 1 dressing forceps
- 1 Metzenbaum scissors
- 1 Mayo scissors
- 1 Olsen Hegar needle holders
- 2 straight artery forceps
- 2 curved artery forceps
- 1 Halsted mosquito forceps

Size 15 scalpel blade

¼" Penrose drain

Sterile gloves

Sterile disposable 45 × 75 cm drape

1 × 3-0 Monocryl

1 × 3-0 Ethilon

(Buprecare, Animal Care), a partial opioid agonist was administered at 0.02 mg/kg as part of his anaesthetic. Romeo was anaesthetised using a triple combination intramuscular (IM) protocol, intubated and maintained on gaseous anaesthetic. Intravenous cannulas are not routinely placed in patients administered triple anaesthetic in the author's practice; however, it is advisable in all anaesthetised patients in case emergency accessed in required (Orpet & Welsh, 2011). The patient was placed on an incontinence sheet to absorb lavage fluids, with the aim of keeping the patient dry and therefore warm.

The author put on disposable gloves to prepare the wound for surgery. The use of gloves helps prevent further contamination to the wound and also protects patients and veterinary staff from infections such as MRSA (Andrew-Jones & Boag, 2008). Managing the wound aseptically by wearing sterile gloves, gown, hat and mask to prevent further wound contamination is recommended (Aldridge, 2013).

Sterile lubricating jelly was applied to the wound. This ensures the wound is protected from hair and contaminates as the surgical site is prepared (Aldridge, 2013; O'Dwyer, 2012). The hair was clipped with a 5 cm margin, with 5–10 cm being recommended (O'Dwyer, 2012). Loose hair was removed from the site and the lubricating jelly removed with gauze swabs. The skin was prepared with a solution of 50:50 chlorhexidine and scrubbed outwards from the wound edge with gauze swabs. It is important not to incorporate the wound or wound edge as chlorhexidine at this concentration is cytotoxic to exposed tissue (Aldridge,

2013). At lower concentrations of 0.05%, chlorhexidine can be useful in infected wounds to reduce bacterial load and enhance epithelial growth with little cytotoxic effect (Aldridge, 2013; Liss, 2012).

The wound was then lavaged using Hartmann's solution in 10 ml syringes with 21-G needles. Hartmann's is the lavage fluid of choice in veterinary practice (Aldridge, 2013; Liss, 2012; O'Dwyer, 2007), as it has a closer pH to normal tissue (O'Dwyer, 2012). However, this appears to be based on a small in-vitro study that found normal saline cytotoxic to fibroblast cells after a 10-minute exposure (Buffa, Lubbe, Verstraete & Swaim, 1997). Saline 0.9% is used extensively in human medicine and the general consensus is to use a sterile isotonic solution (Aldridge, 2013; O'Dwyer, 2012; Orpet & Welsh, 2011).

The pressure at which the lavage is delivered has also been considered and the aim is to remove debris and necrotic tissue without tissue damage or advancing bacteria into the wound (Aldridge, 2013). Pressures of 8–12 psi are required to achieve this and practically this can be managed using a 20-ml syringe and 18–19-gauge needle at a 45° angle (Aldridge, 2013; O'Dwyer, 2007; Orpet & Welsh, 2011).

Peri-operative nursing

The patient was positioned in left lateral recumbency on a heat pad covered with a Vetbed® to prevent thermal burns.

The author's role peri-operatively was to monitor anaesthesia. Parameters monitored included heart rate and pulse rate, respiration rate and depth, mucous membrane colour and capillary refill time and temperature. Wound patients may become haemodynamically unstable during anaesthesia and close monitoring of perfusion is required to assess for deficits that may require further action in the form of drugs or fluid therapy (O'Dwyer, 2012). Further useful measurements include urine output and blood pressure monitoring to assess perfusion (O'Dwyer, 2012).

The author was also required to pass equipment to the VS in a sterile manner. Additionally, wounds can be lavaged by the nurse during debridement to aid visibility and remove necrotic tissue (O'Dwyer, 2007). Ideally these nursing

tasks should be performed separately by two nurses, allowing full attention to both roles (Young & Tivers, 2008).

Continuing multimodal analgesia, a further SC injection of meloxicam (Metacam, Boehringer) 0.3 mg/kg was administered and lidocaine hydrochloride 2% (Lidocaine Hydrochloride, Hameln) 4 mg/kg was administered by an extravascular infiltration technique by the VS. The patient was draped and the VS performed a layered debridement technique. The wound was closed with 3-0 Monocryl, a monofilament chosen as it does not wick fluids, so reducing the risk of ascending infection (Beckett, 2015). A Penrose drain was placed, exited through a separate stab incision, as dehiscence can occur where the drain exits a primary wound (O'Dwyer, 2007; Pope, 2017), and secured with nylon (Ethilon).

Abscess treatment generally involves lavage and debridement of the wound, which can then be left open or, in severe cases, a drain placed and the wound bandaged (Cannon, 2014; Fossum et al., 2007). Thorough debridement is essential in necrotic wounds for successful healing (Sood, Granick, & Tomaselli, 2014). It is vital not to close the wound completely as this will promote pus accumulation (Cannon, 2014; Fossum et al., 2007).

Complications associated with surgery include dehiscence, where the wound becomes oedematous, erythematous and painful 3–5 days post-surgery (O'Dwyer, 2007). The most common reason for this is incomplete debridement of necrotic or contaminated tissue (O'Dwyer, 2007). Removal of wound exudate and dead space is essential for wound healing and so placement of a drain can decrease wound infection and dehiscence (Ladlow, 2009; Pope, 2017). However, an associated risk of using a Penrose drain is ascending infection (Johnston, 2002). This risk can be minimised by aseptic management of the wound and dressings, using sterile gloves and dressing material. A closed drain system is further recommended, as it is more effective than a passive drain, requires minimal dressing and reduces the risk of ascending infection (Carne, 2011; Johnson, 2002; Pope, 2017).

Due to its position, an adhesive dressing (Primapore®) was applied to the wound to cover the drain. Ideally, passive drains should be covered with an absorbent sterile primary layer, held in place with

further absorptive layers and a cohesive wrap to reduce the risk of ascending infection (Carne, 2011). Patient interference and premature drain removal is a problem easily rectified using an Elizabethan collar (Carne, 2011). As neither were possible with Romeo, a cat T-shirt was used. This covered the wound to prevent patient interference; however, it was susceptible to strike-through, posing a risk of ascending infection (Carne, 2011). The dressing was monitored and replaced later that day before discharge. Drain exit sites can be a source of skin irritation due to the fluid produced; if necessary, an emollient can be used to protect the skin (Carne, 2011; Orpet & Welsh, 2011).

Post-operative nursing

Romeo was administered atipamazole (Atipam, Dechra) 125 µg/kg IM and placed in a recovery cage with a Vetbed® and blanket and observed until standing. When Romeo could stand, he was placed back in his kennel with a litter tray, food and water. Patients should be encouraged to eat as soon as they are able, as this aids wound healing and reduces the risk of bacterial translocation, which increases the risk of sepsis (Firth, 2013; O'Dwyer, 2012). Early enteral feeding is particularly important in cats as they are at risk of developing hepatic lipidosis (O'Dwyer, 2012). Wound patients have a high calorie requirement and protein is required due to exudate losses (Marks, 2013). Feeding a food such as Hill's a/d may be appropriate to encourage eating as well as having a high calorie and high protein content.

Romeo's heart rate, pulse rate, respiration rate, mucous membrane colour, capillary refill time and temperature were recorded regularly post-operatively. Ideally, patients should have these parameters monitored every 5 minutes until standing and regularly until discharge. The post-operative period is where most anaesthetic deaths occur, attributed to the lack of monitoring (Crompton & Hill, 2011). Additional parameters that are beneficial to monitor in wound patients include blood pressure, urine output, packed cell volume and total protein (O'Dwyer, 2012). Metabolic changes occur in the body following stress and injury, including increased production of anti-diuretic hormone and aldosterone (Marks, 2013). This response leads to sodium retention and water reabsorption which can increase blood pressure and reduce urine output. Total protein is an indicator of albumin blood levels, and a

decrease below normal should be investigated as it indicates sepsis (O'Dwyer, 2012).

At a later ward round, Romeo had his dressing checked and changed. He was found to have a large bladder and had not urinated; a note was made to question the neighbour about his preferred toileting habits.

Romeo stayed in the practice for one day, but for longer-term patients, grooming should be performed as part of the daily nursing routine. Grooming is a natural behaviour particularly for cats and is important for convalescing animals who are less likely to groom themselves (Goddard & Irving, 2011), and for patients wearing a T-shirt who are unable to groom their coat. Keeping the patients groomed and clean improves the mental well-being of the patient, reduces the risk of wound infection and encourages self-feeding (Goddard & Irving, 2011).

Client communication

On discharge the neighbour was given verbal instructions about general care and wound management along with a standard post-operative handout. Written information is useful to refer back to and enhance explanation (Grey & Clarke, 2011). In this case it was vital to pass correct information back to the owner. A demonstration was given on how to use oral meloxicam (Metacam, Boehringer) 0.05 mg/kg. It was discovered that Romeo liked to toilet outside, and so it was advised to fill litter trays with soil, and return to the practice the next day for a bladder check and dressing change.

Conclusion

Surgical nursing requires planning and preparation. In this case preparation was key to ensure all necessary equipment, scrub solution, lavage solution and dressings were ready for use.

CBAs are commonly seen in practice and nurses should ensure they are up-to-date with wound management techniques. Wound preparation is vital for the success of healing and nurses should ensure wound handling is carried out aseptically. Knowledge of lavage solutions and pressures is paramount to ensure tissue vitality, although more research is required to assess whether Hartmann's is a more appropriate lavage solution than 0.9% saline.

It is recommended that passive drains be covered with absorptive dressings to reduce the risk of ascending infection. However, this needs to be assessed on an individual basis, and where this is not possible, alternative measures should be taken to reduce the risk as much as possible.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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