

## Management of Avulsion Wound in a Calf: A Case Report

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**Abstract:** A male Jersey calf weighing 50kg was presented to the University Veterinary Hospital, University Putra Malaysia with an open non-bleeding contaminated wound situated at the caudo-lateral aspect of carpal joint of the left forelimb. The calf was apparently stable and alert and on examination there was extensive damage to the skin around the wound area. Based on the physical examination and history, the case was diagnosed as that of an avulsed wound. The affected area was cleaned, debrided and lavaged with 0.05% diluted chlorhexidine diacetate and Ilium Dermapred<sup>®</sup>. It was then bandaged after spraying with woundsarex spray; a fly repellent/antiseptic spray. Positive response of the calf to the treatment was noticed within two weeks of treatment. Daily wound dressing, debridement and topical antibiotic treatment was adequate in treatment of non-infected avulsion wound. In order to prevent the occurrence of such type of injuries, it is recommended that farmers should keep animal premises clear of injurious materials such as wire fences, metal sheets, or other sharp objects and stray dogs. Young animals should be segregated from adults to protect them from physical injuries.

**Keyword:** Jersey Calf, avulsion wound, debridement, lameness

### I. Introduction

Wound may be defined as any disruption of cellular, anatomical, and functional continuity of a living tissue (Thakur et al., 2011). In the same vein, Studdert et al. (2011) described that wound is characterized by a bodily injury caused by physical means, with disruption of the normal continuity of structures. An avulsion is a partial or complete tearing away of skin and tissue (Page, 2006). Avulsion wounds usually occur during violent accidents, such as body-crushing accidents, fights, explosions, and gunshots (Falish, 2012). Therefore, avulsion wound means that the tearing away of the tissue from the body part. The condition of tissues at the time of presentation will dictate the type of wound care indicated. This in turn depends on the class of the wound presented. Falish (2012) and Merck et al. (2010) described that wound can be classified as clean, clean/contaminated, contaminated and infected wound. Clean wounds are those created by planned surgical incision made under very controlled conditions with minimal trauma and in a very clean or sterile environment (Falish, 2012). Clean laceration wounds, with little to no bacterial or debris contamination, less than a 6-8 hours old are referred to as clean/contaminated (Swaim and Krahwinkel, 2006). A contaminated wound is any wound that is clearly soiled or heavily contaminated with bacteria, such as an animal that has been involved in automobile accident then dragged or thrown to the ground during the accident, fights, and bite wounds (Bonagura and Twedt, 2013). Most wounds in animal fall under this class except those surgically induced. An infected wound on the other hand is the one that has formed an abscess, that has occurred as a result of an infection, usually bacterial growth with accumulation of dead tissues (Falish, 2012; Page, 2006). The essence of wound management is to return the patient to normal function as soon as possible, as early management of

wounds significantly impacts on both the prognosis and morbidity for the patient (House, 2012). As delay in or inappropriate wound management may result in deep tissue infection with the consequences of decreased animal productivity (Shearer et al., 2013; Van Metre et al., 2001). Hence the aims for treatment of avulsion wound, which is an open wound, is to prevent sepsis and for the wound closure to occur. The appropriate wound care is needed to promote wound healing and prevent wound complications. Therefore this case report described the successful medical management of avulsion wound in a calf.

## II. Case Report

A male Jersey calf weighing 50kg was presented with an open wound at the caudo-lateral aspect of the left forelimb (Figure 1). The calf was managed semi-intensively by paddock-grazing and was also kept together with other cattle in the herd. On physical examination there was an open non-bleeding contaminated wound situated at the caudo-lateral aspect of carpal joint of the left forelimb that resulted to lameness (Fig. 1). There is extensive damage to the skin around the wound area with complete tearing away of some skin and adjacent tissues. The animal's rectal temperature was (38.6°C), heart rate (78 beats/min) and respiratory rate (40 breaths/min), all rates were within the normal range. The cause of the injury could not be ascertained from the client but thought to be from sharp object trauma or an attack from older bulls.



**Figure 1:** The calf with the avulsion wound on the lateral side of the left forelimb

### Diagnosis

Based on the history, physical examination findings and the observation of the wound, the diagnosis of avulsion wound due to trauma was made.

### Treatment

Initial assessment of the animal showed that the animal is stable; an intravenous injection of 1.1mL Flunixin meglumine 50mg/mL (1.1mg/kg) was administered to the calf to reduce pain during the manipulation of the wound. The wound area was shaved and flushed gently with sterile normal saline to remove loose debris and loose hair. As the skin damage is extensive, skin closure could not be performed, hence it was treated as an open wound. The wound was flushed with the hydrogen peroxide (Fig. 2) and the necrotic tissues and debris were removed by debridement to make the wound clean and to prevent flies from causing wound myiasis (Fig. 3). The wound was flushed again with diluted Chlorhexidine acetate 0.05% and Ilium Dermaped<sup>®</sup>, a combination of anti-inflammatory, anti-bacterial, healing and deodorizing compounds active against a wide range of bacterial and mycotic infection was applied topically (Fig. 4). The wound area was sprayed with a fly repellent/antiseptic spray woundsarex spary<sup>®</sup> to prevent the flies. Subsequently a comfortable absorptive dressing of firm cotton bandage was applied to protect the wound from contamination, assists in wound debridement, absorption of exudates and reduction in limb swelling. Daily wound dressing was indicated to help in wound healing and prevent the development of wound myiasis until the wound healed.



**Fig. 2:** The wound was flushed with hydrogen peroxide



**Fig. 3:** Wound debridement to remove necrotic tissues and debris



**Fig. 4:** Ilium Dermapred® topically applied on the cleaned wound

### **Prognosis**

The prognosis was good since the wound was noticed early, although it was contaminated but not infected and there was no maggot infestation. The level of soft tissues involvement was minimal as the wound was not so deep as to delay wound healing. Positive response of calf to the treatment was noticed within two weeks.

### **III. Discussion**

The avulsion wound encountered in the calf in this case report is a typical case of an open wound. Aspinall (2011) described that wounds generally, can be divided into two, open wound and closed wound (Aspinall, 2011). A wound that has resulted from blunt force trauma that caused a contusion, is referred to as a closed wound but when skin is torn, cut, or punctured as a result of shearing, friction or blunt trauma that cause the separation of the skin layers it is then called an open wound (Thakur et al., 2011). Although the cause of the wound in this case cannot be ascertained from the client, however according to Hanson (2004) wounds of the distal limbs are usually caused by wire fences, sheet metal, or other sharp objects in the animal's environment, entrapment between two immovable objects, or during transport. Such types of wounds are often associated with extensive soft tissue loss, crush injury, and severe contamination leading to the necessity for open wound management and second intention healing. As an open wound, it was left to heal by the secondary intention. This is due to the location of the wound at the caudo-lateral aspect of the carpal joint which is subjected to high skin tension as the animal moves. It was not possible to suture the skin for a primary intention healing due to the extensive skin loss. In the present case, animal's condition was initially assessed to ensure that the animal was stable before instituting the wound care measures. This is in line with the reports of Dernell (2006) who opined that there is need for a careful and detailed patient assessment before any intensive wound care is initiated especially when dealing with classic traumatic wounds, such as vehicle or animal fight trauma. Wound care is aimed at promoting wound healing in the shortest time possible with minimal pain, discomfort, and scarring to the patient and must occur in a physiological environment, conducive to tissue repair and regeneration (Bowler et al., 2001). To achieve this a number of measures aimed at wound care and maintenance were instituted in the present case, these include dressing and administration of analgesics, anti-inflammatory agents, topical and parenteral antimicrobial agents and healing promoting agents as reported by (Thakur et al., 2011). The management of avulsion wound can be done by returning skin to its original position if possible, but in this case where the torn skin had already been devitalized or necrotized; it was removed by debridement to avoid any complications in the healing process.

An intravenous injection of 1.1 mL Flunixin meglumine 50mg/mL (1.1mg/kg) was administered to the calf as analgesic prior to the process of wound cleaning and assessment. This is in accordance with the assertion of Dernell (2006) that Analgesics should be administered to patients that are in pain, especially before wound manipulation. The initial flushing of the wound with sterile normal saline to remove loose hair and debris on the wound surface will also expose the wound for further evaluation. This is in consonance with the observations of Dernell (2006) and (LeBlanc et al., 2008) that optimal wound healing cannot occur unless all foreign debris had been removed from the wound. The wound in this case was flushed with diluted Chlorhexidine diacetate 0.05% and sprayed with Ilium Dermapred<sup>®</sup> spray. This was in agreement with the Dernell (2006) who asserted that if there is minimal to moderate contamination, initial wound cleaning should be facilitated with normal saline or diluted antiseptic solution, such as 0.05% chlorhexidine or 1% povidone-iodine solution. In order to protect the wound and avoid contamination following cleaning, the wound was bandaged in this case. It was reported that bandages play an important role in overall wound management as unbandaged wounds desiccate, leading to healing delays and higher incidence of infection and scarring. Open wounds exposed to air are more inflamed, painful, and pruritic, have thicker crusts, and are more likely to scar (Campbell, 2006). Systemic antibiotics were not used in this case as the wound was not infected and that daily wound dressing has been indicated with debridement and topical antibiotic treatment. This is in accordance with the reports of Williams (2009), that antibiotics are best used to manage established or developing wound infection, as most wounds heal normally with effective wound lavage and debridement. It is worthy of note that the use of systemic antibiotic are not substitute for effective wound lavage and debridement.

### **IV. Conclusion**

The initial step in the management of a calf with an avulsion wound is by assessment of the animal's condition and stability in order to rule out life threatening situations. The wound should be classified based on careful examination before instituting management measures. Here, wound cleaning by lavage with normal saline and antiseptic solutions and adequate debridement were adequate to achieve normal wound healing. Daily wound dressing and careful observation of the patient is imperative to avoid any wound healing complications. Daily wound dressing, debridement and topical antibiotic treatment without systemic antibiotic treatment was adequate in treatment of non-infected avulsion wound. To prevent the occurrence of such type of events, it is

recommended that farmers should ensure that animal premises were kept clear injurious materials such as wire fences, sheet metal, or other sharp objects and stray dogs. Young animals should be segregated from adults to protect them from being injured.

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