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Different types of wounds management in buffaloes

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Abstract

Dairy animals play an essential role in the Indian economy. Skin wounds in domestic livestock could have very adverse effects to health, particularly in countries with emerging economies. These animals are more pre-disposed to wounds. If we neglect its management of the wounds, it may lead to secondary bacterial infections and in some rare cases, death may occur. In addition, holistic wound management practices could also contribute to the risk of infections or impaired wound healing of the animal. Understanding the pattern of wounds in bovine can aid in strategizing the required options for treatment and prognosis. This study examined four different buffaloes suffering from wounds, such as lacerated wound, maggot wound, burns and dog bite wounds. Based on the occurrence and pattern of the wound infections, age and weight, animals are subjected to conservative methods. Buffaloes are treated with antibiotics, anti-inflammatory agents and topical appliances. The wounds were observed till they were completely healed. Post-treatment observation had concluded that the prevalence of wound infection decreased and all the animals were recovered without any complications.

Keywords: buffaloes, burns, dog bite, lacerated wounds, maggot wounds

Introduction

Wound is defined as a discontinuity of skin mucus membrane or tissue surface that can be caused by physical, chemical or biological agents (Basha *et al.*, 2019) ^[1]. A wound is a type of injury which happens relatively quickly in which skin is torn, cut, or punctured (an open wound), or where blunt force trauma causes a contusion. Wounds are a common health problem for pets, companions and productive animals in developing and industrialized countries. Wounds in developing countries, however, may result in severe economic complications for dairy farmers due to low hygiene measures. In some cases, these might lead to secondary bacterial infections. A slight, unrecognized wound that remains untreated for several days might turn into a severe microbial infection to the animal. Moreover, the condition may lead to septicemia or infestation with maggots. These scenarios are problematic for animal owners and result in a significant economic loss to the farmers.

The four types of wound which commonly occur in livestock are: lacerated wounds, maggot wounds, burns, and dog bite wounds.

Firstly, lacerated wounds have irregular, jagged borders due to the tearing of tissue. Lacerated wounds in animals are more likely due to accidents such as crossing fenced-wire or injuries from sharp items such as glass fragments. Majority of the lacerated wounds have torn and uneven edges on the animal's infected site (Venugopal, 2009) ^[2].

Secondly, myiasis also known as maggot wound is a parasitic infestation of a live mammal tissue by dipteran larvae (maggots). The maggots grow inside the host while feeding on the tissue, causing traumatizing injury (Hall *et al.*, 1995; Hall and Farkas, 2000) ^[3, 4], which triggers annoyance in animals and disrupts regular feeding and resting habits (Hall *et al.*, 1995; Hall and Farkas, 2000) ^[3, 4].

Thirdly, animals seldom get burned accidentally due to fire accidents. When they are exposed to fire accidents, animals are more likely to be burned by fire or heat than by other means (Yadav *et al.*, 2010; Sandhya *et al.*, 2016) ^[5, 6].

Finally, dog bite wounds have a risk of infection because dogs saliva has several microbes transmitted when biting the other animal. In addition, dog bites were commonly higher in younger and female animals than males and adult animals (Islam *et al.*, 2016) ^[7].

Farmers follow various holistic veterinary medicinal practices such as adding cow dung or soil to wound to heal faster. Dung and soil contain a variety of bacteria that can infect wounds. In addition, it is better to avoid using dung or soil because these attract flies, leading to maggot infestation (Basha *et al.*, 2019) ^[1]. Insecticides and phenyl are poured into maggot wounds to kill the maggots, which is another bad technique practiced by farmers. This should never be

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done since insecticides are absorbed into the animal's body and cause toxicity.

Wound care in veterinary medicine is an essential element of treatment that can impact how long an animal takes to recover following surgery or a traumatic injury. Whenever an animal gets wounded, the first and foremost thing an animal owner must do, is to stop the bleeding and present the animal to the nearest veterinarian or para-veterinary staff. The most immediate treatment for any animal with the wound is to stop the bleeding, including applying pressure on the site with a bandage or a clean cotton cloth and tying it tightly over the area if possible. Treatment with antibiotic and anti-inflammatory agents is likely to cause relief of the pain and assist healing by providing a pathway for local delivery of anti-microbial therapeutics with the ability to achieve high local concentrations (Dasari and Marumulla, 2021; Dasari *et al.*, 2021) [8, 9].

The current study presents various conservative veterinary wound care approaches for buffaloes. For lacerated, maggot, burns, dog bite wounds, we proposed different anti-bacterial, anti-septic and vaccination therapy over the holistic approaches. Post-treatment observation suggests that animals responded to the treatment

Case History

This study examined four different age group buffaloes with various epidemiological wounds from April, 2019 to August, 2020. The individual experimental animals were subjected to examination in a private veterinary clinic, and symptoms were recorded.

Firstly, a five-year-old buffalo had a lacerated wound near the upper eyelid of the left eye caused by a sharp object. The clotted blood was observed on the wound margins with minimal contamination. The animal was applied with turmeric powder at the wound site by the farmer (Fig 1).

Secondly, a 3-month-old buffalo calf was suffering from a wound in the lower jaw (Fig 4) and according to the farmer, continual dropwise bleeding from the mouth and finding difficulty to suckling milk for the past two days. A blunt object had previously caused severe injury and maggots were also noticed in the lower jaw of the calf.

Thirdly, a three-year-old buffalo had burns due to accidental fire on the animal shed. Burns were present on the right side of the abdomen, between the animal's hind limbs and from head to neck (Fig 5). On the first day after the occurrence, the farmer applied dung to the burns, claiming that it stopped the bleeding and helped the burns heal faster. The animal was depressed, dull and in an anorexic state by appearance.

Finally, a 4-month-old buffalo calf was bitten by a street dog on the right side of the ear pinna ((Fig 7) which was severely damaged. Bleeding was observed at the site of the wound.

Materials and Methods

Lacerated wound

The five-year-old buffalo was prepared for aseptic surgery by being cast in right lateral recumbency. The animal was treated with local anesthetic agent such as 2% Lignocaine Hydrochloride at the wound edges on the upper and lower sides. In addition, the wound site was also cleaned with routine disinfected Potassium Permanganate (1:1000) thoroughly, to eliminate debris and clots. After cleaning, the entire wound was dusted with an antibiotic, Dicrysticin powder (Kamalakar *et al.*, 2016) [10] which acts as antimicrobial cover for wound. Later, the muscle layer was sutured continuously through the

wound's centre with chromic catgut No.2. Then using No.2 braided silk, the skin borders were sutured in a horizontal mattress pattern (Figure 2) and Povidine Iodine and Himax ointment were applied. The injection, Tetanus Toxoid @1ml deep intramuscularly was given on the first day of treatment. Finally, to keep the wound free from infection, Povidine Iodine and Himax ointment were applied and sprayed with Topicure as a fly repellent. Post-surgery, antibiotic Inj.Dicrysticin-DS 5gm @15ml intramuscularly (Streptopencillin) and NSAID Inj.Maxxtol (Tolfenamic acid) @10 ml intramuscularly were administered for 7 days. Antihistamine Inj.Histanil (Chlorpheniramine maleate) @15ml intramuscularly for 7days. Sutures were removed on the 10th day of treatment. Routine anti-septic dressing of the wound was done on a regular basis until the wound was healed. The animal completely recovered within 14 days (Fig 9).

Maggot wound

A three-month-old buffalo calf had maggot wound on the lower jaw, and one tooth was already shed off from the gum (Fig 3) due to maggot infestation. We noticed bleeding and found maggots at the wound's site, and the animal was unable to suckle the milk. After the examination, the animal was restrained properly for treatment. The wound was cleaned with an antiseptic - tincture of Iodine solution. The maggots on the wound's surface were then removed with sterile tissue forceps. After that, a gauge dipped in Turpentine oil was used to compress the wound for five minutes to eliminate deep-seated maggots. The gauge was removed with all the living and dead maggots that have erupted from the wound's surface after five minutes. After removing all maggots from the lesion with sterile tissue forceps, sterile gauze soaked in an antiseptic solution of Tincture Iodine was used to clean the dead tissue debris and create inflammation. Himax ointment was applied to the wound to keep it clean and sprayed Topicure for avoiding sitting of flies on wound. Ecto and endo-parasiticide Inj.Sunmec (Ivermectin) was given @200µg/kg.B.wt subcutaneously on the first day of treatment. NSAID Inj.Melonex Plus (Meloxicam) @0.5mg/kgB.wt. with appropriate antibiotic Inj.Dicrysticin-DS 5gm @5ml administered Intra-muscularly for seven days, regularly. The Tetanus Toxoid vaccine (Injection T. T) was given @1ml deep intra-muscular on the first day of treatment. The wound was cleaned daily with an antiseptic, Povidine Iodine and Himax ointment was applied. The animal was cured within 12 days (Fig 9) and suckling the milk normally.

Burns

A three-year-old buffalo which had second-degree burns on the abdomen, head and neck was examined at the clinic. The animal's treatment was started right away after being directed to be provided with comfortable beddings. The burn sites were cleaned with antiseptic solutions like Potassium Permanganate (1:1000), and Povidine Iodine, and then applied with Himax ointment, topically. Fly repellent, Topicure spray was used to keep flies away from the wounds. To correct hypovolemia, intravenous fluids of Dextrose and Ringer's lactate @45ml/kg B.wt and an Inj.Haemacal @450ml were given intravenously to restore electrolyte loss.

On the first day of treatment, injection Tetanus Toxoid vaccine was given @1ml deep intra-muscular. Ciprofloxacin and Metranidazole, (antibiotic and antiprotozoal) were administered intravenously for five days to prevent subsequent bacterial infections. At the same time, antibiotic

Inj.Dicrysticin-DS 5gm @10ml (Streptopencillin) was given intra-muscularly for seven days daily until recovery. NSAID injection, Inj.Melonex plus (Meloxicam) @0.5mg/kgB.wt. was given intra-muscularly and corticosteroid Inj. Pencort (Dexamethasone) @4mg administered slowly intra-venously were used to relieve pain and shock, respectively. Vitamin supplement injection, Tribivet (Vitamin B1, B6, B12) @10ml administered intra-muscularly and antihistamine-Inj.Histanil (Chlorpheniramine maleate) @15ml administered intra-muscularly were provided as supportive therapy. Antiseptic dressing was done on regular basis. Animal was recovered within 14 days without any complications ((Figure 9).

Dog bite

A street dog, bit a 4-month-old buffalo calf on the ear pinna, resulting in significant blood loss that was examined at the veterinary clinic and treated within thirty minutes of the incident. The dog bites are zoonotic, meaning that, they can be transmitted from animals to humans. To avoid transmission, the entire treatment was done with aseptic gloved hands. The wound was thoroughly washed with plenty of clean water and Potassium Permanganate (1:1000) after that cleaned with Povidine Iodine, the lesion was then sutured in a horizontal mattress pattern using No.2 braided silk (Fig 8). After that, Povidine Iodine, Himax ointment, and Topicure spray were applied to the wound's surface. Then antibiotics Inj.Triax S3 (Ceftriaxone and Sulbactam) @5mg/kgB.wt. was given for seven days intra-muscularly. NSAID Inj.Melonex Plus (Meloxicam) @0.5mg intra-muscularly was given for five consecutive days, and Anti-histamines Inj.Histanil (Chlorpheniramine Maleate) @5ml intra-muscularly and vitamin supplement injection, Rumeric (Inj.B-complex and Amino Acid) @5ml were administered intra-muscularly for five consecutive days. This case was treated with Inj.Raksharab (anti-rabies vaccination) @1ml/dose subcutaneously. The anti-rabies vaccination schedule was followed (0, 3, 7, 14, 28, 30, 60, 90 days). On the first day after the dog bite, the tetanus vaccine was also given @1ml deep intra-muscularly. Antiseptic dressing was done on regular basis. Sutures were removed on 15th day of surgery. Animal was recovered within 16 days (Fig 9).

Results and Discussion

We categorized lacerated wounds, maggot wounds, burns, and dog bites in buffaloes based on the cause of the wounds. After the conservative therapy, all animals with diverse types of wounds recovered in 12 to 16 days (Fig 9) without any post-operative complications. These outcomes can be attributed to the development of a model of farmer awareness for the comprehensive management of diverse wounds in buffaloes. Moreover, safe treatment in dairy buffaloes can increase production of dairy products and can decrease the economic losses of dairy farmers.

For lacerated wounds in buffaloes and domestic livestock, Amoxicillin was commonly employed to help prevent infections, while Ketoprofen was given to help with discomfort (Kamalakar *et al.*, 2016) [10]. Earlier studies on livestock showed that various agents such as Fibrin Glue (Michel and Harmond, 1990) [11], Honey (Bergman *et al.*, 1983) [12], and Sea Buck Thorn ointment (Gupta, 2002) [13] were used to improve cutaneous wound healing and obtained better granulation tissue formation, re-epithelialization, and other favourable histopathological factors. In this case, lacerated wound of buffalo was treated by dusting the wound with antibiotic before surgery. To prevent infection, Dicrysticin was given and to

alleviate pain, Maxxtol was administered. Furthermore, post-operative observations show that topical Himax ointment aids in early healing in buffaloes within only two weeks.

Various wound management procedures are currently being practiced in livestock, including Maggot Debridement Therapy (MDT), irrigation, antibiotics, tissue transplants, proteolytic enzymes, and corticosteroids, all aid in removing tissue's debridement, disinfection, and stimulation of healing, biofilm inhibition, and eradication (Sherman, 2009; Valachova *et al.*, 2014; Nayak *et al.*, 2010) [14, 15]. In the current instance of a maggot wound, turpentine oil and Ivermectin were employed, which are more important to treat this wound because turpentine oil causes an anoxic environment in the wound, causing deep-seated maggots to emerge within 5 minutes (Bowe *et al.*, 1997) [16]. It was also discovered that it contains antioxidant qualities, which aid in the reduction of inflammatory damages (Disilvestro, 1989) [17]. Efficacy of turpentine oil in the treatment of myiasis has previously been reported (Agarwal and Singh, 1990) [18]. Ivermectin is a broad-spectrum anthelmintic drug effective against both ectoparasites and endo-parasites including maggots (Haward and Smith, 1999) [19]. It also works effectively in treating granulating wounds without causing complications (Sharma, 1994) [20]. The buffalo calf with maggot wounds recovered in 12 days. Maggot wounds were also treated using herbal formulations containing an equal volume of Acalyphaindica juice extract and Lime water. The wound on the animal was healed in three to five days (Umadevi and Umakanthan, 2016) [21].

Burns were treated in a multi-dimensional therapy that was addressing the electrolyte depletion, bacterial infection avoidance and restoring the animal's health (Griser and walker, 1984) [22]. Compared to other wounds, more pains were observed in burns. Intense pain triggers a huge sympathetic response, which exacerbates shocks and cardiovascular effects. The most important thing in that instance is that initial aid should be delivered directly on the burn wounds by using cool running water (2 to 15° Celsius) to reduce pain and also help in the long-term healing of the wounds, so long as cooling takes place within three hours of the wound (Cuttle *et al.*, 2008) [23]. In dog bite, treatment was the same when compared to other wounds except for anti-rabies vaccination schedule. It is very important in dog bite case because it is a zoonotic disease and fatal to the animal.

In rabies, its management and prevention are poorly understood by livestock farmers (Digafe *et al.*, 2015) [24]. In order to prevent and control rabies, it is critical to raise public awareness about the disease (WHO, 2005) [25]. When animals are bitten by a rabid dog their chances of dying are significantly higher than when they are bitten by a normal dog (Morgan and Palmer, 2007) [26]. Vaccination or neutralization of stray dogs are recommended.

As a result, the current study aims to create a model of farmer's awareness for management of various wounds, rabies and tetanus because when wounds happen to an animal, most of the farmers applied dung or soil on the wound. They believed that dung or soil heals the wound faster. This type of method should be avoided because dung and soil attract flies which may lead to maggot infestation and septicemia. This shows significant economic loss to farmers.

Another bad technique also followed by the farmers is that they pour insecticides or phenyl in maggot wounds to kill maggots. This method should also be prevented because, these products as observed in the tissues result in toxicity.



Fig 1, 2: Condition of the Animal Before and After Treatment of Lacerated Wound in Buffalo.

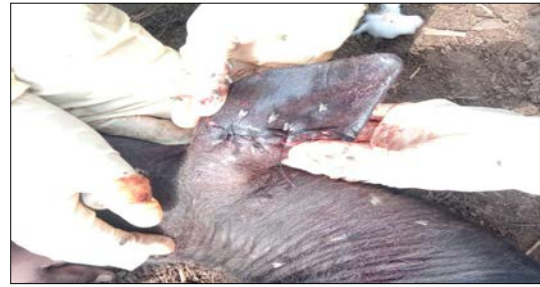


Fig 8: Suture of the Dog Bite Wound in a Horizontal Mattress Pattern



Fig 3, 4: Maggot Wound in Buffalo Calf.

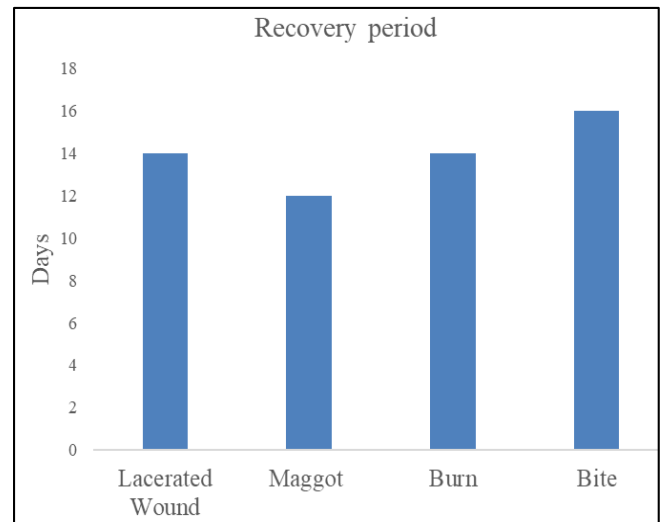


Fig 9: The graph describes the recovery period of various wounds in buffaloes after the treatment.



Fig 5: Burns in Buffalo.



Fig 6: Complete Recovery of the Burns in Buffalo.



Fig 7: Dog Bite on Ear Pinna of Buffalo Calf.

Conclusion

A favourable prognosis is always related with the administration of the proper medication at the correct time. Dermal wounds involve exposed tissue, which, under normal circumstances would be sterile, that is, free from microbial contamination. However, like normal intact skin, a newly formed wound will naturally become colonized by microorganisms and compromised tissue will encourage their proliferation. The majority of open wounds are polymicrobial. A review of the literature indicates that anaerobic bacteria constitute, on average, one-third of the total number of microbial species in colonized wounds, this number increases to approximately 50% in infected wounds. From a practical perspective, controlling the microbial load in wounds is a vital factor in minimizing infection, and this can be achieved in several ways. Anti-microbial agents (antibiotics) are primarily used either prophylactically in the treatment of wounds that are likely to be heavily contaminated. However, both aerobic and anaerobic pathogens may contribute to infections in wounds (often via synergistic interactions), broad-spectrum antibiotics provide the most successful treatment. Surgical debridement of compromised tissue not only exposes the healthy perfused tissue required to initiate wound healing but also effectively removes the majority of microbial contaminants and associated mal-odour thus reducing the risk of infection. Although wound management has been actively researched in recent years, there is still much to be learned about the microbial mechanisms that induce infections and prevent wound healing in buffaloes.

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