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Short Communication

COMPARATIVE EFFICACY OF NORMAL DRESSING AND COLLAGEN DRESSING IN CHRONIC ULCERATIVE LYMPHANGITIS IN EQUINE

F. Mridha, C.K. Ghosh*

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ABSTRACT: Ulcerative lymphangitis in equine is characterized by formation of skin ulcers with involvement of lymph vessels of limb. It heals by either secondary intention healing or by granulation normally. Horses with the history of local swelling and edema at the canon regions of both fore limbs were clinically treated out of which 6 horses suffering from lymphangitis were selected for therapeutic study after confirmation by ultrasonography within 30 -40 days from first day of treatment. Along with common antibiotic therapy, these six horses were divided into two equal groups. The first group of selected horses were treated with normal saline, hydrogen peroxide and gentamicin whereas collagen granules with gentamicin was used for dressing in second group. All the animals of group 2 recovered uneventfully and returned back to the exercise after 90 days whereas only two animals of group 1 recovered after 90 days with small scars. In the present study, collagen-based dressing led to clearly satisfactory, faster and better recovery as compared to normal dressing in management of ulcerative lymphangitic wound in equines.

Key words: Lymphangitis, Collagen dressing, Equine.

Lymphangitis is the inflammation of lymph vessels due to invasion of pathogenic microorganisms from local infection site and absorption of their toxins (Nandi *et al.* 2018). It is an infectious disease of cattle and horse characterized by formation of skin ulcers with involvement of lymph vessels of lower limb (Chakraborty 2003). In horses, *Corynebacterium pseudotuberculosis* causes ulcerative lymphangitis, abscesses in the pectoral region and ventral abdomen, and internal abscesses (Sastry 2001). Acute serous, suppurative, fibrinous or haemorrhagic lymphadenitis occurs in lymph vessel draining areas (Runnels *et al.* 1976). Enzootic lymphangitis is caused by *Cryptococcus farcimonosus* whereas traumatic lymphangitis is caused by *Streptococci* or *Staphylococci* (Nandi *et al.* 2018) associated with wound infection in conditions of poor hygiene (Robinson 1997). The condition seldom extends beyond the hock, but there are reports of spread in regional lymph nodes, wide dissemination of lesions and death (Nocard 1896). The chronic ulcerative wound heals by either secondary intention healing or by granulation normally. Healing of chronic ulcerative lymphangitic wound is uninterrupted process with distinctive phases, which overlap. Sometimes other places in the body and neck may be affected and death may occur due to generalized affection.

Treatment of ulcerative lymphangitis must include parenteral antibiotics and dressing to prevent toxin absorption, eradication of infection, absorption of oedematous fluids and promoting circulation to the affected area. Collagen is the most abundant protein found in all connective tissue in the body in different structural arrangements (Silver 1987). Collagen forms a matrix which holds ground substances and cells in soft tissues. Eco-friendly collagen was used successfully and safely as a material for sclera buckling (Wu *et al.* 2008). In an infected field of ventral hernia repair porcine dermal collagen was used effectively as a prosthetic mesh (Saettele *et al.* 2007). Porcine collagen paste may be appropriate as an alternative to current dermal substitute in full-thickness wounds (Shevchenko *et al.* 2008). Hydrolyzed bovine collagen dressing cleans contamination of wounds and augments early wound epithelization in open wounds in dogs (Swaim *et al.* 2000).

Department of Veterinary Clinical Complex, West Bengal University of Animal and Fishery Sciences, 37 & 68, Kshudiram Bose Sarani, Kolkata-700037, India.
**Corresponding author. e-mail: ghoshchhotan@gmail.com*

The study

Horses were examined clinically with the history of local swelling and edema at the canon regions of both fore limbs. The areas were painful on palpation and found lame. The animals were treated with Inj. Streptopenicillin and Phenylbutazone for a week. The clinical examination was made and all types of physiological parameters were recorded. After 3 to 5 days wounds with greenish pus were observed. Culture of the swab taken from all the wounds shows the presence of *Cornyebacterium*, *Staphylococcus* and *Streptococcus* species. All the wounds were dressed with normal saline and povidone iodine for 30-40 days at 48 hr interval. There were areas of suppuration and ulceration; underlying structures of skin were also involved. The ulcers were coalescing each other and portions of skin started sloughing off with diffused areas of necrosis in all animals. Pascoe (1999) also found greenish malodorous discharge with nodule formation at lymphangitic wound. The animals were non-weight bearing lame with poor appetite during early course of the disease process. Radiography was used to rule out the chances of discontuinty of the underlying soft tissues in those areas of all animals. Ultrasonographically it was found that middle third portion of the superficial digital flexor tendons show less echogenicity and more echogenic subcutaneous tissue in six horses. Ultrasonography confirms the disease as lymphangitis by defining boundaries of pockets of abscess and diffuse subcutaneous swelling which are more echogenic than normal. When high frequency transducer was applied dilated lymphatic vessels which emerged as tiny, tortuous, fluid containing tubular structures, differentiated from those with cellulitis (Reef 1998).

Six (6) horses suffering from lymphangitis were selected for therapeutic study. The criterion for selection of horses was presence of lymphangitic lesion until 30-40 days from first day of treatment. The culture and sensitivity tests were performed from the discharges of all six animals which found the organisms were highly sensitive towards Ceftriaxone. Inj. Ceftriaxone 6 g once daily along with Inj. Flunixin meglumine @ 1.1mg/kg b.wt once daily administered I/V for 10 days for all animals. These six horses were divided into two equal groups. The selected horses were used for therapeutic trials with dressing with normal saline, hydrogen peroxide and Gentamicin in first group and Collagen granules (Medifill Particles) with Gentamicin in second group as shown in Table 1.

Results and discussion

There was a dramatic decrease in wound discharge with the use of collagen dressing after seven days compared to normal dressing where the wound discharge was almost same as earlier. The wounds of collagen dressing became clean and non-infected earlier and were noticed to have improved and earlier appearance of granulating tissue on day 7 as compared to group 1. All these observations were done independently by numerous observers related with dressings of these wounds. All the animals of group 2 recovered uneventfully after 60 days of dressing with some small scars were left to be filled after collagen dressing whereas the reduction in severity of wound was not satisfactory in horses of group 1 after 60 days. The limbs of group 2 animals did not get the normal size and revealed permanent scarring after 80 days. The animals of group 2 were back to the exercise after 90 days and above. Two animals of group 1 recovered after 90 days with small scars to be filled with regular dressing (Fig. 1). The other animal of group 1 which did not recover developed laminitis in both affected limbs and the animal were euthanized on humanitarian ground.

In the present study, in all three phases of healing collagen performs as integral part by hosting cells like macrophages to control the entire healing process, providing an environment for cells, which actively form fresh tissue over time. Collagen also eliminates fluids, which are foundation of infection and offers a friendly atmosphere for cells to help heal the wound and form a better quality of healed tissue. Collagen has been reported as a well-tolerated and completely biodegradable material. In the present study collagen acted as a carrier system for antibiotic also. Rossier *et al.* (1995) and Vasantha *et al.*(1988) also found the efficacy of collagen as a carrier system in ocular application involving pilocarpine and

Table 1. Experimental design for testing efficacy of dressings against lymphangitis in horses.

Group No.	Dressing material	Route	Debridement	Frequency	No. of animals
1	Normal saline, hydrogen peroxide and Gentamicin	Locally	Yes	48 hrs	3
2	Collagen granules (Medifill Particles) with Gentamicin	Locally	No	48 hrs	3

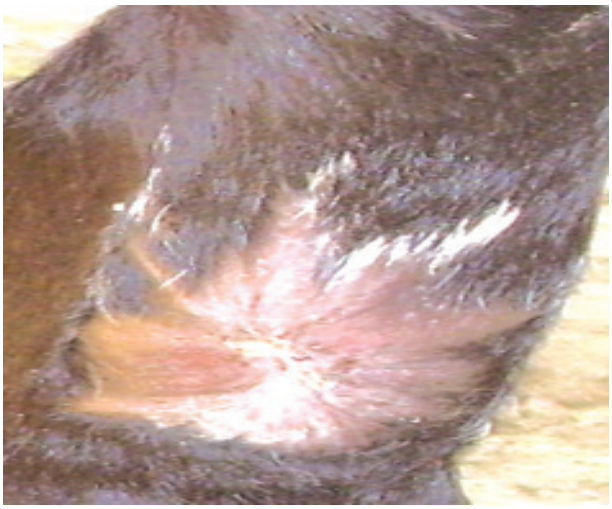

Fig 1. Ulcerative lymphangitic wound after 90 days of collagen dressing.

macrolide antibiotics. In the present study collagen-based dressing led to faster recovery as compared to normal dressing in same kind of chronic wound. The systemic absorption of Gentamicin after collagen sponge was found to be minimal (Ipsen *et al.* 1991). In ulcerative wound the duration of time for release of antibiotic should be greater than normal antibiotic dressing which is also achieved by using antibiotic along with collagen which causes two to three times greater than collagen or antibiotic alone (Trfny *et al.* 1996). The study also matched with Kollenberg (1997) who demonstrated that Gentamicin impregnated collagen sponge shows up to 600 times MIC.

The healing with collagen was significantly fast and dramatic when collagen is used as dressing material, provided the collagen granules should not be used in combination with Povidone Iodine while dressing.

In the present study, the collagen dressing with local Gentamicin appears to be clearly satisfactory, faster and better over normal dressing in management of ulcerative wound.

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