*ejpmr, 2023,10(3), 113-115*

**SJIF Impact Factor 6.222**

**EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH**

www.ejpmr.com

Review Article

ISSN 2394-3211

EJPMR

# SURGICAL MANAGEMENT OF CHRONIC WOUND USING COLLAGEN WET MESH WITH AUTOLOGOUS PRP IN A DOG

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**Article Received on 10/01/2023** **Article Revised on 01/02/2023** **Article Accepted on 22/02/2023**

**SUMMARY**

A chronic wound is defined as a break in the skin for a long duration (6 weeks or more) or frequent recurrence. Management of such wound is challenging and requires a dermal substitute to aid wound healing. The present case aims at analyzing the effect of re-constituted bovine collagen mesh and autologous PRP in the management of chronic wound in a dog. A one-year-old, intact male, Labrador cross was presented with a history of wound on the left hind limb for past 2 months and conventional treatment resulted in vain. Clinical examination revealed extensive wound on the medial aspect of left thigh with necrotic edges. Reconstructive surgery was performed using local flap method. Suture dehiscence and necrosis noticed after 2 days due to self-mutilation. Wound edges were debrided and reconstituted collagen wet mesh was fixed over the wound bed. Subcutaneous injection of autologous Platelet Rich Plasma was administered. Disposable stainless steel skin staples were used to appose the skin in the distal wound margin. Complete wound contraction was appreciated in 60 days. Animal made an uneventful recovery.

**KEYWORDS:** Autologous PRP, chronic wound, collagen mesh, local flap method, skin staples.

A chronic wound is defined as a break in the skin for a long duration (6 weeks or more) or frequent recurrence,[1] which deviates from an expected sequence of repair with respect to time, physical appearance and response to appropriate therapy.[2] Non-healing wounds may be due to a single cause or multiple factors like failure of epithelialization, wound contraction, infection etc., which demands the removal of the cause and an appropriate treatment protocol.[3] The extracellular matrix (ECM) is known to be deficient in chronic wounds. Collagen is the major protein in the ECM and is critical for structural support of the skin.[4] Biodegradable collagen film belongs to bioactive type of wound dressing and acts as scaffold for viable fibroblasts during wound healing.[5] High biocompatibility and intrinsic biodegradability by endogenous collagenases make exogenous collagen ideal for use in biomedical applications.[6] Platelet Rich Plasma is the plasma fraction of autologous blood which is enriched by Growth Factors, cytokines and other plasma proteins.[7] Role for PRP has been proposed in promoting the healing of chronic wounds via various limited by mechanisms including stimulation of the proliferation of keratinocytes and fibroblasts and synthesis and remodeling of extracellular matrix components.[8] The present report describes the use of collagen wet mesh with autologous PRP infiltration at the peri-wound site for the management of chronic wound which helps in early scarless wound healing. A one-year-old, intact male, Labrador cross, weighing 12 kg was presented to the Department of Veterinary Surgery and Radiology with a history of open wound on its left thigh region and limping for past 2 months. Clinical examination revealed a full thickness, chronic wound on the medial aspect of the left thigh measuring 16 cm in length and 14cm in width (Fig.1). The wound was contaminated and necrotic. Hematological parameters were within normal range. The animal was pre-medicated with Inj. Diazepam @0.5 mg/kg B. wt. I/V. General anesthesia was induced using Inj. Propofol @4mg/kg B. wt. and maintained with Inj. Propofol @2mg/kg B. wt. I/V. Under aseptic condition, a full thickness skin flap was dissected from the inguinal region, transposed to the recipient site with its own blood supply, fixed using stay sutures with silk 1-0 and bandaged. After 2 days the site showed suture dehiscence exposing the underlying muscles and necrosed skin flap due to self-mutilation (Fig.2). Animal was anaesthetized using the same anaesthetic protocol mentioned above, the necrosed skin flap was removed, wound bed was irrigated with Inj. Metronidazole and wound edges were debrided. Sterile freeze-dried collagen sheet (Xenoderm WTM- 10cm/10cm) was re-constituted by adding sufficient amount of normal saline and kept for 2 minutes. The re-constituted collagen wet mesh was placed over the wound and sutured to the wound edges using Polypropylene size 4-0 (Fig.3). Autologous platelet

rich plasma (PRP) was prepared by double centrifuging blood with anticoagulant at 2000 rpm for 10 mins and injected in the peri wound area intradermally. The wound edges were apposed using stainless steel skin staples. The collagen mesh was protected using a sterile gauze pack with tie over dressing technique, limb was immobilized using PVC (polyvinyl chloride) splint and bandaged to prevent excessive movements. Post-operatively, Inj. Cefotaxime @25mg/kg B. wt. intravenously for 5 days, Tab. Serratiopeptidase (10 mg) orally for 5 days and multi-vitamin supplements were administered. Wounddressing was done once in a week upto one month post-operatively. In the present case, the exudate was serous and mild on day 5. From day 10 upto 60, the wound edges were attached and firm, the wound bed was pink with nil exudate. Collagen products absorb wound exudate to form a soft biodegradable gel over the wound surface that helps to maintain wound moisture. Collagen sheet is impermeable to bacterial migration and also possess low antigenicity.[9] The use of collagen sheet reduced the amount of exudate by preventing wound infection. Wound epithelialization and contraction were evident and recorded on day 5,21,48 and 60 post operatively (Fig. 5,6,7,8 respectively) and graphically represented in figure 4.

Denuded wound surface requires a layer of collagen to act as scaffold for orderly ingrowth of epithelium. Collagen type I has been shown to promote ECM deposition by dermal fibroblasts and aids in early wound healing.[5] Subcutaneous injection of autologous PRP favored early epithelialization of wound. Platelets play a crucial role in the wound healing process by their hemostatic function and presence of cytokines and growth factors.[10] It may be concluded that application of reconstituted collagen mesh with autologous PRP infiltration resulted in successful management of extensive non-healing wound without any complication and animal made an uneventful recovery.

**Fig.1: Extensive wound on the medial aspect of left thigh.**

**Fig.2: Suture dehiscence and necrosis after 2 days of reconstruction.**

**Fig.3: Reconstituted Collagen wet mesh fixed using polypropylene.**

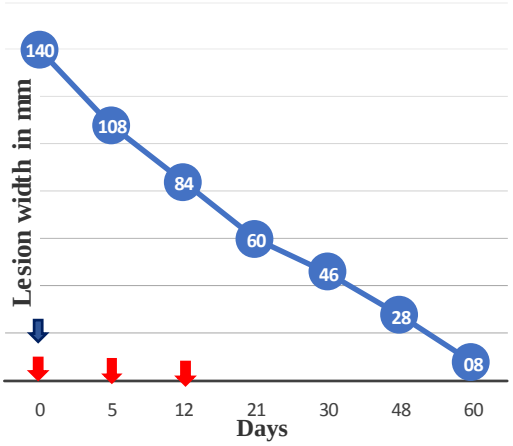


**Figure 4: Wound extent assessment. Advancement of the wound margin is evaluated by lesion width line, as a function of time. Red arrows indicate the days of PRP treatment and blue arrow indicates application of collagen mesh.**

**Fig.5: 5th post operative day**

**Fig.6: 21st post operative day**

**Fig.7: 48th post operative day**

**Fig.8: 60th post operative day**

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