ABSTRACT

Title : EFFECT OF FIBRIN-GELATIN AND FIBRIN-GELATIN IMPREGNATED WITH SILVER/GOLD NANOPARTICLES ON WOUND HEALING IN DOGS

Name of the student : M. VIJAYAKUMAR

I.D. No. : DPV 08014 (SUR)

Degree for which thesis is submitted : Ph.D., in Veterinary Surgery and Radiology

Name of the Chairman : Dr. S. THILAGAR, Ph.D., The Dean, Rajiv Gandhi College of Veterinary and Animal Sciences, Pondicherry.

University : Tamil Nadu Veterinary and Animal Sciences University, Chennai – 600 051.

Year : 2011

The study was carried out on clinical cases referred to the Small Animal Outpatient Unit, Madras Veterinary College Teaching Hospital, Chennai. Thirty two dogs of different breeds, sex, age and body weight were selected and randomly divided into four groups. In Group I, eight dogs were treated with fibrin-gelatin sheet, in Group II eight dogs were treated with fibrin-gelatin impregnated with silver nanoparticles sheet, in Group III eight dogs were treated with Fibrin-gelatin impregnated with gold nanoparticles sheet, in Group IV eight dogs were treated with vetbacin ointment.

Among the 32 animals taken for the study the incidence of wound were observed in 50% of Non-descriptive breed followed by 12.5% (Spitz), 9.4% (German shepherd and Labrador retriever), 6.3% (Daschund) 3.1% (Saint Bernard, Great Dane, Dalmation) and 3.12% (Rajapalayam). The age group affected maximum is 1-5 years (65.6%). Sex wise distribution male (65.6%) and female (34.4%) were
recorded. Wound distributions in affected animals were neck (12.5%), trunk (25.0%), and appendages 62.5%. Appendages recorded the highest incidence of wound.

The parameters studied during the post treatment periods were clinical observation, colour, odour, exudate, Clinical photography, wound planimetry study (percentage of epithelialization, percentage of wound contraction, and percentage of total wound healing), hematological evaluation, bacteriological evaluation, tissue analyses (Protein, Collagen), histopathological evaluation. The parameters were studied on 0, 3rd, 7th, 14th, 21st and 28th post-treatment days.

The protein content for four different treatment groups on different day intervals (0 day to 21st day) differed significantly at 5 per cent level between the groups I, IV and II, III. For group I, increase in protein content was observed from 0 day to 7th day followed by a decrease in value on 14th day and increase in value on 21st day. For group II, III and IV, increase in value was observed from 0 day to 21st day.

The collagen content on 0 day did not differ significantly (P < 0.05) for the four different treatment groups. For 3rd day group I and II did not differ significantly from each other but it differ from the group III and IV. For 7th day and 14th day group I, II and III did not differ significantly but they were different from the group IV. For 21st day a significant difference was observed between the groups I, III and IV. Group II did not differ significantly from group I and III but differed from group IV significantly.

Application of silver nanoparticles increased the production of granulation tissue by attracting fibroblast to the wound site and facilitating and accelerating the early wound healing process when compared to Group I, III and IV. All the three composite films did not show any adverse reaction, and were well accepted by the animals. In the present study, wound healing properties of fibrin-gelatin impregnated with silver nanoparticles composite was found to be the best suitable biomaterial when compared to fibrin-gelatin, fibrin-gelatin impregnated with gold nanoparticles composite and vetbacin ointment.