MEDWELL PUBLISHING
Journal of Animal and Veterinary Advances 8 (6): 1204-1206, 2009
ISSN: 1680-5593

Effects of Yarrow Extract on Wound Healing in Rabbits

[1]Fusun Temamogullari, [2]Ali Hayat and [3]Fusun Baba
[1]Department of Pharmacology and Toxicology,
[2]Surgery Faculty of Veterinary Medicine, Harran University, Sanliurfa-63300, Turkey
[3]Department of Pathology, Faculty of Medicine, Harran University, Sanliurfa-63300, Turkey

Abstract: Yarrow (*Achillea millefolium*) is indicated as an analgesic, antiseptic, wound healer and hemorrhoid healing substance. The effects of yarrow extract on wound healing were investigated and compared with used 10% povidone iodine and 0.9% sodium chloride treatments, which are commonly used. Three full-thickness skin defects, 3.14 cm in diameter, were created on dorsal aspects of 12 rabbits. Wound surfaces were macroscopically examined from the points of exudation, bleeding, thickness of scar, contraction and epithelization during the postoperative period. Biopsy specimens that were collected on the 4, 8, 12 and 16th Postoperative Days (PODs) were evaluated for histopathological changes. Specimens were evaluated according to several histopathologic parameters, such as the thickness of scar tissue, the density of vascular proliferation and the degree of inflammatory cell infiltration. SPSS 11.0 for windows was used for statistical analysis. Thickness of scar tissue was significantly changed during the treatments of yarrow extract and 0.9% sodium chloride ($p<0.05$), while, the wound treatment with 10% povidone iodine and 0.9% sodium chloride created similar results ($p>0.05$). The density of vascular proliferation in study groups was significantly different only on POD 4 and 16 ($p<0.05$). The degree of inflammatory cells infiltration were significantly different on PODs 8-12 within the yarrow extract group. Such relation was not found on PODs 4, 12 and 16 ($p>0.05$). Daily topical yarrow extract application to full-thickness skin defects in rabbits accelerated wound healing. Other advantages of yarrow extract are ease of application and the low cost.

Key words: Rabbits, wound, yarrow, treatment, skin defects, PODs

INTRODUCTION

Many infectious diseases are known to be treated with herbal remedies throughout the history of humankind. Yarrow represents a widespread medicinal plant, which are used against inflammations and spasms. The application of infusions showed positive effects on wound healing and hemorrhages (Giorgil *et al*., 2008). Clinical applications povidone iodine are ubiquitous, ranging from disinfection of inanimate objects and intact skin to therapy for all types of wounds (Lawrence, 1998). The aim of the present study, was to investigate efficacy of yarrow extract on healing wound standing on the clinical comparing with 10% povidone iodine and 0.9% sodium chloride.

MATERIALS AND METHODS

Six male and 6 female rabbits weighing about 2250±100 g were taken for the study (Harran University, Veterinary Fac., Sanliurfa). All rabbits were anesthetized with i.m. administration of 10 mg kg^{-1} xylazine hydrochloride (Rompun, Bayer) and 50 mg kg^{-1} ketamine hydrochloride (Ketanes, Albe). Yarrow methanol extract (The methanol extract was prepared by infusion of the aerial parts of the plant (10 days) in methanol at (1:5, w v^{-1}). The infusion filtered (Frastvedt *et al*., 2004) with gauze saturated was applied to the defect on the right cranial side and 10% povidone iodine was applied to the defect on the left cranial side, as for control 0.9% sodium chloride was applied to the defect on the left caudal side of the same animal. Wound surfaces were macroscopically examined from the points of exudation, bleeding, thickness of scar, contraction and epithelization during the postoperative period. Biopsy specimens that were collected on the 4, 8, 12 and 16th Postoperative Days (PODs) were evaluated for histopathological changes. Specimens were evaluated according to several histopathologic parameters, such as the thickness of scar tissue, the

Corresponding Author: Fusun Temamogullari, Department of Pharmacology and Toxicology, Faculty of Veterinary, Harran University, Yenisehir, Sanliurfa-63300, Turkey

density of vascular proliferation and the degree of inflammatory cell infiltration. SPSS 11.0 for windows was used for statistical analysis.

RESULTS AND DISCUSSION

Macroscopically, there was much less bleeding and more contraction and thickness of scar were observed in yarrow extract group compared to others. The epithelization in this group was completed on POD 12. However, the wounds treated with 0.9% sodium chloride and 10% povidon iodine was not completed on POD 12. The density of vascular proliferation progression was significantly different on PODs 4 and 16 within yarrow extract group. Such relation was not found on PODs 8-12 ($p>0.05$). The degree of inflammatory cells infiltration were significantly different on PODs 8-12 within the yarrow extract group. Such a relation was not found on PODs 4, 12 and 16 ($p>0.05$).

The thickness of scar tissue was significantly different on POD 4, 8 and 12 in all groups ($p<0.05$). However, it was similar in all groups on POD 16 ($p>0.05$). In Fig. 1 significantly difference was appeared ($p<0.05$) between yarrow extract, 10% povidone iodine and 0.9% sodium chloride on PODs 4, 8 and 16.

The density of vascular proliferation progression was significantly different on PODs 4 and 16 between yarrow extract groups than others. Such relation was not found on PODs 8-12 ($p>0.05$) between all groups. The degree of inflammatory cells infiltration were significantly different on POD 8 between yarrow extract groups than others. Such relation was not found on PODs 4, 12 and 16 ($p>0.05$) between all groups.

Wound treated with yarrow extract and povidone-iodine had more wound contraction and the density of vascular proliferation than wounds treated with 0.9% sodium chloride treated wounds. On the other hand, 10% povidone-iodine was shown to have a negative effect on microcirculation (Norman, 2003).

Leaper and Durani (2008) conflicted to the use of antiseptics in open wounds, moreover, Candan *et al.* (2003) claimed that antiseptics might disorder epithelization layer and disturb progressive vascular proliferation. In this study, it did not observe any adverse effects of antiseptics on the thickness of scar tissue, the density of vascular proliferation and the degree of inflammatory cell infiltration in full thickness skin wounds.

Candan *et al.* (2003) observed that *Achillea millefolium* subsp. Millefolium Afan (Asteraceae) possess strong antioxidative activity but low antimicrobial activity *in vitro*. In current study, the degree of inflammatory cells infiltration were more decreased in yarrow extract than 10% povidone iodine applied wounds on PODs 8. This result may be having based on antimicrobial activity of yarrow extract.

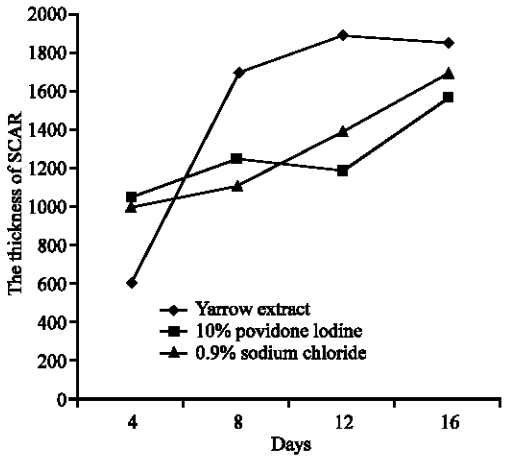

Fig. 1: According to solutions, the thickness of scar tissue (μM) $p<0.05$

CONCLUSION

As a conclusion, we suggested that yerrow extract led limited bleeding, butter contraction and decrease of inflammatory cell infiltration in wound treatment process.

The effect of yarrow extract on wound healing and thickness of scar tissue were investigated and compared to commonly used 10% povidone iodine and 0.9% sodium chloride. Yarrow extract gauze-applied wounds, less bleeding, more contraction and thickness of scar were observed, groups compared to other. In conclusion, application of yarrow extract is significantly effective in healing of full thickness skin wounds in rabbits.

REFERENCES

Candan, F., M. Unlu, B. Tepe, D. Daferera, M. Polissiu, A. Sokmen and H.A. Akpulat, 2003. Antioxidant and Antimicrobial activityof the essential oil and methanol extracts of *Achillea millefolium* Subsp. Millefolium Afan. J. Ethnopharmacol., 87: 215-220. PMID: 12860311.

Frastvedt, E., T.D. Stashak and A. Othic, 2004. Update on Topical Wound Medications. Clinical Techniques in Equine Practice, 3: 164-172. DOI: 10.1053/j.ctep. 2004. 08.003.

Giorgi1, A., R. Bombelli, A. Luini, G. Speranza, M. Cosentino, L. Sergio and C. Maurizio, 2008. Antioxidant and Cytoprotective Properties of Infusions from Leaves and Inflorescences of *Achillea collina* Becker ex Rchb. Phytotherapy Research Published online in Wiley Inter Science, DOI: 10.1002/ptr.2679.

Lawrence, J.C., 1998. The use of iodine as an antiseptic agent. J. Wound Care, 7 (8): 421-425. PMID: 9832752.

Leaper, D.J. and P. Durani, 2008. Topical antimicrobial therapy of chronic wounds healing by secondary intention using iodine products. Int. Wound J., 5 (2): 361-368. PMID: 18494641.

Norman, D., 2003. The use of povidone-iodine in superficial partial-thickness burns. Br. J. Nursing, 12 (6): 32-33. PMID: 12682580.