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Evaluation of wound healing activity of hydroalcoholic extract of *Vetiveria ziznoides* roots in wistar albino rats

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ABSTRACT

Background

Wounds are the common skin disorders. It can occur by various methods. Agents having wound healing activity have wide therapeutic uses. The present study was planned to evaluate wound healing activity of hydroalcoholic extract of *Vetiveria ziznoides* roots in Wistar Albino rats

Materials and Methods

This study was done in the department of Pharmacology, SMIMS. Total 24 rats were divided in to four groups each of 6 rats. G-I: Control, G-II: HAEV.Zroot (75 mg/kg), G-III: HAEV.Zroot (150 mg/kg) and G-IV: HAEV.Zroot (300 mg/kg). 6 cm length of incision was made at para vertebral palace. Rats were given test drugs one week before incision made and one week after incision. Control group treated with distilled water. On 15th day tensile strength was measured.

Results

Significant difference was observed in the tensile strength with high dose of test drug compared to low dose and control group.

Conclusion

In conclusion, pre-administration of V.Z root increased wound healing compared to control group. Further studies required to find the mechanism of action.

Keywords: Anti-oxidant, Hydroalcoholic extract, Healing, Incision, Para vertebral, Tensile strength,

INTRODUCTION

Wound healing is the long process of skin and other soft tissues injuries. There are three steps in

wound healing (inflammation, proliferation, and remodeling). In injury first inflammatory response occurs followed by increase collagen synthesis. After some time epithelial tissue is regenerated. Second

phase is characterized by angiogenesis (new blood vessel growth from endothelial cells) collagen deposition, granulation tissue formation, epithelialization, and wound contraction. In fibroplasia and granulation tissue formation, fibroblasts excrete collagen and fibronectin to form a new, provisional extracellular matrix. Subsequently, epithelial cells crawl across the wound bed to cover it and the wound is contracted by myofibroblasts, which grip the wound edges and undergo contraction using a mechanism similar to that in smooth muscle cells. Final stage wound closed [1]. Some of the synthetic drugs produce the hypersensitivity and cause wounds. Use of medicinal plants in the wound healing can reduce the development of adverse effects. *Vetiveria ziznoides* is a medical plant has various actions. According to Ayurveda it has wound healing, stimulate the collagen synthesis, hepatoprotective, antioxidant, anti-inflammatory, anti-septic, aphrodisiac, cictrisant, nervine, sedative, health tonic and wound healing property [2-5]. With this background the present study was planned to screen the wound healing effect of hydroalcoholic extract of V.Z root in incision wound model in rats.

MATERIALS AND METHODS

Animals

Wistar Albino rats weighed 230-250gm was used in the study. Animals were obtained from Central Animal House, Sree Mookambika Institute of Medical Sciences, Tamil Nadu. All the animals housed individual cages. Rats allowed free access to water and food during the study period [6].

Study groups

Group-I: Control

Group-II: Hydroalcoholic extract of *Vetiveria ziznoides* root (75 mg/kg)

Group-III: Hydroalcoholic extract of *Vetiveria ziznoides* root (150 mg/kg)

Group-IV: Hydroalcoholic extract of *Vetiveria ziznoides* root (300 mg/kg)

PROCEDURE

All the drugs were administered per orally for 14 days. Rats were anesthetized during the wounding procedure. On 7th day wound was made under aseptic conditions. Both sides of paravertebral incisions of 6 cm was made cutting through the full thickness of the skin. 6 sutures were made at each cm. On the 14th day sutures were removed and tensile strength was measured by water flow technique [7, 8].

STATISTICAL ANALYSIS

The data was analyzed by Statistical Package for Social Sciences (SPSS 16.0) version. One way ANOVA (Post hoc) followed by Dunnett t test applied to find the statistical significant between the groups. P value less than 0.05 considered statistically significant at 95% confidence interval.

RESULTS

Group-I showed significant decrease in the tensile strength compared to other groups. Low dose V.Z root treated group showed less effect compared to high dose it was statically significant. Group-III showed significant difference compared to G-I, II and IV. Group-IV showed significant increase in tensile strength compared to all other groups (Table-1).

Table-1: Comparison of wound healing effect of hydroalcoholic extract of V.Z roots

Groups	Drugs/route of administrated	Tensile strength (MEAN±SD)
Group-I	Normal saline (0.5 ml/PO)	302.05±0.34
Group-II	Hydroalcoholic extract of <i>Vetiveria ziznoides</i> root (75 mg/kg/PO)	350.23±0.89*
Group-III	Hydroalcoholic extract of <i>Vetiveria ziznoides</i> root (150 mg/kg/PO)	420.12±0.92* [#]
Group-IV	Hydroalcoholic extract of <i>Vetiveria ziznoides</i> root (300 mg/kg/PO)	470.19±0.14* ^{#,S}

(*p<0.05 significant compared Group-I with other groups, [#]p<0.05 significant compared Group-II with other groups, ^{\$}p<0.05 significant compared Group-III with other groups)

DISCUSSION

Wound healing is a complex process which involves various enzymes and proteins. Inflammation, granulation and remodeling are the major important steps in the wound healing. These complex molecules are made up of proteins cross linked and increased the wound healing [9]. Tensile strength depends on the collagen content. Collagen formation directly related to the wound healing. Agents stimulate the collagen synthesis plays major role in the wound healing [10, 11]. Oxidative stress decreases the collagen formation and delay the wound healing. Antioxidants improve the wound

healing by decreasing oxidative stress [12]. In this present study rats treated with hydroalcoholic extract of V.Z root showed significant wound healing effect. It can be used in the treatment of various wound disorders and after surgery to increase the wound healing process.

CONCLUSION

Rats treated with V.Z root showed wound healing activity. There are further studies required to find out the mechanism of these root preparations in the wound healing.

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