

عنوان مقاله:

The Healing Effect of Chitosan Supported Nano-CeO₂ on Experimental Excisional Wound Infected with *Pseudomonas aeruginosa* in Rat

محل انتشار:

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خلاصه مقاله:

Objective- The healing effect of chitosan supported cerium oxide nanoparticles (nano-CeO₂) on cutaneous experimental excisional wound infected with *pseudomonas aeruginosa* was studied in rat. **Design-** Experimental Study. **Animals-** Sixty male albino rats. **Procedures-** The chitosan supported nano-CeO₂ hydrogel was prepared and characterized using Fourier-transform infrared spectroscopy (FT-IR), Energy Dispersive X-ray Spectroscopy (EDX), X-ray powder diffraction (XRD), Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM). The wound was infected with *p. aeruginosa* and in positive control (PC) group it was treated with silver sulfadiazine ointment with no treatment in negative control (NC) group. The infected wound was treated with chitosan suspension-gel, cerium oxide nanoparticles solution or chitosan supported-CeO₂ nanoparticle gel in the treatment groups. The rats were randomized into five groups (n=۱۲). Each group was subdivided into three subgroups of four animals each and studied ۳, ۷ and ۱۴ days post-wounding. **Results-** Plantimetry, histopathological assessments and hydroxyprolin content showed better and faster healing of the wounds in the treatment groups, particularly in chitosan supported-CeO₂ nanoparticle gel (ChCe) group compared to the NC group (P< ۰.۰۵). Using by Ferric Reducing Antioxidant Power (FRAP) the total antioxidant capacity was statistically higher in treatment groups compared to NC group (p< ۰.۰۵). The bacterial numbers were significantly lower in ChCe and cerium oxide nanoparticles solution (Ce) groups compared to chitosan (CH) group on day ۳ post-wounding (P< ۰.۰۵). **Conclusion and Clinical Relevance-** Topical application of the chitosan supported nano-CeO₂ particles on the infected wound enhanced tissue total antioxidant capacity, reduced the bacterial count, accelerated proliferation and migration of fibroblasts and keratinocytes, increased hydroxyproline level and neovascularization scale of the healing wound. Chitosan supported nano-CeO₂ hydrogel could be suggested as an alternative therapy for treating .of the infected wound

کلمات کلیدی:

nano-CeO₂, Chitosan, *Pseudomonas aeruginosa*, wound healing, Rat

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