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The sole and combined effect of simvastatin and platelet rich fibrin as a filling material in induced bone defect in tibia of albino rats.

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Abstract

Statins like simvastatin (SIM) have demonstrated to have pleiotropic actions other than their conventional use as antilipidemic drugs. Also, nowadays natural scaffolds like platelets rich fibrin (PRF) showed promising results on bone regeneration. Aim This study compare the regenerative power of SIM and PRF added locally each as a sole filling material on induced bone defect and evaluate the combined effect using PRF loaded with SIM. MATERIALS AND METHODS: A critical size bone defect was induced in 48 male albino rats of average weight 150-200 g and were divided into 4 groups according to the filling material. Control, PRF, SIM, and SIM/PRF group. Each group was subdivided according to the sacrificing period into two subgroups (one and two-months postoperatively). Tibial specimens were evaluated histologically using masson trichrome (MT) special stain to detect areas of new bone formation, immunohistochemically using anti- BMP2 and anti-VEGF, serum levels of Osteo protegerin (OPG), RANKL, osteocalcin and alkaline phosphatase enzyme (ALP) were measured one and two months postoperatively using ELISA, Finally bone mineral density (BMD) at the bone defect area was analyzed using digital X-ray one and two-months postoperatively. RESULTS: The percentage of newly formed bone increased significantly in the three groups vs the control group with the highest significant increase (p 0.001) in the SIM/PRF group one month postoperatively. Also, SIM/PRF group was the only group which showed significant bone maturation two-months postoperatively compared to the other groups. Immunohistochemical analysis showed significant increase in positively stained BMP-2 and VEGF expression ($p < 0.001$) in the three groups vs the control group with the highest significant increase ($p < 0.001$) in the SIM/PRF group. Serum bone anabolic markers increased significantly in the SIM and SIM/PRF groups. In contrast, RANKL serum level decreased significantly in the SIM and SIM/PRF group one month postoperatively with no significant decrease in the PRF group vs the control group. Digital X-ray results revealed the highest BMD percent change was found in the SIM/PRF group and showed complete bone healing two-months postoperatively.

Biography:

Dr. Shereen Nader Raafat currently working in the department of pharmacology and toxicology (Pharmaceutical Sciences), Faculty of Dentistry, The British University in Egypt (BUE). She has done her graduation from the Faculty of Pharmacy, Ain Shams University. First she had Masters Degree in Clinical Pharmacy from Ain Shams University with the opportunity to implement clinical pharmacy practice where she first worked in The National Institute of Urology and Nephrology, where she aimed to improve general patient's health and pharmacy practice. Since joining academia, she has researched extensively problems related to the orthopedic field. She has attended various national and international conferences and workshops on experimental animals and tissue culture. Recently she had her PhD Degree in the Pharmacology Department, Cairo University. Recent research has been published in The Journal of Bone which had a powerful impact not only on the field of orthopaedic s but also the field of dentistry. In addition, she is a member in the Egyptian Society of Pharmacology & Experimental Therapeutics Journal.

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