Chronic Treatment with Sildenafil Stimulates Bone Regeneration in a Calvarial Bone Defect in Rats

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Guided bone regeneration (GBR) is a process by which new bone is formed in an area where it was lost. This technique is performed by creating a space between the surface of the bone and surrounding soft tissues, using membranes that allow the formation of new bone in the created space. A factor involved in the GBR process is the vascularization of the area. Sildenafil citrate (SC) is a phosphodiesterase-5 inhibitor and due to its vasodilator action, it showed healing benefits in different experimental models. **Objective:** To evaluate the effect of SC in the GBR process in a calvarial bone defect in rats. **Methods:** Ten male Wistar rats aged 30-day-old underwent surgery to perform a bone defect in calvaria. The day after surgery, the animals were randomly divided into two groups which were administered, by orogastric tube, physiological solution (Control Group (CG); n=5) or SC solution at a dose of 10mg / kg of body weight (Sildenafil Group (SG), n=5). After 28 days of treatment animals were euthanized by cervical dislocation. Prior to euthanasia, blood samples were taken to measure liver transaminases (GOT and GPT) and plasma Ca and P levels. Subsequently tissue samples were extracted from the regenerated area for histological processing. Frontal sections of 6 µm thickness were obtained at the level of the middle defect area, which were then colored with H&E. On digital microphotographs of these sections, the following histomorphometric parameters were measured using Image ProPlus program: bone volume [BV/TV(%)] and soft tissue volume [SV/TV(%)]. The results were statistically analyzed by Student *t* test, setting a p-value <0.05 for significant differences. **Results:** No significant differences in plasma levels of GOT and GPT were observed between the groups studied (p>0.05). The animals treated with SC showed an increase in P levels (p<0.05). Qualitatively, a more compact and continuous cortical was observed at the base of the bone defect in sections from the SC group. BV/TV(%) was significantly higher in bone defects of SG compared to CG (41.03 ± 11.76 vs. 18.26 ± 3.54; p<0.01) while SV/TV(%) was significantly lower in SG compared to CG (28.94 ± 11.26 vs. 42.47 ± 5.08; p<0.05). **Conclusion:** The SC did not generate liver toxicity assessed by the absence of changes in transaminases levels. In addition, the results suggest that SC stimulates the bone regeneration in a calvarial bone defect in rats.

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