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The effect of concentrated growth factor on calvarial bone in diabetic

EXPERIMENTAL STUDIES

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ABSTRACT

Diabete mellitus is a chronic disease which adversely affects the healing of both soft and hard tissues. Consequently, in compromised patients different biomaterials have been used to enhance bone metabolism and its physiological process, especially in order to accelerate dental implant osseointegration. One of these biomaterials is CGF (Concentrated Growth Factor) and the aim of this study was to evaluate its effect on bone healing in 24 male Sprague-Dawley rats in which experimental diabetes was induced by a single intraperitoneal injection of streptozotocin. Three days after streptozotocin injection, glycemia was confirmed, and rats showing fasting blood glucose levels higher than 250 mg/dL were considered to be diabetic. Twenty-four more animals served as healthy controls. Diabetes-induced and healthy rats were divided into 4 subgroups according to the graft protocol in critical-sized defects in the calvaria: empty bone defect (n: 6), xenogenous graft (n: 14), CGF (n: 14), CGF with combined xenogenous graft (n: 14). As xenogenous graft, a mixture of collagenated cortico cancellous porcin-derived bone granules (OsteoBiol® *Gen-Os*®, Tecnoss®, Giaveno, Italy) was used. After 6 weeks, all animals were sacrificed, their calvaria bone tissues were completely dissected in order to perform histological and histomorphometric evaluations. Histomorphometric analysis of all sections revealed that the percentage of new bone formation was lower in the diabetic group than the healthy group (P: 0.001). In both groups, the highest rate of ossification was observed in the combined use of xenogenous graft and CGF. As a result of the histological and statistical evaluations of the study, no foreign bodies and necrosis were found in any of the sections. Inflammatory cell infiltration was also observed to be very low, meaning that the biomaterial used is compatible with the tissues and does not cause negative effects.

CONCLUSIONS

Although clinical trials are needed to support the results of this study, it is possible to conclude that combination therapy with CGF and xenogenous graft may reduce the negative effects of diabetes on the bone healing and can be suitable for treatment of large bone defects.

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