Abstracts


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With the advances in bone cellular biology, three stages of growth and differentiation of an osteoblast have been distinguished (Stein and Lian, 1993). During the proliferation stage, several genes associated with the formation of the extracellular matrix (ECM) are actively expressed - type I collagen, fibronectin and transforming growth factor b (TGF-b). During the maturation stage the levels of these proteins decrease, while the expression of alkaline phosphatase (ALP) and osteoponitin increase. During the mineralization stage, the expression of osteocalcin (OC) is increased, at the same time that occur the accumulation of mineral.

A middle diaphyseal 4 mm osteoperiosteal segmental defect, stabilized by a buttress plate, was created in the left tibia of 12 ewes. The 12 ewes were divided in two groups (n=8). In one group the defect remained empty and in the other group the defect received an autogenous cancellous bone graft. The animals were euthanatized at the 12th week. We performed the determination of the serum activity of the total ALP and the serum minerals (Ca, P, Mg) in the pre-operative period and at each two weeks intervals in the post-operative period by spectrophotometry by molecular absorbency and with commercial kits from bioMérieux. The Ca2+ was performed in an automatic analyser and the serum activity of bone ALP and the serum level of OC by ELISA with commercial kits METRATM BAP EIA and METRATM Osteocalcin from QUIDEL Corporation, respectively.

The serum activities of total and bone ALP were significantly affected by the treatment (p<0.01), but only the total ALP by the time (p<0.001). The level of serum OC was just significantly affected by the treatment (p<0.05). There was an acceptable correlation between the serum activity of total ALP and Ca (r = 0.6077), between Ca and Mg (r = 0.5852) and between P and Mg (r = 0.6290).

The results suggest a different response from the total and bone ALP and the OC to the treatment, with their values usually decreased in the group where the defect received the autogenous cancellous bone graft. The changes observed in the early post-injury period are the subject of further investigation to determine whether these are specific responses to fracture.