

Heterotopic implantation of autologous bone marrow in rock pigeons (*Columba livia*): possible applications in avian bone grafting

ABSTRACT

Autologous bone marrow, alone or as a composite marrow graft, has received much attention in various species. To assess the potential osteogenicity of autologous, extramedullary bone marrow implants in an avian model, 24 adult pigeons (*Columba livia*) were given intramuscular implantations of autologous marrow aspirated from the medial tibiotarsus. Birds were euthanatized at 1, 4, 6, 8, 10, and 12 weeks after surgery to evaluate whether ectopic bone had formed at the implant sites. Primary evaluations by in situ radiography and postmortem histologic examinations showed no evidence of bone formation. Further evaluation with histologic scores and histomorphometry revealed a significantly increased rate of angiogenesis at the implant sites by the sixth and tenth week postimplantation ($P < .05$). No significant differences between the treatment and control sites were present at any other endpoints. Results of this study show that, although autologous bone marrow lacks heterotopic osteogenic potentials in this avian model, it could still function as a useful adjunct to routine bone grafting techniques because of its unique capabilities to promote early angiogenesis.

Keyword: Heterotopic implantation; Autologous bone marrow; Ectopic bone; Bone grafting; Angiogenesis; Avian; Pigeon; *Columba livia*