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Multiple Platelet-Rich Plasma Injections Versus Single Platelet-Rich Plasma Injection in Early Osteoarthritis of the Knee: An Experimental Study in a Guinea Pig Model of Early Knee Osteoarthritis.

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Abstract

BACKGROUND: Platelet-rich plasma (**PRP**) has emerged as the forerunner among disease-modifying treatment options for early osteoarthritis (OA) of the knee. However, no consensus is available regarding optimum dosing schedules.

PURPOSE: To determine whether multiple injections of **PRP** (3 injections) provide better short-term and long-term results than a single injection of **PRP** in a guinea pig model of knee OA.

STUDY DESIGN: Controlled laboratory study.

METHODS: 36 Dunkin-Hartley guinea pigs (weighing ~600-800 g) were chosen for this study. The animals were assigned to group DC (disease control group), group G1 (single-**PRP** group), and group G2 (multiple-**PRP** group) containing 10, 10, and 12 animals, respectively. Another 4 animals were used for preparation of allogenic **PRP**. Groups G1 and G2 received 1 and 3 injections of **PRP**, respectively, at weekly intervals in the intervention knee while the contralateral knee was injected with normal saline. Group DC received no intervention in either knee. Half of the animals from each group (subgroups DC.3, G1.3, and G2.3) were sacrificed at 3 months, and the remaining half (subgroups DC.6, G1.6, and G2.6) were sacrificed at 6 months after intervention. Both knee joints were harvested for histological assessment of articular cartilage and synovium.

RESULTS: The mean synovial scores for groups G1 and G2 were significantly better than those for group DC at 3 months. No difference was found between groups G1 and G2 at 3 months. At 6 months, group G2 had significantly better mean synovial scores than group G1 and group DC. The mean articular cartilage scores in group G2 were significantly better than those in group DC at 3 months. However, at 6 months, no significant difference was found among any of the groups in terms of mean articular scores.

CONCLUSION: Both single and multiple injections of **PRP** exert similar anti-inflammatory effects on the synovium in the short term. However, this effect is sustained in the long term only for multiple injections. Multiple injections of **PRP** exert a chondroprotective effect, but only in the short term. This effect is not seen with a single injection of **PRP**.

CLINICAL RELEVANCE:

This study provides insight into the histological basis for the superiority of multiple injections of **PRP**.

KEYWORDS: animal experimental study; guinea pig; osteoarthritis knee; platelet-rich plasma

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