A comparative histologic analysis of tissue-engineered bone using platelet-rich plasma and platelet-enriched fibrin glue.

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Abstract:

Objective: The aim of this study was to compare the effects of platelet-rich plasma (PRP) and platelet-enriched fibrin glue on bone formation in bone tissue engineering. Study design: PRP was mixed with bone marrow mesenchymal stem cells and bone morphogenetic protein-2 (BMP-2), and the composites were injected into the subcutaneous space on the dorsum of nude mice. On the contralateral side of the dorsum, platelet-enriched fibrin glue/bone marrow mesenchymal stem cells/BMP-2 composites were injected. Bone formation was evaluated after 12 weeks. Results: The volumes of subcutaneous nodules formed in nude mice were 55 +/- 18 muL at the PRP/bone marrow mesenchymal stem cells/BMP-2 sites and 135 +/- 27 muL at the platelet-enriched fibrin glue/bone marrow mesenchymal stem cells/BMP-2 sites. Histomorphometric analysis demonstrated that the nodules contained 14.9 +/- 4.1% newly formed bone when using PRP and 19.8 +/- 3.6% newly formed bone when using platelet-enriched fibrin glue. Conclusion: The results indicated that the osteogenic characteristics of platelet-enriched fibrin glue are superior to PRP in bone tissue engineering.