The combined use of composite ceramic granules and fibrin glue for cranioplasties: Results of a rat model study and clinical findings with regard to biocompatibility. [Japanese]

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Abstract:

For cranioplasties, we have previously reported on the efficacy and safety of using a mixture of hydroxyapatite granules and the tricalciumphosphate composite (Ceratite) with fibrin glue (Beriplast P). Continuing our research further, we have now investigated the biocompatibility of cranioplasty in rats. Two sets of Wistar rat (250-300 g) underwent a small craniectomy of the parietal bone, about 4 x 5 mm in size, without causing damage to the dura mater. The Ceratite in the form of granules, 0.3-0.6 mm in diameter, was then applied to the bone defect with Beriplast P. Postoperatively, at 3 and at 12 months, the results in each rat set, consisting of 6 rats each, were respectively evaluated. To accomplish this, 10 mum thick sections from each set were prepared and stained with hematoxylin and eosin and examined under light microscopy. Results revealed that at 3 months postoperatively, there were signs that an excellent cranioplastic repair was in progress, but newly formed bone had not yet to be seen among the Ceratite granules. However, at 12 months postoperatively, the repair appeared to be progressing well, for regenerated bone was observed amongst the Ceratite granules. Cranioplasties using Ceratite granules and Beriplast P have been performed for 22 neurosurgical patients, including one with a posterior fossa bone defect, and neither an infection nor local abnormal granulation were noted during the postoperative follow-up. These findings suggest that composite ceramics possess an excellent biocompatibility, and that the combined usage of composite granular ceramics and fibrin glue is both useful and safe fur

cranioplasties.