

The Results of Membrane-Induced Osteogenesis in Posttraumatic Bone Defects

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Purpose: It is absolutely challenging to treat posttraumatic bone defects surgically. Some of them are accompanied by soft-tissue defects and/or infection. Masquelet has reported that membrane-induced 2-step operation can accelerate osteogenesis in the zone with bone defects. First, remove the dead tissue completely, and then, reconstruct the soft tissue and fill the cement spacer in the zone with bone defect. Second, when the membrane equipped with osteogenesis is formed around the cement spacer, remove the spacer and perform a bone graft to treat the bone defects. We are performing membrane-induced osteogenesis for patients suffering from posttraumatic bone defects. Here, we are going to analyze the results of their treatment and also the effects of the operation.

Methods: From January 2014 until June 2016, among the patients having bone defects either posttraumatically or for a resection done in the process of getting treatment for posttraumatic osteomyelitis, we selected 54 subjects who had received treatment with membrane-induced osteogenesis and had been observed for over 1 year. Here, retrograde analysis was conducted. We cultured the tissue before removing the dead tissue from the zone with bone defects or debriding the tissue infected for osteomyelitis, and then, we cultured the tissue again after the debridement in order to evaluate the appropriateness of the treatment. We filled the antibiotic-loaded cement spacer in the zone with bone defects to form an induced membrane and repeated the debridement until the tissue culture was found to be negative. After treating the infection clinically, we operated the bone graft. We evaluated the length of bone defects and the presence of union radiologically. Analyzing the results of the tissue culture, we evaluated the recurrence of infection or initial bacteria.

Results: The mean age of the 54 patients was 46 years; 47 were males, and 7 were females. The average length of their bone defects was 81.77 mm. All patients, except for 8 cases in which infection recurred, got union. Infection recurred even though we operated the bone graft when the culture was found to be negative. Particularly, in 2 out of the 8 cases, before the bone graft, bacteria were never cultured in the tissue culture. Only in 1 out of the 8 cases, the bacteria identical to the initial ones recurred. In 1 case, the donor site for the bone graft showed infection. 5 out of the 8 recurrence cases have gained union, and 2 cases are waiting for union after the second operation; only 1 case has received amputation.

Conclusion: In patients with severe bone defects, induced-membrane osteogenesis can be an excellent treatment. It is also useful for treating bone defects accompanied with infection.