

Abstract Type : Oral Presentation
Abstract Submission No. : F-006110

Nerve regeneration effect of FK-506 using local reserver flap

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Introduction: FK-506(Tacrolimus) a calcineurin inhibitor, suppresses helper T cell function causing immunosuppression. It is used widely as an immunosuppressant in transplanted patients. Studies have shown FK-506 to promote nerve regeneration through FK-506 binding protein (FKBP) 51 and 52, enhancing nerve stimulation factor. It is also known that sensory recovery of transplanted arm is faster and recovery rate is higher than those of replanted. Thus, research is being done on applying FK-506 with less problems of immunosuppression while increasing nerve regeneration. The authors aimed to investigate the effects of local injection of FK-506 using an adipose flap as a reserve flap for nerve regeneration.

Methods: The SD-rat sciatic nerve injury model was used in this study. Nerve repair was performed after sciatic nerve transection, then adipose fat flap from the abdomen was moved to the pubic area as a reserver flap to be positioned around the nerve. Experimental group 1: low-dose (0.5mg/kg) injection. Experimental group 2: high-dose (2.0mg/kg) injection. Injection was performed twice over a total of four weeks. Blood tests, walking tests, analysis of the gastrocnemius muscle, axon and myelin analysis, and analysis of glial cell-derived neurotrophic factor (GDNF) were performed.

Results: Experimental group 1, which received low-dose injections, showed faster recovery of sciatic function index (SFI) in the walking test. There was a tendency for experimental group 1 to recover in terms of gastrocnemius muscle weight and width. The myelin thickness was also thicker in experimental group 1. The GDNF gene increased in experimental group 1. There was no apparent immunosuppressive effect in the individuals receiving either low or high doses of FK-506.

Conclusion: When FK-506 was injected at a low dose using a local reserve flap, it showed a regenerative effect on nerve tissue.