

A COMPARISON BETWEEN THE EFFECTS OF THREE POTENTIAL SCAR-REDUCING AGENTS APPLIED AT A SITE OF SCIATIC NERVE REPAIR

Abstract

We have investigated the effect of three potential scar-reducing agents applied at a sciatic nerve repair site in C57-black-6 mice. Under anaesthesia the nerve was transected, repaired using four epineurial sutures, and 100 μ l of either triamcinolone acetonide (1 mg/100 μ l), an interleukin-10 peptide fragment: (125 ng/100 μ l or 500 ng/100 μ l) or mannose-6-phosphate (M6P, 200 mM or 600 mM) was injected into and around the nerve. After 6 weeks the extent of regeneration was assessed electrophysiologically by determining the ratio of the compound action potential (CAP) modulus evoked by electrical stimulation of the nerve 2 mm distal or proximal to the repair site. The conduction velocity of the fastest components in the CAP was also calculated. The percentage area of collagen staining (PAS) at the repair site was analysed using Picrosirius Red and image analysis. Comparisons were made with a placebo group (100 μ l of phosphate buffered saline) and sham-operated controls. The median CAP modulus ratio in the 600 mM M6P group was 0.44, which was significantly higher than in the placebo group (0.24, $P=0.012$: Kruskal-Wallis test). Conduction velocities were also faster in the 600 mM M6P group (median 30 m s⁻¹) than in the placebo group (median 27.8 m s⁻¹); $P=0.0197$: Kruskal-Wallis test). None of the other treated groups were significantly different from the placebo, and all had significantly lower CAP ratios than the sham controls ($P<0.05$). All repair groups had a significantly higher PAS for collagen than sham controls. We conclude that the administration of 600 mM mannose-6-phosphate to a nerve repair site enhances; axonal regeneration. (C) 2011 IBRO. Published by Elsevier Ltd. All rights reserved.

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