SURGICAL INTERVENTION FOR UPPER BRACHIAL PLEXUS BIRTH INJURY

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PURPOSE: To describe the long-term (15-year) outcome of shoulder and hand function in patients with a history of upper brachial plexus birth injury (BPBI).

METHODS: Retrospective review was performed of patients who underwent primary nerve surgery for BPBI between 2000-2005. Of 131 patients, 55 of were classified as upper BPBI; 32/55 were available for long-term follow-up. Evaluation at an average age of 15years ± 2y2mo included hand function assessment with 9-hole peg test (9-HPT). Shoulder function was evaluated using the Miami Shoulder Scale. Statistical analysis included comparison of 9-HPT time against normative data using the student's t-test.

RESULTS: The cohort includes 22 right-hand-dominant and 10 left-hand-dominant patients. Mean age at surgery: 10 months; mean age at follow-up:15years ± 2y2mo. Cumulative shoulder function was ‘good’ or ‘excellent’ (Miami score) in 23 patients; 4 patients had ‘poor’ shoulder scores. For 9-HPT, 27/32 patients required significantly longer time using the involved hand; mean time difference 2.9 seconds (expected difference 0.68 seconds; p= 0.00035). Among 7 patients with hand dominance on the affected side, two demonstrated significantly worse times for the involved hand, and mean time difference for the remaining 5 patients was 2.7 seconds. Three patients displayed no time difference between involved and uninvolved hands.

CONCLUSIONS: Long term follow-up in patients with upper BPBI demonstrates that the majority of patients have detectable differences in hand function, contrary to the accepted ‘normal’ hand function in this patient population. Under-recognized deficits in hand function may play a role in residual functional disability in these patients.

P130. ENHANCING FUNCTIONAL RECOVERY WITH LOCAL FK506 HYDROGEL TREATMENT IN PERIPHERAL NERVE INJURY

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PURPOSE: Peripheral nerve injuries result in loss of function and can be associated with long durations of recovery. FK506 (tacrolimus) accelerates the rate of nerve regeneration, however, systemic effects limit its clinical applications. Drug delivery approaches hold promise for local FK506 delivery without systemic side effects. This study aims to assess functional recovery after systemic and local FK506 therapy with hydrogel.

METHODS: A sciatic nerve transection and repair was performed in four groups: Negative control, daily systemic FK506, empty hydrogel and FK506-loaded hydrogel application. Gel was applied locally over the repair site for once at the time of the initial surgery. All groups were followed 7 weeks with weekly FK506 blood concentration and walking track/gait analysis. Electrophysiology was performed at the endpoint to assess gastrocnemius tetanic force.

RESULTS: Blood FK506 levels in the systemic group were within the therapeutic range throughout the experiment. Blood FK506 levels were not detectable in the local hydrogel-treated group. Both systemic and hydrogel treated groups had a higher functional index than their respective control groups. The hydrogel and systemic groups generated similar forces, and the hydrogel group generated greater force than its respective control (p<0.001).

CONCLUSION: Local FK506 delivery with hydrogel has the potential to improve functional outcomes after nerve injury, while negating systemic side effects. This hydrogel can be easily applied under direct visualization and could be injected under ultrasound guidance. Future studies on molecular mechanisms of nerve regeneration and local drug dosing can help identify the optimal treatment for different nerve injuries.