## Scientific paper session 7: OBPL & adult

Introduced and moderated by Piero Raimondi and Alex Muset

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7.1 Our approach in restoring hand function in C7-T1 brachial plexus palsies

C.G. Zhang
Huashan Hospital, Shanghai, China

In the past decade, our team has developed a staged approach to restore hand function in C7-T1 brachial plexus palsies. In the first stage, the supinator motor branch was transferred to the posterior interosseous nerve for finger extension plus brachialis and pronator teres motor branch combined transfer to flexor digitorum superficialis branch and anterior interosseous nerve for finger flexion. In the second stage, the intact brachioradialis muscle was used for abductorplasty to restore thumb opposition and in the meantime, the sensory branch of ulnar nerve was repaired by radial branch of superficial radial nerve to restore sensation at the ulnar aspect of the hand. The patients acquired satisfactory recovery.
7.2 Restoring finger flexion in C7-T1 brachial plexus injury

Z. Dong
Huashan Hospital, Shanghai, China

In author's unit, the brachialis motor branch transfer has been performed to restore finger flexion since 2004. However, finger flexion strength after this procedure merely corresponds to Medical Research Council Grades M2-M3, lowering the grip strength and practical value of the reconstructed hand. Therefore, we modified the technique and now use 2 donor nerves for nerve transfer in aims to achieve stronger finger flexion. In 6 patients with C7-T1 brachial plexus injury, we transferred the pronator teres branch to the anterior interosseous nerve and the brachialis motor branch to the flexor digitorum superficialis branch for reinnervation of full finger flexors. Compared with previous cases, the patients in this series acquired stronger finger flexion.
7.3 Nerve transfer to restore thenar muscle in low median and brachial plexus palsy

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INTRODUCTION

Anterior interosseous nerve (NIA) has well described to restore ulnar motor function in patients with ulnar nerve palsy, severe compression or low brachial plexus injuries. We decided to use NIA as a motor nerve to restore thenar muscle function in some patients with absent motor thenar function and viability of NIA after partial brachial plexus injury. Accurate nerve conduction studies (NCS) are crucial to indicate this nerve transfer.

MATERIAL AND METHODS

Three patients have been treated on the period 2014-2015, age ranges 28 to 57, 2 females and one male. Preoperative NCS is crucial to be sure pronator quadratus function is normal, as well it was uninjured or successful reinnervation.

Surgical technique was assisted by intraoperative nerve recording (INR) to identify any residual nerve action potential (NAP) on motor branch of median nerve or compound motor action potential in thenar muscle (CMAP). Intraneural dissection is avoided in cases with some activity and in one case without any activity. Reverse end to side in cases with some NAP recorded or end to end with NAP absent was done.

RESULTS

Improve in CMAP at thenar muscle was achieved in all three cases. Initial reinnervation was detected at 4 months. Clinically patients recover some abduction function and atrophy of thenar muscle.

CONCLUSIONS

Results are successful to restore thenar abduction with no morbidity of tendon transfer measured objectively by nerve conduction studies. Reverse end to side suture reveal effectiveness of this method as well.
7.4 The Results Of Hand Secondary Procedures

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Nerve reconstruction is indicated in case of total palsy; the goal of this surgery is to have sensitive and functional hand. In literature this result is obtained in 60 %. But what about patient which didn’t have nerve surgery? Through this study we present the result of hand secondary procedures.

Material and method: Retrospective study concerning over than 30 children presenting total plexus palsy; operated in our department.

Result: Average age was four. Preoperative assessment showed that: In 70 % of cases the hand was classified 3 according to GILBERT and RAIMONDIE score. Sensibility was present in 50% of cases. In 80 % surgery was performed in order to reanimate wrist extension. The results of surgery increased function but it was not sufficient to obtain functional hand.

Discussion /Conclusion: In total plexus palsy hand function is bad even with late surgery.
7.5 Functional outcome on drop hand patient treated with jones tendon transfer (serial case report)

Prof. Dr. R. Soeharso Orthopaedic Hospital, Surakarta, Indonesia

Background: High lesion radial nerve palsy in the hand due to trauma creates a significant disability for the patient. One treatment for radial nerve palsy is tendon transfer to restore hand function, and are among the best and most predictable transfers in the upper extremity. The most popular and frequently used method was Jones Tendon transfer.

Methods: We report 14 patients with humeral shaft fracture encountering case of drop hand and being operated with Jones Tendon Transfer in Prof. Dr. R. Soeharso Orthopaedic Hospital Surakarta from January 2014 to June 2016. All surgeries were performed by a single experienced hand and microsurgeon (TTO) and we evaluated the result for 6 months – 1 years post operatively based on functional outcome using DASH score.

Results: Total of 14 patients were included in this research criteria which divided into 12 (85,7%) male patients and 2 (14,2%) female patients. Average patients’ age was 28 years old with most frequently injured arm was the right arm 10 patients (69%) and less frequent one, the left arm were 4 patients (31%). We mostly do transfer as folowing : PT – ECRL/ECRB, PL – EPL, FCR – EDC (12 patients) and PT – ERL/ECRB and FCR – EDC ( 2 patients) The result from evaluation of DASH score on the average was 13.88.

Conclusions: Operative treatment of irreparable radial nerve palsy using Jones Tendon Transfer for drop hand gave a satisfactory functional outcome based on the DASH score.
7.6 Forearm rotational imbalance in obpp

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As a sequela of forearm rotational imbalance in obstetric brachial plexus palsy (obpp), a lot of deformities may present, like weakness of active or passive pronation or supination, supination contracture, a subluxated or dislocated radial head or an imbalanced wrist in ulnar deviation. We present the clinical evaluation system we use in forearm assessment, and the surgical solutions adapted to these conditions, including pronating tendon transfers (mainly tendon rerouting procedures), relocation of the radial head and minor additional steps. The forearm deformities are frequently individualized and difficult to be corrected surgically, the pathophysiology combines different factors like muscle weakness and imbalance, growth disturbance and joint stiffness-dysplasia. We present our strategy to stimulate discussion how these deformities could be identified and addressed earlier and in a more physiologic and preventive manner.
7.7 Restoration of Elbow Function Using End-to-Side Anastomosis between Ulnar Fascicles and Musculocutaneous Nerve in Late Incomplete Obstetrical Erb’s Palsy

S. Rochkind
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Purpose: Improvement of elbow flexion using end-to-side anastomosis, where intact fascicles of the ulnar nerve are implanted into a barely functional musculocutaneous nerve, has been clinically investigated in cases of late obstetrical Erb’s palsy.

Methods: The study was conducted on 2 patients suffering from severe elbow flexion disability resulting from late obstetrical Erb’s palsy (operated on at the ages of 5 and 14.5 years old). Clinical and electrophysiological motor function data were compared before and after surgery. Using intraoperative electrophysiological monitoring 2 intact fascicles of the ulnar nerve were implanted (end-to-side) into a barely functional musculocutaneous nerve (at the connection point between musculocutaneous nerve and its branch to the biceps) through an epineurial window, using 10-0 sutures. Follow up period after the operation was 2 years.

Results: Prior to the surgery, the patient’s strength of elbow flexors (using MRC grading system) was M1 or M2 and improved 2 years after surgery to M4-. Postoperative electrophysiological analysis showed improvement in amplitude of compound muscle action potentials and recruitment compared to before surgery.

Conclusion: The study suggests that end-to-side anastomosis can be considered as a viable microsurgical technique for patients suffering from late incomplete obstetrical Erb’s palsy.