

Challenges in Decision Making Process Considering Nerve Transfers for Upper (C5-C6) Brachial Plexus

Palsy Due to Traction Injuries

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Introduction

In the past, nerve transfers were the treatment of choice in cases with spinal nerve root avulsion, or those with directly irreparable proximal lesions and very proximal or injuries without a nerve available for grafting. Recently, indications for nerve transfers have been extended to high level nerve injuries with extensive gap for grafting and delayed nerve repairs, significant bony or vascular injuries in the region of direct repair and previously failed proximal nerve repair. The main advantage of this procedure over nerve grafting is a conversion of proximal highlevel injury to a low-level one.

Nerve transfers in cases of directly irreparable, or high level extensive brachial plexus traction injuries are performed using a variety of donor nerves with various success but an ideal method has not been established.

Methods

The purpose of this study was to analyze the results of nerve transfers in patients with traction injuries to the brachial plexus using the thoracodorsal and medial pectoral nerves as donors. Most frequently used nerve transfer modalities for upper brachial plexus palsy due to traction injuries were evaluated. This study included 40 patients with 25 procedures using the thoracodorsal nerve and 33 procedures using the medial pectoral nerve as donors for reinnervation of the musculocutaneous or axillary nerve. Nerve grafts vs. nerve transfers arguments pro and contra were excluded from this point.

Results

The total rate of recovery for elbow flexion was 94.1%, for shoulder abduction 89.3%, and for shoulder external rotation 64.3%. The corresponding rates of recovery using the thoracodorsal nerve were 100%, 93.7% and 68.7%, respectively. The rates of recovery with medial pectoral nerve transfers were 90.5%, 83.3% and 58.3% respectively.

Conclusions

Although there are multiple controversies in nerve transfer for upper brachial plexus palsy due to traction injuries, Oberlin procedure is currently the first choice in nerve transfer, where it is possible, in cases with upper brachial plexus palsy due to the traction injuries. According to findings in this series, nerve transfers using collateral branches of the brachial plexus in cases with upper palsy offer several advantages and yield high rate and good quality of recovery.



Excellent recovery of elbow flexion (A) with preserved brachio-thoracic pinch (B) for a 19-year-old male patient. Reinnervation of the left musculocutaneous nerve using the medial pectoral nerve as donor was done 3 months after injury

References

1.Addas B, Midha R. Nerve transfer for shoulder reanimation, In: Midha R, Zager E eds. Surgery of peripheral nerves. New York. Thieme; 2008. 53-59.

2.Oberlin C, Beal D, Leechavengvongs S, Dauge M.C, Sarcy J.J: Nerve transfer to biceps muscle using a part of ulnar nerve for C5C6 avulsion of the brachial plexus:anatomical study and report of 4 cases, 1994; 19:232-237.

3.Samardzic M, Rasulic L, Grujicic D, Milicic B. Results of nerve transfers to the musculocutaneous and axillary nerves. Neurosurgery. 2000. 46: 93-103.

4.Sulaiman C, Kim D, Burkett C, Kline D. Nerve transfer surgery for adult brachial plexus injury: A 10- year experience Louisiana State University. Neurosurgery Suppl. 2009. 65:A55-A62.



Nearly a complete recovery of arm abduction (A) and anteflexion (B) following reinnervation of the left axillary nerve using the thoracodorsal nerve as donor



Shoulder external rotation recovery over 90 degrees