

Peripheral Nerve Repair Through Minimally Invasive Technique

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Introduction

During the past few decades, technological development led to creation of new, minimally invasive surgical techniques, growing in every part peripheral nerve and brachial plexus surgery.

Mini-Open techniques

The beginning of development of these techniques is marked with creating minimally invasive techniques in the surgery of compressive neuropathies. The first minimally invasive technique for median nerve entrapment included the incision of only 2 to 3 cm enabling the surgeon to visualize whole flexor retinaculum, and to safely cut it without damaging recurrent motor branch. After this, more and more minimally invasive approaches were described.

Nerve transfer of supinator motor branch to the posterior interosseous nerve as well as a branch of the pronator quadratus muscle and motor branch of extensor carpi radialis brevis muscle can be used through a minimally invasive approach. Also, minimally invasive approaches for brachial plexus lesions were developed, including the easy-done nerve transfer of accessory nerve to suprascapular nerve.

Another interesting endoscope application is in sural nerve harvesting. Duration of the procedure is 25 minutes and requires only one skin incision of 12 mm in length.

Minimally invasive endoscopic approaches

Endoscopic carpal tunnel release has been performed since the late 1980s, using two operating techniques. Several published studies showed excellent results using this technique. There were also attempts to treating cubital tunnel syndrome using endoscopy, with only "in situ" decompression, and decompression followed by subcutaneous transposition with excellent results. Surgery for tarsal tunnel syndrome can also be performed using minimally invasive endoscopic approach.

Endoscopic surgery for brachial plexus is still in the development stage. Even though the technology has made huge leap in the past years. A few cadaveric trials using surgical robotic systems were conducted in attempt to find a minimally invasive technique for exploration of the brachial plexus.

Ultrasound guides procedures

One of the novel and promising procedures is thread carpal tunnel release being neither open, nor endoscopic, but related to marvelous results.

Conclusion

These techniques are overwhelming classical approaches in peripheral nervous system surgery, with the increase in their use with modern surgical as well as imaging and monitoring techniques.