



Treatment of Thoracic outlet syndrome

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Introduction

Clinical manifestations of thoracic outlet syndrome (TOS) are vague pain in upper extremity. And the diagnosis is often delayed or misled as cervical HNP, shoulder pathologies or peripheral neuropathy. For this reason, many patients spend time for unnecessary or ineffective treatments. The authors report the results of TOS treated by conservative care or surgical treatment.

Materials & Methods

Twenty-seven cases diagnosed as thoracic outlet syndrome between January 1999 and March 2013 were reviewed retrospectively. The subjects included 15 male and 12 female patients. The mean age was 45 years (range, 22-68 years) and the mean follow-up period was 7 months (range, 3-21 months). For evaluation of TOC, patient underwent C-spine X-ray, MRI, and nerve conduction study. At initial visit, authors recommended light shoulder & neck exercise, and then wait and see the improvement of symptoms every 3 to 4 weeks. After 3 months, if patient's symptom did not improved, authors decided to undergo surgical procedure. Surgical method included anterior and middle scalenectomy, neurolysis of brachial plexus, and resection of first rib. The outcomes were assessed based on the subjective postoperative symptom improvement.

Results

Among 27 patients, 16 patients improved by conservative care (Group A) and 11 patients underwent surgery (Group B). In group A, 13 patients were free of symptoms, and 3 patients showed no improvement in symptoms. And 1 patient was diagnosed as vascular TOS, he took antiplatelet agent and cumadin. In Group B, We performed anterior and middle scalenectomy in all cases, first rib resection in four cases, and cervical rib resection in three cases. No postoperative complications were noted. Nine patients were improved to nearly normal after 6.5 months (range, 2-21 months) postoperatively. Two patient had mildly remained symptom after 6 months.

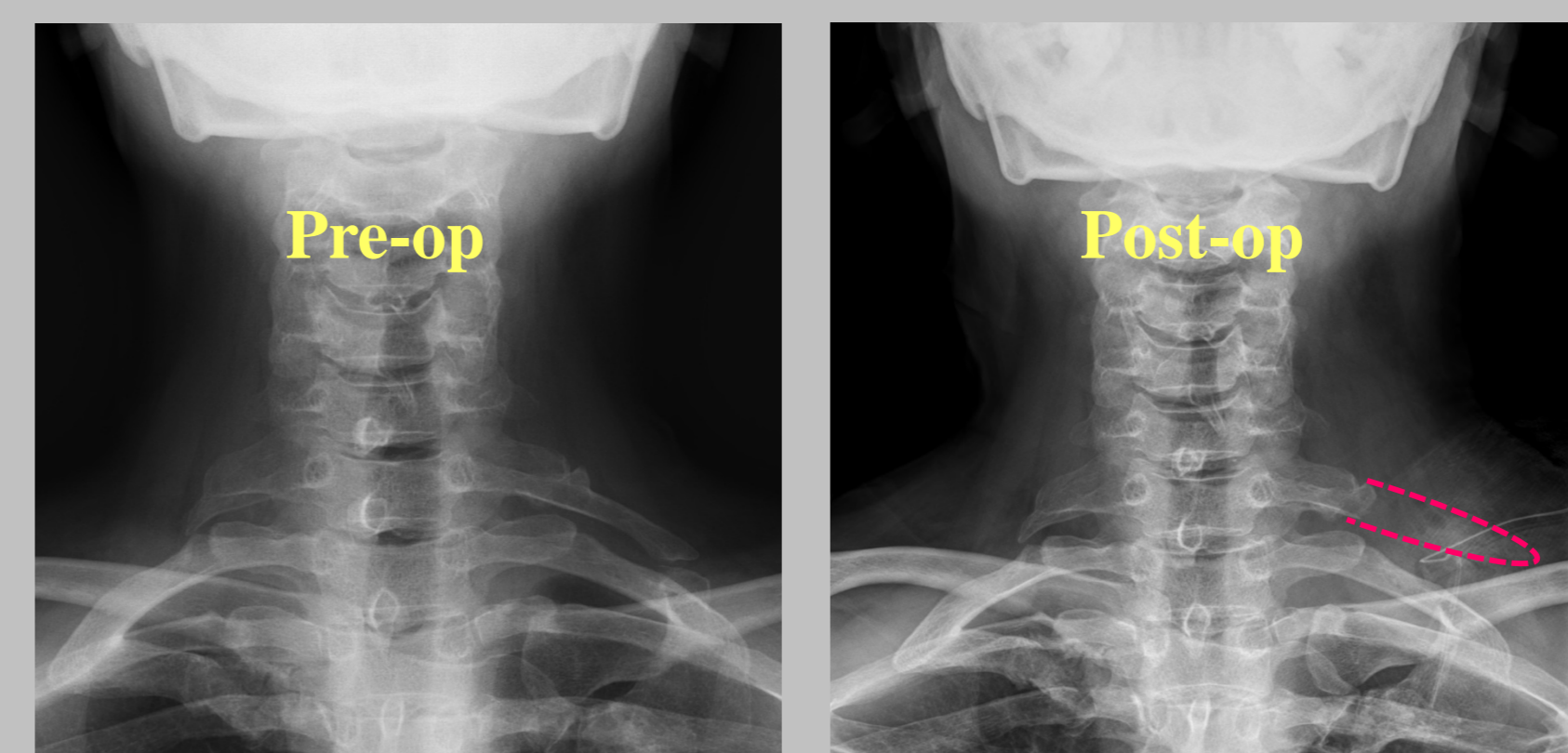
	Group A (16)	Group B (11)
Adson	9	5
Reverse Adson	3	5
Hyperabduction	3	4
Costoclavicular compression	2	0
Roo's	2	3
Allen test	1	0
Muscle atrophy	2	1
Weak radial a. pulse	1	0

Table 1. Result of physical examination

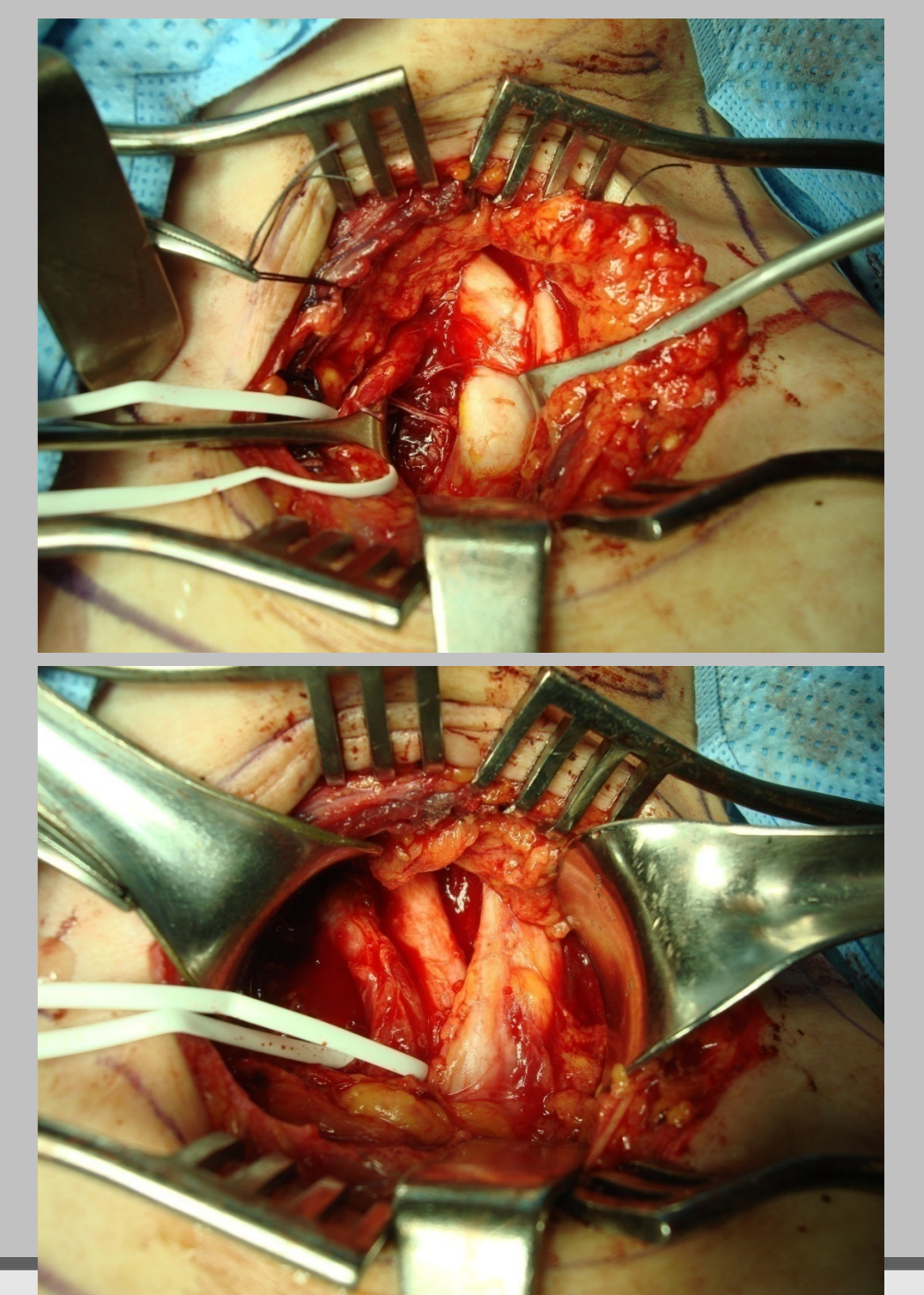
EMG was checked in 16 cases. Any comment about brachial plexopathy or TOC were noted in 2 cases. In 7 cases, EMG showed no evidence of peripheral neuropathy or cervical radiculopathy. Peripheral neuropathy was noted in 5 cases.

MRI was checked in 18 cases. In most cases, MRI showed negative findings about evidence of compression over brachial plexopathy. Hypertrophy of middle scalene muscle was definitely identified in on case. In the case with cervical rib syndrome, brachial plexus was detected in MRI.

Case 1. 44/F Tingling sensation on left upper extremity



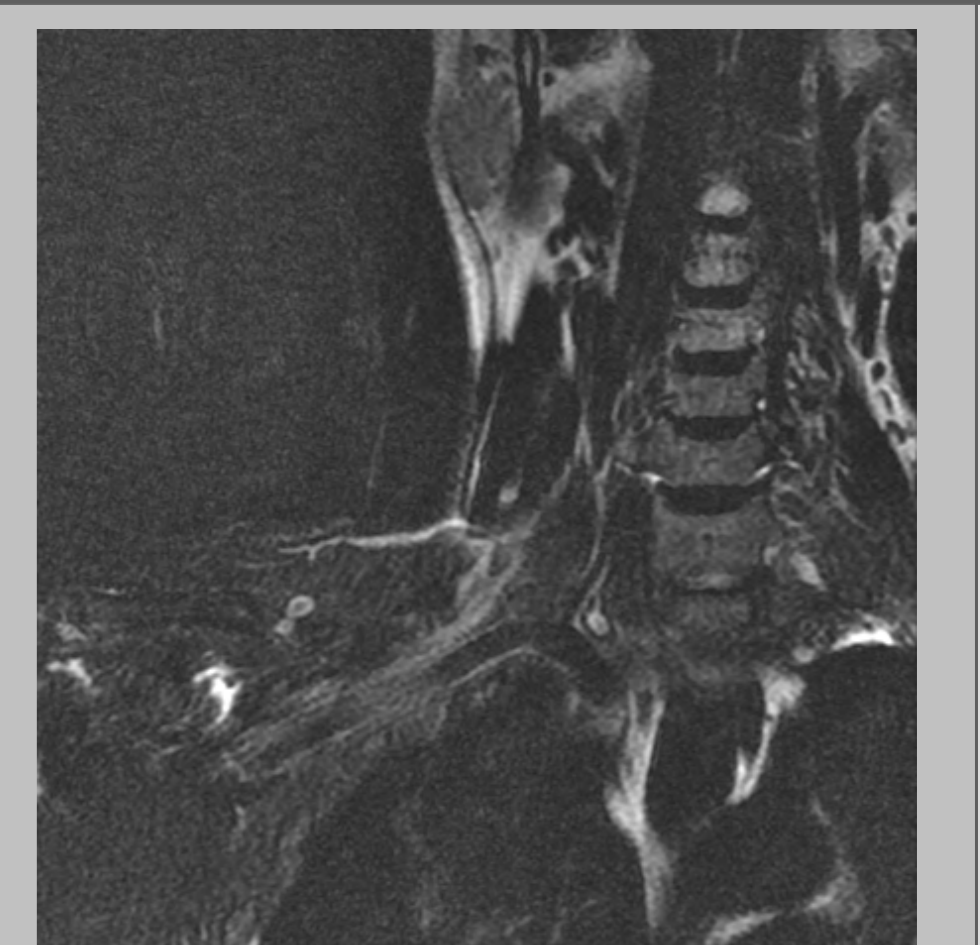
After resection of cervical rib of left side, brachial plexus was decompressed and symptom improved immediately after surgery.



Case 2. 48/M Rt. hand tingling sensation for 7 months



Weak radial a. pulse
Adson test(+), Reverse Adson test(+)
Conservative care for 3 months



Brachial plexus was compressed by distal portion of anterior and middle scalene muscle. Immediately after resection of scalene muscles, radial pulsation dramatically improved and patient's subjective symptom was improved also.

Discussion

In treatment of TOS, suspicion to possibility of the diagnosis of TOS is most important. Mismatch between history and physical examination can be the clue of TOS. Conservative treatment is an effective method for TOS patients at initial clinic visit. If conservative treatment is ineffective, surgical methods may require. Thorough exploration of brachial plexus and anterior and middle scalenectomy are most helpful for successful outcomes. Other pathologic lesion such as cervical rib or space-occupying lesion must be removed for the complete decompression of brachial plexus.

Treatment algorithm

