

Thoracoscopic Resection of the First Rib for Thoracic Outlet Syndrome: A Case Report

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Standard open procedures for resection of the first rib in thoracic outlet syndrome can prove to be quite difficult with extensive incisions. A minimal invasive procedure can also be painstaking, but provides an attractive alternative to the more radical open procedures. We report the details of the technique with direct video footage of the procedure performed in a 41-year-old man with thoracic outlet syndrome done entirely by thoracoscopic methods. [J Trauma Inj 2017; 30: 63-65]

Key Words: First rib resection, Thoracic outlet syndrome, Video assisted thoracoscopic surgery

I. Introduction

Minimally invasive thoracoscopic surgery has provided an option for many radical procedures. Thoracoscopic surgery is evolving and becoming more tangible. We report a case of thoracic outlet syndrome occurring in a 41 yr-old young man, whom had his first rib resected by thoracoscopic surgery. Three ports were utilized and the rib removed through the axillary port. The patient was discharged on the postoperative 10th day without pain and paresthesia and is happy with the cosmesis.

II. Case Report

A 41 yr-old male had visited our clinic with symptoms of left upper extremity pain and paresthesia of 1 year onset after a traffic accident. He had sus-

tained multiple rib fractures, left 4, 8, 9 and 10th and has had the above complaints ever since. He was diagnosed with thoracic outlet syndrome after conduction velocity testing showing delay in velocities from below his root to below his elbow and electromyographic studies that had shown abnormal paravertebral muscle done 3 and 6 months after the incident at a university hospital. His cervical-spine MRI presented traumatic c-spine injury with foraminal encroachment with suspected cervical 6 and cervical 7 nerve impingement. After failure of medication, the patient consulted our hospital for thoracoscopic resection of his first rib one year after the accident. The patient had positive hyperabduction test as seen by symptoms of ulnar division pain and paresthesia aggravated by abduction of his left arm.

The operation was scheduled and the procedure was done with double lumen intubation (Fig. 1). The

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patient was placed in the right down decubitus position with arm elevated and placed over an arm rest. CO₂ insufflation after placing three ports was utilized. A 5 mm camera port was placed in his 6th inter-

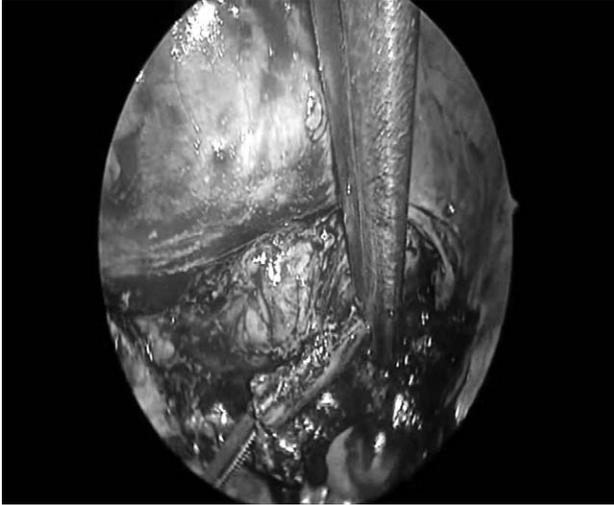


Fig. 1. Captured shot of the procedure showing the rib cut with total thoracoscopic methods using a Kerrison bone punch.

costal space in his mid-axillary line, a 1 cm port in his areola margin and a 1.5 cm port in his axilla in his 3rd intercostal space at his mid-axillary line. The overlying pleura was dissected off with the help of Harmonic scalpel and readily available open instruments, a freer and periosteal elevator. The anterior portion of the first rib was cut with Kerrison bone punch. The rib was held with endoscopic cardiovascular clamp (Sonntec, Colorado, USA) and long Kelly. The posterior portion of the rib was very difficult to cut and use of an orthopedic drill (Zimmer, Microdrill, Minnesota, USA), similar to the case described by Ohtsuka et al, was used to help cut the rib.(1) The Kerrison bone punch was found to be too short to reach the posterior portions of the rib. A 24 French chest tube was inserted.

His postoperative course was uneventful and his tube was removed on his postoperative 2nd day. At the request of the patient, he was discharged on the 10th postoperative day without complication. An immediate follow up computer tomogram has shown

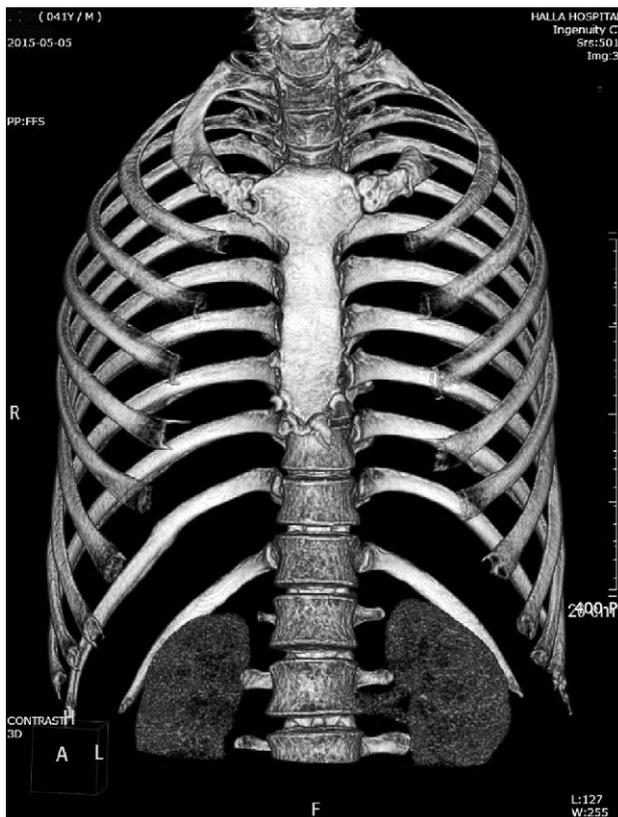


Fig. 2. Chest 3D Computer tomographic scan showing the removed first rib (arrows showing the extent of the resection).



Fig. 3. Postoperative picture of the port wounds placed in his axilla, areola margin, and in his 6th intercostal space inferiorly.

over 80% removal of the rib with decompression of his thoracic outlet components (Fig. 2). The patient no longer has symptoms of pain and paresthesia of his ulnar division and is happy with the results (Fig. 3).

III. Discussion

Compression of the neurovascular structures in the superior outlet of the thoracic cavity defines thoracic outlet syndrome. This includes symptoms due to compression of structures such as the subclavian vein, subclavian artery, or brachial plexus. Such compression is due to mechanical factors caused by pressure between the scalene muscles, between the clavicle and first rib, or in the subcoracoid tunnel.(2) Until recently, most of the corrective operative procedures have been done by open methods, supraclavicular and transaxillary approaches. Thoracoscopy allows for direct visualization and safe removal of the first rib. The first description of thoracoscopic removal of the first rib was done in 1999 and since then very few reports have been made that have utilized complete removal by thoracoscopic methods in the English literature.(1) Our procedure is similar to the case reported in Korea.(3)

Our particular case also presented similar methods of removal with readily available instruments. However, there was great difficulty in cutting the posterior portion of the rib and the use of the drill was inevitable. Until there are bone punches which are longer than

the conventional open instruments, there will be some difficulty.

IV. Conclusion

Thoracic outlet syndrome can be treated by a minimally invasive procedure. It is feasible and resection of the first rib can be done by thoracoscopic methods. Using the robot as described in a couple series can be done, but are at expense of high costs in Korea.(4,5) Again, further case analyses and development of instruments that would make the procedure more simple would be necessary in the future.

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