

Cervicothoracic junction disc herniation: Our experience, technical remarks, and outcome

ABSTRACT

Background: C7-D1 disc herniation is rare in comparison with other cervical levels. The incidence rates are between 3.5% and 8%. The cervicothoracic junction disc herniation can be operated posteriorly or anteriorly. The anterior approach can be challenging because of the difficulty of access resulted from the manubrium. In this article, we present our experience about cervicothoracic junction disc herniation (C7-T1) surgery.

Materials and Methods: Between January 2008 and December 2017, 21 patients have been operated for solitary C7-T1 disc herniation. We operated 12 male patients and 9 female patients. Eight patients have been operated by the anterior approach, and 13 patients underwent surgery by the posterior approach. The mean symptoms duration was 11.4 months.

Results: All patients had C8 cervicobrachial neuralgia. Other clinical presentations were numbness, tingling sensation, and weakness. All patients improved after surgery. We had no significant complication.

Conclusion: We did not find a great difference between the clinical features of cervicothoracic herniated disc and other cervical levels. The anterior approach seems more difficult to carry out in particularly in large patients with the short neck. The posterior approach can be used for all types of patients except in the case of medial disc herniation.

Keywords: Anterior cervical approach, cervicothoracic spine, disc herniation, posterior cervical approach

INTRODUCTION

C7-D1 disc herniation is rare in comparison with other cervical levels. The incidence rates have been reported between 3.5% and 8%.^[1-8] Typically, it is demonstrated clinically by C8 radiculalgia. The latter births in the neck and radiates in the little finger. There is also a referred pain in the scapular region. Sensory loss is in the medial forearm and the sensation of pinky and ring finger is affected too. The muscles particularly affected include abductor pollicis brevis (pulmar abduction of the thumb), first dorsal interossei (abduction of the index), and abductor digiti minimi (abduction of the little finger).^[9-15] The cervicothoracic junction can be approached posteriorly or anteriorly. While the anterior approach to cervical spine is very familiar to spine surgeons, but C7-T1 anterior cervical discectomy can be challenging because of the difficulty of access resulted from the manubrium in particular among patients with the short and deep neck. The posterior approach can also be

challenging in particular in medial disc herniation because of difficulty to access to hernia and inability to reflect the spinal cord. Concerning C7-T1 cervical discectomy, few data are available in the literature. In this article, we aim to present our experience with cervicothoracic junction disc herniation (C7-T1) surgery, describe our approaches,


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the reason of each approach, and propose some surgical remarks.

Surgical anatomy of the cervicothoracic junction

The cervicothoracic junction is formed by the manubrium anteriorly, the first ribs laterally, and the vertebral body of T1 posteriorly. The sternocleidomastoid (SCM) muscle inserts the sternum. The latter is covered by the platysma muscle. The sternohyoid and sternothyroid muscles attach to sternum too and are deeper compared to the SCM. Vascular structures of the region contain a terminal portion of the subclavian vein, right brachiocephalic, left subclavian, and left internal arteries. Nervous structures include the internal jugular vein, the common carotid artery, the vague nerve, the phrenic nerve, recurrent laryngeal nerve, and stellate ganglia. The internal organs passing through the cervicothoracic junction include the thoracic duct, trachea, and esophagus.^[8-10,16-19]

MATERIALS AND METHODS

Between January 2008 and December 2017, 21 patients have been operated for solitary C7-T1 disc herniation. We operated 12 male patients and 9 female patients (female/male ratio = 1/1,33). The mean symptoms duration was 11.4 months. All patients had cervicobrachial neuralgia (radiculalgia and cervical pain). Patients with cervical myelopathy were excluded from the study. Eight patients have been operated by the anterior approach and 13 patients underwent surgery by the posterior approach. The posterior approach involved simple discectomy and anterior approach consisted of total discectomy and fusion by the intersomatic cage. The average length of stay in hospitals was 2 days. Four patients were discharged the day after surgery, and one patient stayed 3 days in the hospital for family-related reasons. Table 1 demonstrates the patients' baseline and characteristics.

Patients wore cervical collar a few days after surgery used for reducing pain and avoiding too much cervical movement. Patients operated by the anterior approach underwent X-ray imaging (anteroposterior and lateral cervical spine) of the cervical spine on the day after surgery, week 6, months 6, year 1, and year 2 postoperatively. Patients operated by the posterior approach had X-ray imaging one and 2 years after surgery. All patients were examined clinically at 6 and 12 weeks, 6 months, 1 year, and 2 years postoperatively and evaluated with a Visual Analog Scale (VAS) ranging from

0 (no pain) to 10 (worst pain imaginable) and with the Neck Disability Index (NDI), which ranges from 0 to 50 (0%–100%). The mean duration of follow-up was 3.7 years.

RESULTS

The results were evaluated for pain with VAS, for ability, and to manage in everyday life by NDI. Table 2 demonstrates the pre- and postoperative evaluation of patients by VAS and NDI.

DISCUSSION

The indication of the posterior or anterior approach for the treatment of upper cervical radiculopathy is well reported in the medical literature.^[3-5,20-29] Classically, the posterior approach is indicated for the treatment of lateral disc herniation or foraminal stenosis. The anterior approach is used for the treatment of central osteophytes or disc herniation. Some authors consider that anterior approach and fusion by intersomatic cage can provide improvement in the cervical lordosis angle.^[30-33] However, this notion is insufficiently clear and probably implausible in cervicothoracic junction because of reduced mobility of the region and because of the existence of sternum. On the other hand, the existence of recurrent laryngeal nerve, stellate ganglia, and the thoracic duct, etc., make this specific anatomical site hard to access and obscure the surgical field. We did not find a significant change in cervical lordosis in patients operated by the anterior or posterior approach in cervicothoracic junction. The danger of the anterior approach in this region is injury to the subclavian vein, the recurrent laryngeal nerve, and the thoracic duct and great vessel.^[2,18] For the cervicothoracic posterior approach, the same complications associated with any type of cervical surgery (cord and root injury). We operated 9 females and 12 males, resulting in a final ratio of 1.33/1 versus 2/1 in the literature for cervical disc herniation.^[34,35] The mean age of our patients was 52.34. This is in close agreement with the results from the medical literature that gives an average age of around 50 years.^[36,37] We operated eight patients by anterior and 13 patients with the posterior approach. For the anterior approach, we used a transverse incision except for one patient that we performed an oblique longitudinal incision because of his expansive corpulence and his very short neck. No sternotomy was performed in any patient operated by the anterior approach. For the posterior approach, a 3- or 4-cm paramedian skin incision is made centered over the involved segment. Needless to say, while it is recommended to preserve facet joint,^[38,39] we think that the preservation of the facet joint is not indispensable unlike other cervical levels because the maintaining of stability is easier given the

Table 1: Patients' baseline and characteristics

Patients	Age	Female	Male	AA	PA
21	41-67 (52.34)	9	12	8	13

AA - Anterior approach; PA - Posterior approach

Table 2: Pre- and postoperative Visual Analog Scale and Neck Disability Index

Preoperative		Postoperative 6 weeks		Postoperative 6 months		Postoperative 1 year		Postoperative 2 years	
VAS	NDI	VAS	NDI	VAS	NDI	VAS	NDI	VAS	NDI
PA									
7.69	71.22	3.99	42.44	1.95	31.05	2.01	29.76	1.89	24.34
AA									
8.01	74.12	4.01	39.34	3.19	32.83	1.89	19.97	1.96	21.32

VAS - Visual Analog Scale; NDI - Neck Disability Index; PA - Posterior approach; AA - Anterior approach

existence of sternum and other elements of cervicothoracic junction. We had no complications. We have not noted any lordotic and kyphotic modification after 2 years of follow-up. The results are nearly identical in two groups [Table 2]. On average, NDI was 71.22 in patients operated by the posterior approach and 74.12 in patients operated by the anterior approach before the surgery. VAS was 7.96 in the first group and 8.01 in the second group in the preoperative period. After surgery, NDI and VAS were 24.34 and 1.89 in the first group and 21.32 and 1.96 in the second group, respectively.

CONCLUSION

Following our experience of 21 surgeries for C7-T1 disc herniation, we believe that there is no great difference between the clinical features of cervicothoracic herniated disc and other cervical levels. The anterior approach seems more difficult to carry out in particularly in large patients with the short neck. The posterior approach can be used for all types of patients except in the case of medial disc herniation.

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Conflicts of interest

There are no conflicts of interest.

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