4c THORACOSCOPIC DISCECTOMY

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1. Introduction:

Technical improvement in endoscopy has a major role in the practice of minimally invasive surgery which is a current goal of surgical intervention. For the patient, the benefits of endoscopic thoracic discectomy are that it is less invasive and it results in less surgical trauma, less pain, possibility less morbidity and less scaring [(1)].

According to results of computed tomographic (CT) scans, the incidence of thoracic disc herniation is approximately one patient per 1 million individuals [(2)] and according to result of magnetic resonance imaging (MRI) and post myelographic CT scanning has found an 11.1% to 14.5% prevalence of thoracic disc herniations [(2-4)]. It is low incidence and present with a variety of nonspecific findings. They may be leads to a wrong or delayed diagnosis [(4-7)]. Endoscopic thoracic discectomy has the advantages of anterior approach in the patients with central ossified thoracic disc herniations. The traditional surgery for these patients is anterior approache with thoracotomy. Endoscopic thoracic discectomy has significantly reduced the chest wall morbidity related to the thoracotomy. Thoracoscopic spine surgery clearly provides minimally invasive and effective alternative top open thoracic surgery. Surgeon must be familiar with the surgical anatomy and the endoscopic techniques to ensure optimal surgical outcome. Hence, that causes limitation in practice of thoracoscopic discectomy. In the other hand, the excellent results of thoracoscopic discectomy encourage it is application to situations in which conventional thoracic approach is indicated.

2. History:

The application of thoracoscope for discectomy was independtly developed by Mack-Regan [(8)] and Rosenthal [(9)]. They have popularized the use of thoracoscope for thoracic discectomy. The first article of the thoracoscopy for spinal disease was published by Mack and associates [(8)]. The enthusiasm is using thoracoscopic technique for central and hard thoracic disc herniation.

3. Anatomical Specialty in Thoracoscopic Approache:

There are many anatomical point should be care by surgeons to avoid complication peroperatively. The majority of thoracoscopic surgery for thoracic disc herniation is from the right side where there is a greater working spinal surface area lateral to the azygos vein than that to the aorta [(10)].

Thoracoscopic approach of left side is done possible blow Th9 where the aorta has moved away from the left postero-lateral of the spine to an anterior position s it passes through the diaphragm.

Anatomical orientation definitely plays a major role in thoracoscopic surgery. Columna vertebralis, aorta rib and pedicles are anatomic signs that lead surgeon. For location of disc level, the rib heads provide essential landmarks. The pedicles are dense oval cylinders of bone with a cancellous center. They connect the vertebral bodies with the remainder of the posterior arch [(11)].

Space between the ribs joins the transverse process and the vertebral body with the surface of pedicle produce costo-vertebral triangle. This space has

a major role to provide proper point to enter spinal canal.

The other anatomic formation which should be aware of that's, are intercostals artery, vein and nerve and the segmental vein and artery on the surface of vertebral body. The segmental vessels and nerve joins together at the neural foramen. The ligation of the segmental vessels was controversery for a long time. Although experimental models define caution one on the potential reduction of cord perfusion in scoliotic patient with neurological deficit [12]. However, no neurological deficit noted in ligating patients is demonstrated [13]. In our practice we try to protect these vessels when doing only discectomies without screwing during pleura dissection along the spinal column, the branches of the symphatic chain is divided. It may cause to transient vasodilatation of the ipsilateral leg.

4. Operative Technique:

The procedure was performed under general anesthesia on a radiolucent operating table. Endotracheal intubation with a double-lumen tube was applied to all patients. All initial preparations such as arterial line, central nervous catheter, pneumatic compression stockings and urinary catheter were placed. All patients were also prepared for conventional thoracotomy that might be performed if complications occurred during thoracoscopic surgery. Then the patients were generally turned and placed in a right- or left-up lateral decubitis position with the side to be operated on facing up. Fluoroscopy (c-arm) was positioned to verify the disease level before incision and to obtain lateral and anterior-posterior intraoperative images as defined in *chapter 4b*.

Three to four portal trocars were used depending on localization of the target. The first 10 mm portal was placed directly over the target spine or disc segment posterolaterally between the posterior axillary and the midline as in *chapter 4b*. Second portal was on the cross point of the anterior axillary line and transverse line that passed first portal. This method permitted us compatible manipulation during the procedure and the use of 0 and 30 degree-angled optics during operation in all varieties of spine disorders. Spinal canal is visualized by removing the superior portion of the pedicle. Tracing the superior edge of the pedicle to the vertebral body and the disc space lead to explore of the disc herniation.

In all patients', general considerations such as operating room setup and patient positioning, thoracoscopic imaging and instruments, portal insertion and wound closure and early postoperative management in all cases are similar. A 32-Fr chest tube is inserted before lung expansion and wound closure.

Preoperative and postoperative MRI and CT figures of a thoracal disc disease which is operated via thoracoscopic endoscopic approach is seen in figure 1a, b and c.

5. Thoracoscopic discectomy results:

Correct indication and choice of adequate patient thoracoscopic surgery have a major point to reach good surgery results.

Rosenthal and Dickman reported the results of 55 consecutive patients undergoing thoracoscopic discectomy [9]. Among these patients 79% of radiculopathic patients recovered completely, whereas 60% of the myelopathic patients recovered neurologically. The perioperative morbidity associated with the thoracoscopic thoracic spine approache is less than the thoracotomy.

6. References:

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Figure 1: A calcified Th8-9 central disc herniation: **a, b)** Preoperative T2 weighted sagittal MRI **c)** postoperative axial CT scan is seen.