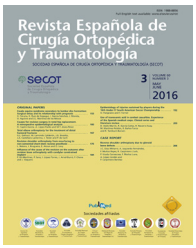
Rev Esp Cir Ortop Traumatol. 2017;61(2):124–129

Revista Española de Cirugía Ortopédica y Traumatología

www.elsevier.es/rot



CASE REPORT

Experience in the treatment of thoracic herniated disc using image-guided thorascopy☆

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Received 3 February 2015; accepted 25 July 2015

KEYWORDS
Thoracoscopic discectomy;
Image-guided surgery;
Thoracic disc herniation

Abstract Thoracoscopic micro-discectomy is a treatment option for thoracic disc disease that combines the advantages of the anterior approach and the benefits of a minimally invasive technique. Adding a navigation system provides many advantages to the usual technique, as it allows accurate marking of the lesion level, improvement in the surgical approach, and precise control of herniated disc resection and vertebral osteotomy. The navigation system also reduces the learning curve for thoracoscopic technique. We report our experience in the treatment of thoracic disc herniation with image-guided thoracoscopy.

PALABRAS CLAVE
Discectomía toracoscópica;
Navegación;
Hernia torácica

Tratamiento de la hernia discal torácica mediante toracoscopia navegada. Nuestra experiencia

Resumen La discectomía toracoscópica es una técnica quirúrgica que combina las ventajas del abordaje anterior a la columna torácica con los beneficios de una técnica mínimamente invasiva. La adición del sistema de navegación aporta múltiples ventajas a la técnica habitual como marcaje exacto del nivel lesional, mejoría del abordaje quirúrgico, control de la resección herniaria y de la osteotomía vertebral. El sistema de navegación también acorta la curva de aprendizaje de la toracoscopia. Se presenta nuestra experiencia en el tratamiento de hernias discales torácicas mediante toracoscopia navegada.

☆ Please cite this article as: Bordon G, Burguet Girona S. Tratamiento de la hernia discal torácica mediante toracoscopia navegada. Nuestra experiencia. Rev Esp Cir Ortop Traumatol. 2017;61:124–129.
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Introduction

The estimated incidence of symptomatic thoracic herniated disc is 1/1,000,000 cases in the general population,[1,2] although there are publications that insinuate that the incidence is quite a bit higher.[3] It affects men between the 4th and 5th decades of life with greater frequency.[2] It is most frequently found below T8, probably due to a greater mobility of the thoracic spine in comparison to the rigidity of the rest of the thoracic segments.[2,4]

The thoracic herniated disc has been reported in relationship to pain, weakness in the lower limbs or sensitivity alterations, symptoms of radiculopathy and myelopathy, and even atypical symptoms such as gastrointestinal or cardiopulmonary ones. The symptomatology often does not coincide with the level of the hernia, which usually delays diagnosis.[4] In cases with occupation of more than 50% of the spinal canal or calcification of the hernia, the degree of the symptoms is usually greater.[5]

The indication for surgery is rare and is established when there are radicular symptoms resistant to the standard conservative treatment or myelopathy. Surgery on the thoracic herniated disc has been estimated to be 0.5–4% a year of all surgical procedures on herniated discs.[2,4]

Thoracoscopic discectomy as a treatment for symptomatic thoracic hernias is a technique that combines better visualisation of the hernia through the anterior approach with the advantages of the low invasiveness involved in endoscopy (less postoperative pain, less bleeding and more prompt recovery). The use of thoracoscopy has proven the reduction of postoperative complications, mainly pulmonary problems and infections, in comparison with the open thoracotomy.[3,5–7]

As disadvantages involved with the technique, the most notable are the difficulty in locating and confirming the level of the lesion during the operation, the need for longer surgical time compared with the anterior or posterior-lateral open approach, and its long learning curve.[3,5,6,8]

The addition of a navigation system to the standard thoracoscopic technique yields many advantages: precise marking of the lesion level, improved approach and control of the hernia resection and the vertebral osteotomy. In addition, it provides the surgeon with exact information about the position of the manipulative material, reducing the margin of error and shortening the learning curve.[9]

We present our experience with this surgical technique and a brief discussion based on the literature published with respect to it.

Material and method

Two cases of thoracic herniated disc operated using thoracoscopic discectomy with the help of a navigation system (O-Arm with Stealth Navigation Medtronic®) are presented. Preoperative magnetic resonance imaging (MRI) and computed tomography (CT) are valuable tools for surgical planning, given that they determine the side and level of the hernia, whether it is calcified or in an intradural situation, and the degree of occupation of the canal.

In all of the operations, monitoring was used via somatosensory evoked potentials (SEPs).

Surgical technique

Selective intubation that makes it possible to collapse the lung on the side of the approach is required for this technique.

The side for the approach depends on the position of the hernia and the large vessels. The patient is placed in a lateral recumbent position with the side selected for the approach upwards. If the segment to handle is located above T6, it is usually necessary to place the arm up above the head, which makes it possible to move the scapula out of the operating field and gives better visualisation of the intercostals spaces. It is very important for the patient to be kept stable on the operating table because, if not, any change in posture can lead to navigation errors during the surgery. It is necessary to fasten the patient to the table at the hip level with Tensoplast adhesive tape, and to maintain the thorax using a support in the anterior area and another in the posterior.

The navigation system needs an intraosseous reference probe fastened to the iliac blade or spinous process. To make it less invasive, only the skin can be closed with sutures, as was done in the two cases that we present. At the level of the iliac blade, the skin is sutured in the caudal area of the surgical field; this is done because it is easier than fixation in the spinous process when the patient is in the lateral recumbent position (Fig. 1). The receptor is placed at the patient's feet in an elevated position so that it can capture the probe signal.

In spite of the use of the navigator, it is a good idea to make a prior marking using an intramuscular needle placed above the rib over the intervertebral level. Marking is performed using the O-Arm as a fluoroscope, being careful not to penetrate the thoracic cavity with the needle.

The navigation system takes an initial CT made by the O-Arm before beginning the surgery as a base. An important step before beginning the surgery is to check that the location of the hernia on the CT coincides with the fluoroscope-performed marking; this is necessary because error in the surgery level is one of the most frequent technical failures

Figure 1 Intraosseous reference probe fastened to the iliac blade with the patient in lateral recumbent position.