



PRACTICAL ALGORITHM FOR THORACIC DISC HERNIATIONS

TORAKAL DİSK HERNİLERİNE PRATİK YAKLAŞIM

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SUMMARY

Although discectomy operations are the most common operations on the spine, thoracic region discectomies are very rare. Thoracic discectomy procedures constitute only 0.15% to 4% of all disc surgeries. The highest incidence is during the fourth and fifth decades of life. Cases frequently occur below the T8 level, with T11–12 as the most common level. The common symptoms bringing the patient to hospital are unilateral radicular pain, or pain spreading from the upper or middle back to the chest.

Magnetic resonance imaging is the most important radiological technique to diagnose spinal disc pathologies. Because of the complex anatomical structure of the thoracic region, there are multiple surgical approaches and techniques used and described. Nowadays, when surgery is planned for thoracic discectomy, minimally invasive techniques such as video-assisted thoracoscopic surgery, endoscopic discectomy, microendoscopic discectomy, and microdiscectomy, are commonly used, despite traditional techniques such as thoracotomy, costotransversectomy, and a lateral extracavitary approach.

Key words: Thoracic disc herniation, thoracic discectomy; surgical treatment

Level of evidence: Review article, Level V

ÖZET

Omurga cerrahisinde en sık yapılan ameliyatlardan diskektomi ameliyatları olmasına karşın bu cerrahilerin en nadir yapıldığı bölge torakal bölgedir. Tüm spinal disk cerrahileri arasında ise torakal disk cerrahisi % 0.15 ile % 4 arasında yer işgal etmektedir. En sık görülme yaşı 4. ile 5. dekadlar arasındadır. Genellikle T8 seviyesinin altında görülmekle beraber en sık T11-12 seviyesinde görülür. Hastayı hastaneye getiren semptomlar arasında tek taraflı bacak ağrısı, sırttan göğse doğru yayılan ağrı, his kaybı, tariflenemeyen hisler, bacaklara ve karın bölgesine doğru elektrik çarpması şeklinde yayılan ağrılardır.

Manyetik rezonans görüntüleme (MRG), spinal disk patolojilerinin ortaya konulmasındaki en önemli radyolojik yöntemdir. Torakal spinal bölgenin anatomisinin zorlukları nedeniyle bu bölgedeki disk patolojilerine yaklaşımlar için çok çeşitli yöntemler denenmiş ve tanımlanmıştır.

Torakal diskektomi için cerrahi planlanırken artık torakotomi, kostotransversektomi ve lateral ekstrakaviter gibi geleneksel yöntemlerden daha çok video eşliğinde torakoskopik cerrahi, endoskopik diskektomi, mikroendoskopik diskektomi, mikro- diskektomi gibi minimal invaziv teknikler tercih edilmektedir.

Anahtar Sözcükler: Torakal disk hernisi, torakal diskektomi; cerrahi tedavi

Kant Düzeyi: Derleme, Düzey V

INTRODUCTION:

Thoracic disc hernias are rarely seen compared to the cervical and lumbar regions. In the literature, the incidence is reported as between 1/1,000 and 1/1,000,000 in the general population. Thoracic disc surgery represents 0.15–4% of all spinal disc surgery (20). The highest incidence is during the fourth and fifth decades of life. Cases frequently occur below the T8 level, with T11–12 being the most common level^{18,14,20}. The reason is thought to be the high mobility of this region, as it is the thoracolumbar passage zone. Differential diagnosis of sequestered thoracic disc hernias is quite challenging. They can be confused with mass lesions found inside the spinal canal¹³.

CLINICAL EVALUATION:

The symptoms causing the patient to come to hospital are unilateral leg pain, pain spreading from the back to the chest, loss of sensation, undefined senses, and pain spreading towards the legs and abdomen like an electric shock sensation¹². Physical examination findings are not generally diagnostic. Classical myelopathy signs cannot be detected on examination. Deep tendon reflexes can be detected, while the Babinski reflex can be sporadic¹⁴. In patients who have had symptoms for a long time, motor deficit, walking disorders, and balance loss can be observed. Therefore, anamnesis should be carefully taken and the beginning and duration of symptoms should be understood well for a differential diagnosis.

DIAGNOSIS METHODS:

It is hard to diagnose sequestered disc fragments, except for herniations that do not separate from the classical vertebral disc space^{1,4,6,8,19}. Disc fragments in the thoracic region are rarely sequestered due to the robust posterior longitudinal ligaments and the robust structure of the lateral membranes. Differentiation of these lesions from massive lesions, synovial cysts, hematomas, and inflammatory lesions can be challenging.

Magnetic resonance imaging (MRI) is the most important radiological method to reveal spinal disc pathologies (Figure-1). Most thoracic disc herniations are calcified¹⁸. The most effective radiological method showing this calcification is computerized tomography (CT). Although it has been stated in the literature that differential diagnosis of thoracic disc hernias can be performed with MRI using contrast material,

definitive diagnosis is performed by observation of the material excised during surgery and histopathological evaluation²⁰.

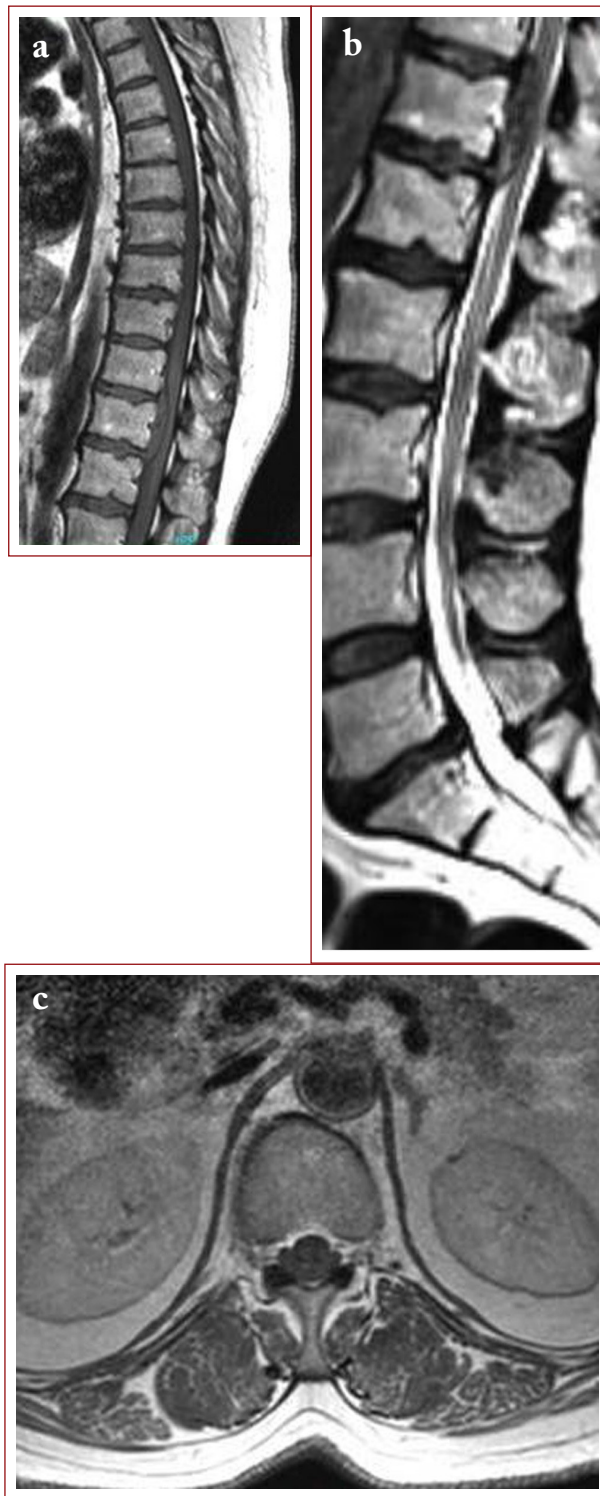


Fig-1.a) T1-weighted sagittal MRI section of thoracic disc hernia at T11–12 level, **b)** T2-weighted sagittal MRI section and **c)** T2-weighted axial MRI section

In the differential diagnosis of sequestered thoracic disc fragments, signal differences in MRI using contrast material have been reported. Sequestered disc fragments are generally observed as hypointense in T1-weighted images and hyperintense in T2-weighted images. Also, a shining ring-shaped rim enhancement is observed¹⁷. Epidural abscess is observed as isointense with the spinal cord in T1-weighted images and hyperintense in T2-weighted images. Epidural hematomas in the resorption stage hold contrast in a ring and can cause confusion. For malignant tumor structures, the contrast is homogenous or heterogeneous, and they generally damage the adjacent tissues. Nerve sheath tumors are observed as isointense in T1-weighted images and hyperintense in T2-weighted images. They are also completely stained with contrast material. Spinal cord extradural meningiomas are observed as isointense in T1- and T2-weighted images and are homogeneously stained with contrast material^{2,17}.

TREATMENT METHODS:

Various methods have been tried and defined for approaches to disc pathologies in this region, due to the anatomical difficulties of the thoracic spinal region. Conservative treatment options should be suggested for patients with symptoms but no spinal cord compression. These options include physiotherapy, anti-inflammatory drug use, and corticosteroid treatment. Surgery should be performed for lesions compressing the thoracic spinal cord, to avoid further deficit^{8,12,14,20}.

Surgery in the thoracic spinal region should be planned carefully. The gauge of the thoracic spinal cord can cause severe postoperative neurological deficit, and damage of the adjacent vascular structures can lead to severe mortality. In newly-developed, non-calcified, laterally-localized disc hernias, classical unilateral transpedicular or costotransversectomy approaches can be preferred. In calcified, midpoint-localized disc hernias, thoracotomy, anterolateral transpleural, or lateral extracavitary methods can be used^{12,20}.

In recent years, minimally invasive techniques have been developed that have begun to compete with traditional methods, as they reduce the operation duration with increased experience of the surgeon, cause less bleeding, and decrease the hospitalization duration. The most commonly used methods are video-based thoracoscopic surgery (VATS), endoscopic discectomy, microendoscopic discectomy, microdiscectomy, and the minilateral approach^{5,7,9,11,16}.

DISCUSSION:

Although the most common spinal surgery is surgery for disc pathologies, the rarest region for this surgery to be performed is the thoracic region. A great deal of experience is required for this surgery, due to the rare occurrence and the anatomical difficulties of the region.

In atypically localized disc hernias, careful differential diagnosis before surgery should exclude pathologies such as tumoral lesion, hematoma, cyst, and formation of inflammation. Although the typical symptoms of thoracic disc hernias are defined as unilateral leg pain, pain spreading from the back to chest, loss of sensation, undefined senses, and pains spreading towards the legs and abdomen with an electric shock sensation, Shirzadi et al. also reported atypical symptoms such as nausea, vomiting, chest pain, chronic constipation, frequent urination, and walking disorders in two cases¹¹.

Song et al. and Carvi y Nievas et al. examined MRIs of sequestered thoracic disc hernias in detail^{2,13}. They emphasized that an area of contrast in the form of a ring, due to the protein-water content of the sequestered disc fragment and vascularization caused by the inflammatory response, is quite valuable for differential diagnosis.

Teufack et al. reported the first intramedullary thoracic disc herniation¹⁵. The patient was admitted due to strength loss and loss of sensation in both lower extremities continuing progressively for two weeks. In MRIs, focal cord expansion and surrounding edema were observed. Choi et al. previously defined this image as the "hawk-beak sign" by showing the discontinuation of the posterior longitudinal ligament based on axial sections of the lumbar region^{1,3,4,19}.

While surgery is planned for thoracic discectomy, minimally invasive techniques should be preferred instead of traditional methods such as thoracotomy, costotransversectomy, and lateral extracavitary methods^{12,20}. Sasani et al. performed a thoracoscopic method, Jho et al. performed endoscopic thoracic discectomy, Perez Cruet et al. applied microendoscopic thoracic discectomy, and Uribe et al. performed lateral approach with a small incision, and they all obtained good results^{5,9,10,16}. Less bleeding occurred in the patients, the operation duration was short, and the patients were discharged sooner.

The rare formation of thoracic disc hernia, the difficult differential diagnosis of atypically localized hernias, even with modern technology, and the complex anatomical structure of the thoracic region should be considered, and these patients should be treated carefully. If surgery is performed, the approach should be chosen according to experience, and the complication risk should be minimized.

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