Thoracic disc

To the Editor: We read with great interest the article by Uribe et al.1 (Uribe JS, Smith WD, Pimenta L, et al: Minimally invasive lateral approach for symptomatic thoracic disc herniation: initial multicenter clinical experience. Clinical article. J Neurosurg Spine 16:264–279, March 2012) who reported data from 60 patients treated for 75 symptomatic cases of thoracic disc herniation (TDH) via what the authors describe as a mini-open lateral approach. In this series, two-thirds of the patients had at least 1 centrally located TDH (without lateral extension), and more than half of the TDHs were calcified. Although the percentage of TDHs that met the criteria of “giant” is unclear, the one illustrative case for which pre- and postoperative imaging was provided appears to be of a disc that occupies 40% of the spinal canal. It would therefore be classified as a giant TDH. Clearly, these patients were technically challenging to treat, and we applaud the authors’ attempts to minimize the morbidity associated with this thoracic pathology.

Although the concept of using the mini-open lateral approach for the treatment of symptomatic TDH has some merits, the authors failed to discuss several significant shortcomings of their approach. The retractor used for the mini-open lateral approach was initially designed to provide a corridor to lumbar disc spaces for insertion of interbody fusion cages.1 The long, narrow corridor created for this approach creates a tight corridor to the spine inherent to this approach limit the surgeon’s ability to perform bimanual dissection, to work from different angles to the spine, to see the pathology, all of which are necessary for the treatment of TDH and which would be more easily done via open thoracotomy or thoracoscopy. In addition to impeding the surgeon’s ability to safely perform the surgery, the narrow surgical corridor significantly inhibits the surgeon’s ability to deal effectively with potential complications, such as repairing a durotomy with dural suturing techniques.

Other problems with the mini-open lateral approach include the possibility that the rigid retractor blades will compress the intercostal nerves against the ribs. For the size of the operative window to be increased, the retractor must be opened more widely. Doing so increases compression on the neurovascular bundle and subsequently increases the patient’s risk for postoperative intercostal neuralgia. Most thoracoscopy procedures are performed through flexible thoracoports rather than rigid portals, which are associated with a relatively high incidence of postoperative intercostal neuralgia.

We were concerned that more than 10% of patients in this case series required subsequent surgeries. Six patients required additional surgery for separate posterior approaches for spinal fixation, and 2 patients required additional surgical decompression. It is important to point out that intraoperative spinal fixation can be achieved via open thoracotomy and thoracoscopy, without the need for additional posterior surgeries for decompression or fusion. Indeed, the need to return to the operating room for supplemental posterior decompression or posterior fusion is a significant drawback to Dr. Uribe and colleagues’ approach. Furthermore, it is difficult to maintain a subpleural approach and keep the pleura intact, especially in adults.

We disagree with the assertion that the mini-open lateral approach represents “a middle-ground alternative between endoscopic and open-approach procedures for the treatment of symptomatic TDH.” The mini-open lateral approach uses a skin incision in the chest wall identical to the position of a thoracoscopic incision. The working distance from the chest wall to the spine is identical to the working distance during thoracoscopy. The mini-open lateral approach requires the same tools used in thoracoscopy, specifically, long instruments that allow the disc to be removed without the surgeon’s hands entering the thoracic cavity. The visualization of the spinal cord and the ability to work with bimanual dissection are far superior with thoracoscopy and with open thoracotomy than with the mini-open lateral approach.

Our experience demonstrates that thoracoscopy is superior to the proposed mini-open lateral approach in a number of important ways. First, in most instances, thoracoscopy provides superior visualization of the pathology by allowing visualization of multiple spinal segments above and below the index level. Multiple access ports allow the pathology to be approached via multiple angles, decreasing the likelihood that instruments will have to "fight" each other for operative space. Furthermore, tho-
thoracoscopy allows 2 thoracoscopic instruments to be used simultaneously, permitting bimanual dissection, and replicating what is done during open surgery. Moreover, the thoracoscopic technique is relatively simple and straightforward, and the learning curve is not prohibitive. Multiple reports have demonstrated that thoracoscopy is a perfect option for treating medium-sized calcified or soft central TDHs.

The authors failed to provide anatomical evidence that surgical procedures performed via the mini-open lateral approach successfully allowed complete resection of the herniated discs. The authors failed to obtain postoperative imaging in every patient to verify that all of the TDH material was removed completely. As reported, the senior author (C.A.D.) performs postoperative imaging sequentially in all open and thoracoscopic cases to determine whether the surgery was successful in resecting the herniated discs. It is not sufficient to simply state that all patients did well neurologically without demonstrating radiographically that the technique achieved the surgical goal.

The senior author has performed more than 250 thoracic disc surgeries using a variety of open and minimally invasive techniques. This experience supports the truth of the adage that “no single hammer is suitable for all nails.” Indeed, it is critical for the surgeon treating these lesions to realize that not all TDHs can be safely treated with the same approach. Posterolateral approaches are the best approaches for lateral thoracic disc herniations, while anterolateral approaches are needed for broad-based central disc herniations.

Several options are available for central disc herniations. Moderately sized central TDHs are often amenable to thoracoscopic approaches, which can minimize intraoperative surgical time and postoperative morbidity. However, giant ossified or densely calcified TDHs tend to either be transdural or densely adherent to the dura, thus acting as rigid masses. These TDHs are dangerous to remove through minimally invasive approaches because they require exquisite control of the lesion to be maintained throughout their resection. Based on our experience, these lesions require open thoracotomies with extensive exposure, as well as corpectomies, fusion, and instrumentation. The wide corpectomy creates the large working corridor needed to expose normal dura above and below the lesion. This approach also allows four surgical hands to work in immediate proximity to the surgical pathology as needed with maximum dexterity to minimize manipulation of the spinal cord. Should the dura require repair due to a transdural TDH, as is often the case with giant ossified TDHs, this approach allows the duraplasty to be performed optimally. For these reasons, we believe that it would be extremely dangerous to try to remove these types of giant ossified discs with the mini-open lateral approach or with endoscopic techniques.

As we continue the search for the optimal surgical treatment for symptomatic TDHs, Uribe et al. have added to our knowledge by demonstrating that the mini-open lateral approach may have some utility in the treatment of a subset of TDH cases. However, this subset has yet to be defined. Both thoracoscopy and open thoracotomy are extremely valuable options for the treatment of TDH, with proven and viable track records. Open thoracotomy is preferred for giant ossified discs, while thoracoscopy has far greater ease and wider utility than the mini-open approach. As this search continues, it is important that all reports on novel operative approaches provide enough data to allow the technique to be evaluated appropriately.

References


RESPONSE: We would like to extend our thanks to Dr. Clark and Dr. Dickman for their comments regarding our manuscript. While several important points were brought up that deserve revisiting based on the results of our manuscript as well as those of other publications, in general, we respectfully disagree both with most of the suggested limitations of the minimally invasive lateral approach and the relative and subjective distinctions of thoracoscopy and open thoracotomy being “far superior” or “perfect options” for the treatment of TDH. We would, therefore, like to address several of these points with respect to the existing early and emerging data supporting the minimally invasive lateral approach for advanced indications.

First is the question of a “small skin incision and long working distance to the spine inherent to this approach limiting the surgeon’s ability to safely and effectively treat TDHs” resulting in an inability to perform bimanual dissection (instrument “sword fighting”), effectively place instrumentation, use different working angles, and visualize pathology adequately. While this may be a reasonable theoretical concern, it is not consistent with the growing body of evidence around the minimally invasive lateral approach for advanced applications, including the current series, showing safe, reproducible, and adequate decompression for thoracic pathology. In this series, successful treatment, measured by generally accepted criteria, of a large series of primarily central and calcific thoracic herniated discs in the hands of multiple