Commentary

Commentary on 'Totally Endoscopic (VATS) First Rib Resection for Thoracic Outlet Syndrome'

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George *et al.* presented an innovative approach with excellent results in a series of 10 patients treated with a complete thoracoscopic first rib resection for thoracic outlet syndrome (TOS) (1). Their video assisted thoracoscopic approach resulted in a complete resolution of symptoms in all patients after a follow-up of 6 months without major complications. Main advantages of the technique described are the superior visualization due to the magnified video-assisted thoracoscopic view, and perfect illumination by the scope allowing complete resection of the first rib. Theoretically this might improve results and reduce recurrence rates because presence of a long posterior first rib stump was found to be a strong predictor of poor outcome and residual complaints (2).

In a recently published systematic review and meta-analysis of the available literature, outcome of surgical treatment for TOS has been reported (3). For the vascular forms of TOS the reported clinical success rates are 90-100%. For neurogenic TOS success rates are worse and are in the range of 56-89% (3). There are no large high quality randomized controlled trials focusing on the outcome of surgical treatment of TOS. Published studies are generally flawed by poor methodological quality and have a high risk of bias. Moreover, considerable heterogeneity in selection criteria and outcome reporting limit the strength of conclusions that can be drawn from the meta-analysis. One of the main challenges in the treatment of neurogenic thoracic outlet syndrome is the lack of generally accepted diagnostic criteria.

In the last decades, several reports have been published describing thoracoscopic and video-assisted first rib resections (4-10). Main advantages mentioned in those reports are the magnified view allowing perfect identification of the neurovascular structures, safer dissection and thereby reduction of complications. Additionally, the surgeon, assistants or trainees and other staff in the operating theatre can follow the procedure on the monitor improving situational awareness for the whole team. Techniques described are a video-assisted transaxillary first rib resection (4-7), thoracoscopically assisted transaxillary first rib resection (8), and a video-assisted total thoracoscopic first rib resection (9-10). The first 2 approaches have the advantage of allowing normal tactile feedback through the transaxillary incision. With the thoracoscopic approach less traction on the arm is needed. Many publications on this topic are technical reports describing the feasibility of the technique illustrated by 1 or 2 cases (4,9,10). Soukiasian *et al.* described the results of 66 thoracoscopically assisted first rib resections (80% neurogenic TOS) and obtained complete resolution of symptoms in 89% of patients (8). In the study by Abdellaoui *et al.* 82% of patients (n=28; 85% neurogenic TOS) treated with a video-assisted transaxillary first rib resection had their symptoms completely resolved (5). These results seem to be in line with the results described in the systematic review cited above (3).

In the perspective of the data summarized above, the 100% clinical success rate reported by George *et al.* is commendable. There are however some limitations that warrant careful interpretation of these promising results. Most evident are the small number of only 10 patients and the retrospective nature of the study. Additionally, no information on the diagnostic work-up and patient selection

is available. The authors report a series of 10 patients treated over a period of 7 years and the small number of patients might represent a selected group of patients. The follow-up of 6 months is too short to draw firm conclusion about the durability of the results. No comparison with the current standard surgical techniques was made and good results might depend on the vast experience of the authors. However, no information about the learning curve to master this technique is reported. Therefore it might by inappropriate to generalize the reported results to a wider population treated in other surgical centers. For implementation of this technique in daily practice, broad experience with (video-assisted) thoracoscopic resections is mandatory. Furthermore, customized instruments were used in the reported study which are not widely available on the market. This further limits adaptation of this technique by other centers at this time.

Therefore, before implementing this technique as a superior treatment modality for thoracic outlet syndrome the results need to be confirmed in a larger prospective comparative study. A multicenter study design might be necessary to allow patient accrual within an acceptable timeframe and to confirm whether the promising results of George *et al.* can be achieved by others. It is important to select and report the diagnostic criteria applied that determine the indication for surgical treatment. Objective outcome measures should be reported using validated questionnaires [such as Disabilities of the Arm, Shoulder and Hand (DASH) (11), The Short Form 36 Health Survey (12) or derived versions like the Short Form (12) or QuickDASH (13)] and objective measures of functional outcome such as range of motion (14), nine-hole peg test (15) and action research arm test (16). Secondary outcome parameters of interest could be pain scores (visual analogue scale), nerve conduction studies, cosmetic result, complications, costs, length of hospital stay, and operating times. Follow-up should be sufficient to determine mid- to long-term outcomes to assess durability of treatment success. Ideally, the data obtained in a properly designed study with a sufficient number of included patients could also be used to identify factors (i.e., diagnostic findings, patient factors and outcome variables such as scarring, pain scores, complications, etc.) that are predictive for favorable surgical outcome.

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Footnote

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