Commentary on: "uniportal video-assisted thoracoscopic surgery: safety, efficacy and learning curve during the first 250 cases in Quebec, Canada"

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The past two decades have seen video-assisted thoracoscopic surgery (VATS) become the preferred approach for the treatment of early stage lung cancer (1,2) (NCCN, ACCP). Traditionally performed through 2–4 small incisions, thoracoscopic resection by a single 3–4 cm incision, or uniportal VATS resections, gaining traction at many centers around the globe. The adoption of anatomic resection by a uniportal thoracoscopic approach is still in a relatively early, phase with champions and critics on both teams (3,4). Proponents of uniportal VATS lobectomy advocate that this approach is associated with decreased pain, paresthesias, and morbidity, when compared to a multiportal thoracoscopic approach, resulting in expedited recovery. Opponents of the uniportal approach intimate concerns of patient safety and a steep learning curve as a result of the technical requirements of having all instrumentation share the same incision, in addition to unresolved questions of oncologic adequacy.

The boundaries of this discussion define, in our opinion, some of the important criteria according to which modern thoracic surgical techniques should be: (I) evaluated; and (II) incorporated into practice. Specifically, we suggest that safety, efficacy, and beneficence are among the core measures that innovative thoracic surgical approaches should be judged.

In their manuscript entitled "Uniportal video-assisted thoracoscopic surgery: safety, efficacy and learning curve during the first 250 cases in Quebec, Canada", Dr. Drevet and Dr. Figueroa report on their experience in adopting the uniportal VATS approach into their practice (5). We congratulate the authors for presentation of such a robust series. It is through accumulation of published data like these that novel surgical techniques become standard and accepted procedures, as was the case for thoracoscopic lobectomy. The work is based on a retrospective analysis of a prospective departmental database for the outcomes of 250 consecutive uniportal VATS procedures performed over a one and one-half year time period. Notably, of the cases reviewed, 72% were anatomic lung resections and 10% were non-anatomic lung resections. The authors were able to complete anatomic resections in 85% of cases and non-anatomic resections in 100% of cases, and conversion to thoracotomy was more likely to occur in their earlier experience. The authors concluded that uniportal VATS is safe and feasible both for standard and complex pulmonary resections, and indicated that a steep learning curve existed for uniportal anatomic lung resections.

Safety

The authors' cohort included 180 intended anatomic lung resection comprised by 146 lobectomies, 29 segmentectomy, and 5 pneumonectomy. Eleven percent of procedures were considered complex anatomic resections and included lobectomy with chest wall resection (3 cases), lobectomy after induction therapy (2 cases), lobectomy for tumors >6 cm (6 cases), and intrapericardial lobectomy (2 cases). Among these cases, mortality was less than 1% and major morbidity was 5%, frequencies which are very similar to those reported in large national databases for thoracoscopic lobectomy from which the overwhelming majority are likely multiportal approaches (6,7). When a uniportal approach could not

accomplish anatomic resection (mostly for technical difficulty of superior pulmonary vein division), placement of an additional port allowed completion of resection via a minimally invasive technique. Conversion to thoracotomy occurred in 11 cases (6.1% of all cases), with a vascular accident accounting for 4 of these cases (2.2% of all cases). These data along with data from other recently reported series attest to the safety and feasibility of uniportal anatomic lung resection resection, which is further corroborated by the increasing use of uniportal VATS as the standard approach for lobectomy in a number of centers worldwide (8-16).

Efficacy

The efficacy of a novel surgical technique can be measured by: (I) achieving the stated goals of the operation; and (II) consideration of the time and resources required to complete the procedure. In this regard, Dr. Drevet and Dr. Figueroa report completion of the planed anatomic resection in 85% of cases by uniportal VATS. They further indicate that the median operative time for anatomic lung resections was 144 min (range, 60 to 600 min) and that the median hospital stay was 4 days. Such median operative times, lengths of stay, and the reported 6.1% rate conversion to thororactomy rate reported by Dr. Drevet and Dr. Figueroa compare well with outcomes reported in the literature for the more traditional two to four port VATS approaches (6,7). Yet, one key element that is missing from this report is the number and location of lymph nodes sampled during the uniportal anatomic lung resections. This is important for several reasons. First, the number of lymph nodes sampled during anatomic lung resection is regarded as a quality metric in lung cancer (17) and is a quantifiable measure of efficacy in the evaluation of novel approaches to lung cancer resection. Further, while we are several years away from long-term oncologic outcomes data for uniportal resections, the number of resected lymph nodes is important oncologic outcome that is easily measurable. As recently highlighted by Rocco *et al.* in a perspective on uniportal VATS there remains some concern over the adequacy of dissection of the subcarinal nodal station from an anterior approach (3). In a companion perspective article, Sihoe reviews reports comparing uniportal to multiportal thoracoscopic lobectomy and concludes non-inferiority of the total number of sampled nodes (4). Nonetheless, data regarding specific lymph node stations is still limited and it remains to be seen whether uniportal VATS remains non-inferior once greater experience is reported.

Beneficence

The beneficence of uniportal VATS ultimately will be determined by its standing against traditional thoracoscopic resection with respect to short-term and long-term outcomes. The current series by Dr. Drevet and Dr. Figueroa inherently does not aim to address these issues as its major focus was feasibility and safety. Whether uniportal anatomic resection has any short-term advantages over multiportal thoracoscopic resection in operative time, postoperative pain, and speed of recovery has yet to be convincingly demonstrated. Whereas it tempting to speculate that having one instead of two or three incisions will reduce postoperative pain and expedite recovery, this claim is supported by some studies and not others [reviewed in (4)]. Variability in such things as surgical technique, analgesic protocols, measurement of pain levels, and practice of postoperative care requires careful study design to accurately answer this question. In upcoming years, we can expect to see the first reports of long-term outcomes of uniportal anatomic resection which are unlikely to be more favorable than non-inferior when compared to traditional multi-portal thoracoscopic approaches.

To conclude, the current series by Dr. Drevet and Dr. Figueroa provides important and comprehensive insights to the process of incorporating a uniportal VATS technique into practice. In their report, the authors' demonstrate safety and feasibility of this uniportal VATS approach which is similar to that of traditional, multiportal thoracoscopic approaches. The short-term outcomes of uniportal thoracic surgery appear favorable and the long-term outcomes are forthcoming. For thoracic surgeons who are adopting this approach into their practice, the authors' conclusion that uniportal thoracoscopic resections are associated with a steep learning curve is a central message that underscores the importance of careful patient selection and early conversion to multiportal thoracoscopy early in one's experience.

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