Current Readings: Redefining Minimally Invasive: Uniportal Video-Assisted Thoracic Surgery

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Minimally invasive surgery is clearly dominating the modern surgical era across multiple surgical subspecialties and thoracic surgery is no exception. Video-assisted thoracic surgery (VATS) is a well-established method of performing various interventions, and it continues to gain momentum. Though small differences in VATS methods exist, it is commonly accepted as a non–rib-spreading approach into the thoracic cavity via 2-4 incisions and allows for a wide range of anatomical and nonanatomical pulmonary resections. As more experience is gained with VATS, more complex surgeries take place and greater refinement of the technique occurs. A newer single-incision or uniportal VATS has been described to minimize surgical trauma, to decrease the number and size of thoracic incisions, to reduce the number of complications, and to enable faster recovery. It allows performing a full spectrum of thoracic operations through a single incision adhering to surgical and oncological principles without compromise.

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The common practice for surgeons performing video-assisted thoracic surgery (VATS) calls for 3 or 4 VATS incisions, although increasingly 2 incisions seem adequate for most VATS resections.[1] Ultimately, in carrying this trend forward, it appears that VATS should allow for performance of a full spectrum of thoracic surgery without the compromise of surgical oncologic principals while maximizing the benefits of this minimally invasive approach using the least number and smallest size of thoracic incisions.[2] It is broadly understood that VATS applies only to the method of accessing the thoracic cavity while the intrathoracic part of surgery remains standard and equivalent to the open techniques. To that end, according to the Society of Thoracic Surgeons General Thoracic Surgery Database, 45% of lobectomies were performed thoracoscopically in 2010.[3] As experience with VATS lobectomy progresses, it will become technically feasible to perform anatomical pulmonary resections with a single-incision approach.

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PAIN FOLLOWING THORACOSCOPIC SURGERY: RETROSPECTIVE ANALYSIS BETWEEN SINGLE-INCISION AND THREE-PORT VIDEO-ASSISTED THORACOSCOPIC SURGERY

Tamura M, Shimizu Y, Hashizume Y. J Cardiovasc Surg 8:153-161, 2013

Tamura et al[4] from Fukui Prefectural Hospital, Yotsui, Fukui, Japan, compare their results of 37 patients in total, half undergoing single-incision thoracoscopic surgery (SITS) and the remaining cases treated with conventional 3-port video-assisted thoracoscopic surgery (3P-VATS). The study observed noteworthy differences between the techniques by key indicators of surgical duration, postoperative pain, and patient satisfaction scores.

This retrospective analysis summarizes the results of VATS in 37 consecutive patients with primary spontaneous pneumothorax, peripheral lung nodules, and thymic tumors who were treated between October 2011 and August 2012. Among them, 19 patients were operated on using SITS and 18 had 3P-VATS. The surgical duration, number of resected

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pulmonary nodules, duration of chest tube drainage, length of hospital stay, inpatient scores, and patient satisfaction scores were compared between the 2 groups. Visual analog scale from 0-10 was used to assess pain scores and was recorded on postoperative days 0, 1, 3, 7, and 14. A nurse unaware of the ongoing study applied a similar scale to patient satisfaction scores when patients presented for their first outpatient office visit.

The authors' SITS technique includes a 2.5-cm incision in the fifth intercostal space at the midaxillary line for pneumothorax and in fourth or fifth intercostal space, anterior axillary line for thymic tumors. A rigid 5-mm, 30° thoracoscope, a reticulating laparoscopic grasper, and either an endostapler (Covidien, Norwalk, CT) or a LigaSure (Covidien, Norwalk, CT, USA), in case of a thymectomy, was introduced through the same single incision. For the 3P-VATS, a 1.5-cm and two 0.5-cm incisions were used. The intrathoracic part of the operation was performed in a similar manner in both techniques. Pain management was also similar in both groups. The results reveal that the mean operative time was longer for the SITS group. Pain scores on postoperative days 0, 1, and 3 were significantly higher for patients who underwent 3P-VATS than for those who underwent SITS ($P = 0.012$, 0.039, and 0.037, respectively). No substantial differences could be gleaned between the 2 groups of patients in the duration of surgery, length of the chest tube drainage, or the hospital stays. By contrast, the SITS group did report higher satisfaction scores, although not statistically significant and potentially explained by subjective measures of decreased postoperative pain and cosmetic superiority. Although retrospective, these data suggest that SITS decreases postoperative pain and results in higher patient satisfaction when compared with the conventional 3-port VATS.

A PROSPECTIVE STUDY COMPARING THREE-PORT VIDEO-ASSISTED THORACOSCOPY WITH THE SINGLE-INCISION LAPAROSCOPIC SURGERY (SILS) PORT AND INSTRUMENTS FOR THE VIDEO THORACOSCOPIC APPROACH: A PILOT STUDY

Mier JM, Chavarin A, Izquierdo-Vidal C, et al. Surg Endosc 27:2557-2560, 2013

Mier et al[5] from Barcelona, Spain, presented this small prospective study of 20 patients comparing the differences in the hospital length of stay, duration of the chest drainage, and postoperative pain and reported favorable results if single-incision laparoscopic surgery (SILS) port used.

From October 2010 to October 2011, 10 patients had a classic 3-ports (5, 10, and 12 mm) video-assisted thoracoscopic surgery (VATS) and 10 patients had VATS with only SILS port. The same surgical team completed all the cases in both groups and the intrathoracic technique was the same. When using the SILS port, a 2.5-cm incision was made in the fifth intercostal space at the anterior axillary line and a 5-mm, 0° camera was used. In the classic VATS, a 12-mm port for a 10-mm, 35° camera was used and was inserted in the seventh intercostal space on the midaxillary line. Additionally, 5- and 10-mm ports were placed depending on the procedure. The pain control protocol was the same in both groups and postoperative pain was assessed at 24 hours based on a visual analog scale. The surgical variety of cases included 11 lung biopsies (5 SILS and 6 classic VATS), bullectomy with mechanical pleurodesis (3 SILS and 3 classic VATS), resection of mediastinal cyst (1 in each group), and 1 SILS surgery for catamenial pneumothorax.

The authors collected data in a prospective manner and both groups were well matched by age and sex. No significant differences were observed between the groups in the mean pleural drainage duration (38.8 ± 31.8 hours for the SILS vs 34.2 ± 22 hours for the VATS, $P = 0.971$), length of hospitalization (44 ± 31.8 hours for the SILS vs 43.2 ± 22 hours for the VATS, $P = 0.971$). However, the mean visual analog scale value for pain was 4.4 ± 1.7 for the SILS group and 6.2 ± 1.4 for the VATS group, and this difference was statistically significant ($P = 0.035$). Consequently, this study, although not randomized and small, confirms that patients undergoing uniportal VATS with SILS port have less postoperative pain and that the technique is a safe and effective method of minimally invasive thoracic surgery.

UNIPORTAL VIDEO-ASSISTED THORACOSCOPIC LOBECTOMY: TWO YEARS OF EXPERIENCE

Gonzalez-Rivas D, Paradela M, Fernandez R, et al. Ann Thorac Surg 95(2): 426-432, 2013

Gonzalez-Rivas et al[6] presented the result of 102 uniportal non–rib-spreading video-assisted thoracoscopic (VATS) major pulmonary resections performed from June 2010 to July 2012 at the Minimally Invasive Thoracic Surgery Unit, Coruña University Hospital, Coruña, Spain.

In this retrospective descriptive prevalence study, 102 patients who met the criteria for minimally invasive thoracoscopic lobectomy underwent anatomical pulmonary resections via uniportal VATS. Right upper lobectomy was performed in 28, middle