Video-assisted thoracoscopic surgery

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Video-assisted thoracoscopic surgery (VATS) is a type of minimally invasive thoracic surgery performed using a small video camera mounted to a fiberoptic thoracoscope (either 5 mm or 10 mm caliber), with or without angulated visualization, which allows the surgeon to see inside the chest by viewing the video images relayed onto a television screen, and perform procedures using elongated surgical instruments. The camera and instruments are inserted into the patient's chest cavity through small incisions in the chest wall, usually via specially designed guiding tubes known as "ports".

VATS procedures are done using either conventional surgical instruments or laparoscopic instruments. Unlike with laparoscopy, carbon dioxide insufflation is not generally required in VATS due to the inherent rigidity of the thoracic cage. However, lung deflation on the side of the operated chest is a must to be able to visualize and pass instruments into the thorax; this is usually effected with a double-lumen endotracheal tube that allows for single-lung ventilation, or a one-side bronchial occlusion delivered via a standard single-lumen tracheal tube.

Propensity score matching (PSM) and multivariate Cox proportional risk models were used to evaluate the perioperative outcomes and survival rates of patients undergoing open and VATS for thymic carcinomas and thymic neuroendocrine tumors at the Second Affiliated Hospital of Air Force Military Medical University Hospital, between 2009 and 2018.

Of the total 126 cases of TCs and TNETs, VATS treatment was used in 39 (30.9%). Advanced age and Masaoka-Koga staging were found to be independent prognostic factors for both TCs and TNETs, through a multifactorial Cox regression analysis. There was no significant difference in survival between the VATS and open groups before and after PSM; however, the VATS group had better perioperative-related indicators. There were no significant differences between the groups in terms of mortality at 30 days, mortality at 90 days, R0 resection rate, and 5-year survival rate (67.5% vs. 58.5% [P = 0.260] in the VATS group compared to the open group, in a PSM analysis of the 27 VATS

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and 27 open groups). Compared to the open group, the VATS group had a shorter length of hospital stay (13 days vs. 16 days, P = 0.015), a shorter level I care (0 days vs. 1 day, P = 0.016), and less intraoperative bleeding (50 mL vs. 300 mL, P < 0.001).

In this single-center retrospective study of thymic carcinomas and thymic neuroendocrine tumors, survival rates were comparable between the VATS group and the open group, and the VATS group showed improved perioperative-related parameters $^{1)}$

In conclusion, the study suggests that VATS and open surgery for thymic carcinomas and thymic neuroendocrine tumors offer comparable survival rates, with the VATS approach demonstrating better perioperative outcomes. However, the study's sample size and potential selection biases should be considered when interpreting the findings. Further research, potentially with a larger, more diverse cohort and longer follow-up, could help strengthen the evidence for the use of VATS in these cases.

The trend toward the use of minimally invasive procedures with endoscopic visualization of the thoracic cavity in thoracic spine surgery has evolved. It is difficult to develop a new set of visuomotor skills unique to endoscopic procedures and understand the three-dimensional (3D) anatomy while performing a two-dimensional (2D) imaging procedure. Adding image guidance would have a positive impact on these procedures, making them safer and more precise.

Hur et al, report the results of 10 patients who underwent diskectomy for Thoracic Disk Herniations (TDH) using VATS assisted by an O-arm-based navigation system and describe the surgical technique. The average duration of the symptoms was 2.8 years; average operation time, 326.9 minutes; and average additional time required for the image guidance surgery using the O-arm-based navigation, ~ 29.4 minutes. No complications occurred during the surgical procedure or the immediate postoperative period. The advantages of using navigational assistance during the surgical procedure include better visualization of the operative field, more accurate surgical planning, and optimization of the surgical approach involving the establishment of the correct drilling trajectory and safe decompression of the spinal cord, as well as the possibility of intraoperative control of bone resection 2 .

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Li G, Chang H, Wang Z, He D, Qu L, Shao Q, Wang Q. Effect of open versus video-assisted thoracoscopy on perioperative outcomes and survival for cases of thymic carcinomas and thymic neuroendocrine tumors. World J Surg Oncol. 2023 Oct 16;21(1):329. doi: 10.1186/s12957-023-03210-7. PMID: 37845701.

Hur JW, Kim JS, Cho DY, Shin JM, Lee JH, Lee SH. Video-Assisted Thoracoscopic Surgery under O-Arm Navigation System Guidance for the Treatment of Thoracic Disk Herniations: Surgical Techniques and Early Clinical Results. J Neurol Surg A Cent Eur Neurosurg. 2014 Feb 25. [Epub ahead of print] PubMed PMID: 24570307.

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