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Original Contribution

NON-INTUBATED SINGLE-PORT VIDEO-ASSISTED THORACIC SURGERY IN PATIENTS WITH PLEURAL EFFUSION AND POOR PERFORMANCE STATUS

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ABSTRACT

Objective: To determine the safety and efficacy of its application in patients treated at the Clinic of Thoracic Surgery, University Multiprofile Hospital for Active Treatment "Prof. Dr. Stoyan Kirkovich" AD, Stara Zagora through a retrospective analysis of patients who underwent Non-intubated Single-port Video-Assisted Thoracic Surgery (SVATS). **Materials and Methods:** For the period from 01.01.2021 to 28.02.2025, a total of 1436 patients with pleural effusions (PE) were treated at the Clinic of Thoracic Surgery. The surgical procedures performed included intrapleural drainage, conventional VATS under general intubation anesthesia, and SVATS under non-intubated anesthesia combined with local anesthesia. In order to prevent recurrent PE, pleurectomy, decortication, talc or povidone-iodine pleurodesis were performed, as well as placement of a prolonged thoracostomy catheter. **Results:** The mean patient age was 68 years. Of the 1436 patients, 674 underwent VATS procedures. Among them, 143 underwent intubated conventional VATS, while the remaining 531 underwent non-intubated SVATS. Postoperative pain was significantly lower in patients who underwent non-intubated SVATS compared to those who underwent conventional VATS. **Conclusions:** Non-intubated SVATS is a safe and minimally invasive procedure, especially in patients with severe general condition, poor performance status, and significant comorbidities.

Keywords: non-intubated anesthesia, Single-port Video-Assisted Thoracic Surgery (SVATS), pleural effusion.

INTRODUCTION

A significant proportion of patients with pleural effusions are elderly, present with poor general condition, and multiple comorbidities. These factors predispose them to a higher risk of complications when undergoing general intubated anesthesia and a more invasive surgical approache. Consequently, the number of patients eligible for general anesthesia with a double-lumen endotracheal tube for one-lung ventilation is significantly limited. This situation has prompted thoracic surgeons to pursue not only less invasive surgical techniques, but also to combine them with minimally invasive anesthetic strategies.

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OBJECTIVE

The aim of this study was to determine the safety and efficacy of Non-intubated Single-port Video-Assisted Thoracic Surgery (SVATS) under intravenous sedation combined with local infiltrative and topical anesthesia in patients with pleural effusions, through a prospective analysis.

MATERIALS AND METHODS

The study was approved and registered with the Ethics Committee of the Faculty of Medicine – Trakia University, Stara Zagora, under Protocol No. 25.

For the period from 01.01.2021 to 28.02.2025 (50 months), a total of 1436 patients with

pleural effusions were treated at the Clinic of Thoracic Surgery, University Multiprofile Hospital for Active Treatment "Prof. Dr. Stoyan Kirkovich" AD. Thoracentesis and placement of a pleural catheter were performed in 762 patients, and VATS procedures in 674 patients.

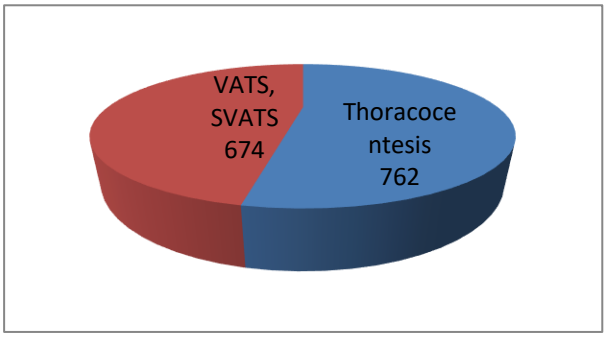

Figure 1. Distribution of surgical procedures in 1436 patients.

Of all 674 anesthesias for VATS procedures, 143 were performed as VATS under general anesthesia with double-lumen endotracheal intubation, and 531 as SVATS under intravenous sedation with additional local infiltrative and topical anesthesia on the ventilating lung.

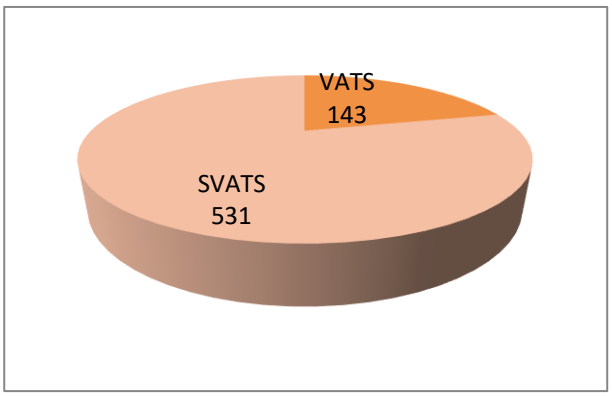

Figure 2. Distribution of surgical procedures performed with VATS und SVATS.

The mean age of patients who underwent SVATS under local anesthesia combined with intravenous sedation was 68 years. The study population included 878 men and 558 women.

Of the 674 VATS procedures carried out, 335 were performed for malignant pleural effusions and 339 for non-malignant effusions.

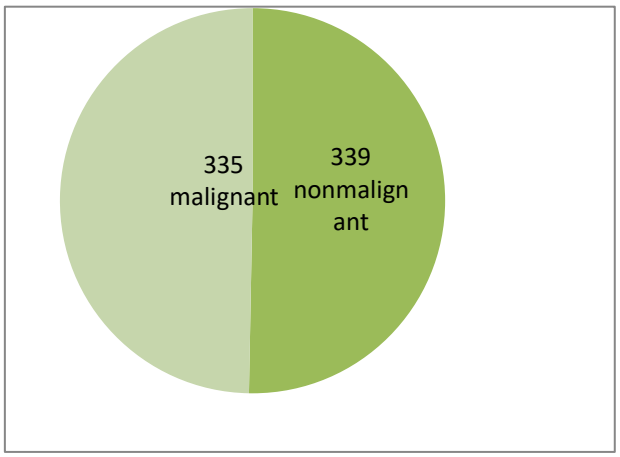

Figure 3. Distribution of VATS by malignant and non-malignant effusions.

Local infiltrative and topical anesthesia is achieved using a lidocaine solution. The total dose of lidocaine ranges from 3 to 5 mg/kg body weight (1). For infiltrative anesthesia at the port

site, 10 ml of a 0.5% solution is sufficient. The remaining amount is used for topical anesthesia by instillation into the pleural cavity after effusion evacuation, without aspiration. The use of topical anesthesia during the surgical procedure significantly reduces the need for postoperative analgesia in the first 1–2 hours.

RESULTS

Among the 674 patients with pleural effusions treated with SVATS, 339 presented with non-malignant effusions (hydrostatic, hypoproteinemic, inflammatory, including hepatic hydrothorax), whereas 335 had malignant effusions. The surgical interventions performed in patients undergoing non-intubated SVATS included pleurectomy, decortication, placement of a thoracostomy catheter, and pleurodesis with talc poudrage or povidone-iodine.

During the study period, no operative mortality was recorded among patients who underwent non-intubated SVATS. No other intraoperative or postoperative complications were reported either. Postoperative pain in patients after SVATS performed under intravenous sedation and local anesthesia was significantly lower compared to patients after conventional VATS. Pain assessed using the Visual Analog Scale (VAS) during the early postoperative period in patients who underwent SVATS under intravenous sedation and local anesthesia was as follows: at the 2nd hour – mean 1.2; at the 4th hour – mean 0.4; on the first postoperative day – mean 0.6.

Patients with malignant pleural effusion (MPE) and successful lung re-expansion, a performance status above 30% according to the Karnofsky scale, as well as an ECOG performance status score below 3, underwent SVATS talc poudrage pleurodesis. The estimated preoperative survival was over 3 months.

In patients with unsuccessful re-expansion, a performance status below 30% according to the Karnofsky scale, an ECOG performance status score of 3 or higher, and an estimated survival of less than 3 months, pleurodesis was not performed and the procedure was completed with the placement of a temporary or permanent pleural catheter.

Mortality

During the study period, among patients who underwent SVATS under intravenous sedation combined with local infiltrative and topical anesthesia, no intraoperative or early postoperative mortality was recorded.

Complications

No other intraoperative or postoperative complications such as bleeding, fever, development of ARDS, or worsening of respiratory, cardiac, or hepatic failure were observed. In none of the cases was it necessary to transfer the patient to the intensive care and resuscitation unit upon discharge from the operating room.

DISCUSSION

The main limitations of this study include the absence of a control group of intubated SVATS patients and the lack of a comparative analysis of postoperative pain and patient satisfaction between non-intubated and intubated procedures. In many centers employing non-intubated anesthesia, epidural anesthesia or intercostal nerve blocks are used, with a current trend favoring intercostal blocks due to reduced induction time and shorter duration of postoperative intercostal catheterization. (1-3).

It should be noted that these studies mainly concern NI-SVATS for pulmonary resection surgery with longer operative times. In our case, the operative time is relatively short, within 20–30 minutes, which makes topical anesthesia with lidocaine fully sufficient for the purpose of the procedure. (4)

The possibility of performing video-assisted surgery in compromised patients with multiple comorbidities is the greatest advantage of the method. Not least is the complete absence or significant reduction of postoperative pain during the first 2–3 hours, which reduces the need for analgesic therapy. (5, 6)

Another advantage of the method is the early resumption of oral intake as early as the second postoperative hour. Numerous studies confirm not only the earlier resumption of oral intake, but also the lower anesthesia costs, shorter duration of postoperative pleural catheterization, earlier discharge, and fewer complications in non-intubated SVATS compared to intubated SVATS. (1, 3, 5)
Among the advantages of NI SVATS are the lower incidence of postoperative nausea and vomiting, the avoidance of potential injuries during intubation, and the reduced risk of ventilation-related pulmonary damage. (5)

One of the disadvantages of the NI SVATS method is the constant movement of the lung and the occasional associated cough, which can hinder visualization and the work of the surgical team; however, with sufficient experience, this drawback can be managed. (3)

The duration of the patient's stay in the operating room is considerably shorter compared to intubated SVATS. In this context, no additional preoperative time is required for induction of anesthesia, nor postoperative time for emergence. In video-assisted procedures for pleural effusions, the anesthetic time often exceeds the duration of the surgical procedure itself.

In cases of talc poudrage or povidone-iodine pleurodesis for malignant pleural effusions, the low success rate of pleurodesis is most frequently attributable to a trapped lung or poor performance status, both of which are associated with limited predicted postoperative survival.

Informed consent is particularly essential in cases of NI SVATS, as the advantages and disadvantages of the technique must be clearly explained to patients. During non-intubated procedures, patient cooperation is required for urethral catheterization and for positioning on the operating table in the left or right lateral decubitus position.

A study conducted among members of the European Society of Thoracic Surgeons (ESTS) demonstrated that a considerable proportion of thoracic surgeons employ non-intubated VATS for minor procedures (1, 5). The aim of the study was to identify current trends, patterns of use, and the potential of this approach to broaden the scope of non-intubated thoracic surgery (NITS).

CONCLUSION

Non-intubated SVATS is a safe and sparing procedure for compromised patients in an advanced stage of underlying disease and with multiple comorbidities, who are at increased risk for general anesthesia and double-lumen endotracheal intubation for differential lung ventilation.

REFERENCES

1. Parini S, Rena O. Non-intubated video-assisted thoracoscopic surgery for pleural biopsy: a narrative review. Video-Assisted Thorac Surg. 6, 2021.
2. Sagiroglu G, Yanik F, Karamusfaoglu YA, Copuroglu E. May awake video-assisted thoracoscopic surgery with thoracic epidural anesthesia use routinely for minimaly invasive thoracic surgery procedures in the future?. *Int Surg J* [Internet]. Apr. 21 [cited 2025 May 8];5(5):1602-9, 2018.
3. Yanik F. Current overview of awake, non-intubated, video-assisted thoracic surgery. *Wideochir Inne Tech Maloinwazyjne.* Sep;18(3):445-452, 2023.
4. Mineo TC. Epidural anesthesia in awake thoracic surgery. *Eur J Cardiothorac Surg*. 32(1):13–19, 2007.
5. Pompeo E. Minimally invasive thoracic surgery: new trends in Italy. *Ann Transl Med.* Oct;3(18):269, 2015.
6. Cox SE, Katlic MR. Non-intubated video-assisted thoracic surgery as the modality of choice for treatment of recurrent pleural effusions. *Ann Transl Med*. May;3(8):103, 2015.