

## Single-Incision Video-Assisted Thoracoscopic Surgery for Benign Mediastinal Diseases: Experiences in Single Institution

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With advancement of the technique of video-assisted thoracic surgery (VATS), some surgeons have made great efforts to reduce the number of incisions in the conventional three- or four-port approach. Several studies on cases treated by single-incision VATS and their short-term outcomes were reported. Here, we present our experience with single-incision VATS for the treatment of benign mediastinal diseases.

**Key words:** 1. Minimally invasive surgical procedures  
2. Video-assisted thoracic surgery (VATS)  
3. Mediastinal disease

### TECHNIQUE

Patients with a benign mediastinal mass underwent single-incision thoracoscopic mediastinal mass removal under general anesthesia and single-lung ventilation using double lumen endotracheal tubes (Table 1).

For removal of the mass, the patient was placed in a semi-lateral decubitus position and a 2.5-cm incision was

done in the fourth intercostal space in mid-axillary line. A single-incision laparoscopic surgery (SILS) port (Covidien SILS PT12; Tyco Healthcare, Norwalk, CT, USA) with three channels was inserted into the single incision (Fig. 1A). A 30-degree, 10-mm thoracoscope was placed in the posterior channel of the SILS port and the SILS articulating hand instruments were inserted into the other channels, making an 'inverted triangle' position (Fig. 1B-D). First, carbon dioxide

**Table 1.** Patients characteristics

Sex/age (yr)	Diagnosis	Operating time (min)	Duration of catheter placement (day)	Hospital stay (day)	Location of mass	Mass size (cm)
Female/59	Schwannoma	120	1	3	Superior mediastinum	2.9×1.9
Male/50	Thymic cyst	120	1	4	Anterior mediastinum	2.3×1.5
Male/40	Pericardial cyst	50	1	3	Anterior mediastinum	2.4×2.2
Male/37	Schwannoma	60	0	2	Superior mediastinum	2.1×1.0

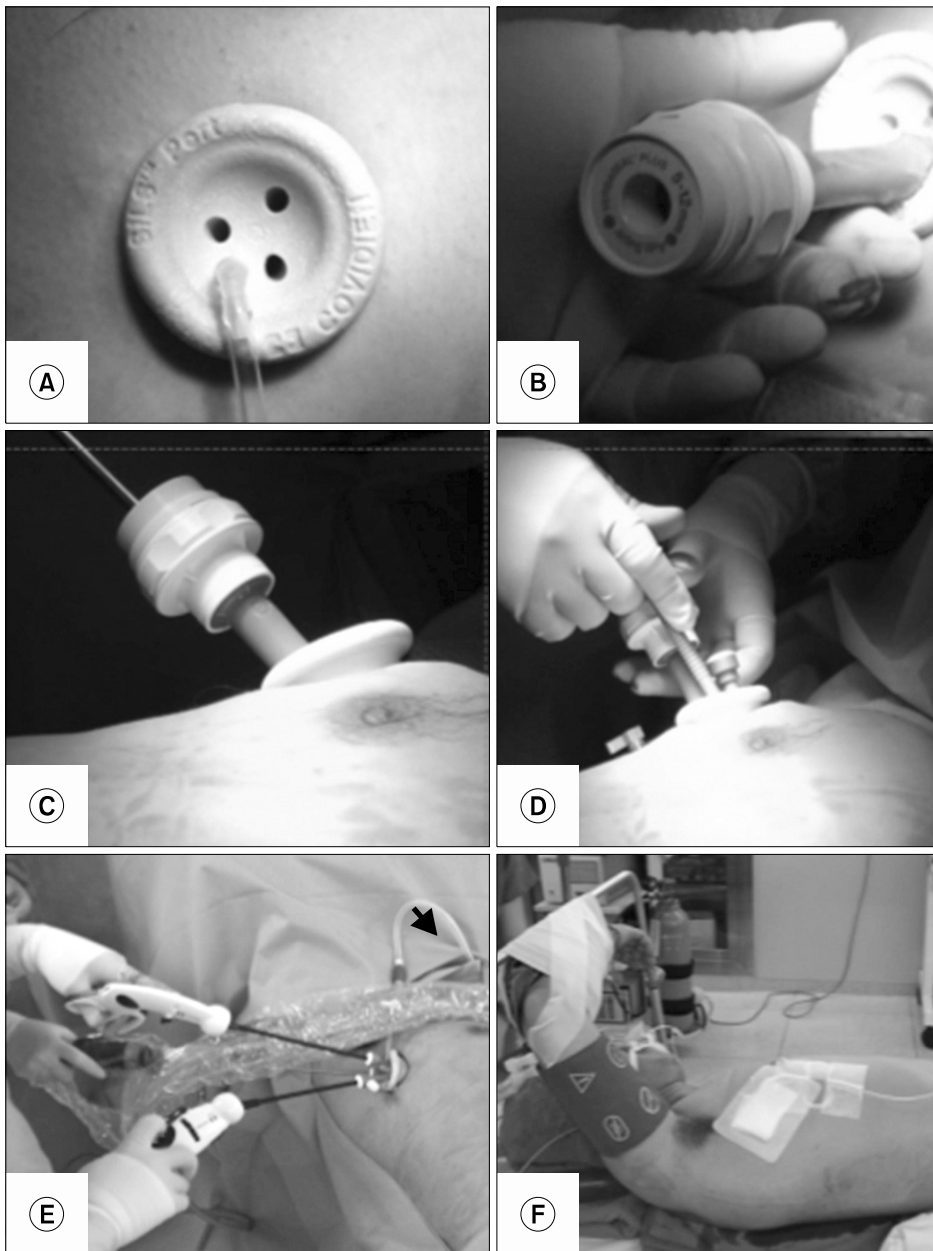
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**Fig. 1.** (A–D) A single port with three channels (SILS port) was inserted through a single incision. The posterior channel in the port was used for a thoracoscope, and SILS articulating hand instruments were inserted into the other channels. (E) The thoracoscope was placed through the posterior channel of the SILS port and the SILS articulating hand through the other holes, making an ‘inverted triangle’ under insufflating carbon dioxide (arrow). (F) The patient was placed in a left semi-lateral decubitus position and the right arm was bent and raised to an abducted state and fixed to a bar over the patient’s head to expose the axillary area.

gas was insufflated to a maximum ‘pressure setting’ of 8 mmHg to create an adequate surgical field (Fig. 1E), and the mass was identified after dissection of the mediastinal pleura. The mass was exposed by SILS articulating hand instruments while preserving the phrenic nerve. The mass was extracted in a protective bag through the incision under inspection by the thoracoscope. A Jackson-Pratt catheter was placed in the area where the mass had been through the anterior part of the incision under endoscopic guidance (Fig. 1F).

## COMMENT

Based on several studies, single-incision thoracoscopic surgery (SITS) has been used to treat lung cancer, primary spontaneous pneumothorax, hyperhidrosis, and pleural empyema [1-3]. However, we did not consider SITS in cases that were related to recurrence such as lung cancer or pneumothorax. The advantages of SITS include better cosmetic outcomes, less incisional pain, and less paresthesia than experienced

with conventional multiport procedures. However, thoracic manipulation and the view of the field obtained through a single port have been quite limited, even with the development of various angled staples and instruments; therefore, optimal field exposure by movement of the thoracoscope needs to be coordinated with surgical articulating hand instruments [1,2,4,5]. That is, SITS has not yet become widely accepted due to several disadvantages, including conflict among the video-assisted thoracic surgery (VATS) instruments, limitations in viewing the surgical field, a longer operation time, and ergonomic discomfort in performing the surgery. In addition, the postoperative long-term results after single-incision VATS of malignant disease and recurrence-associated disease have not yet been verified in the current literature on SITS. In our cases, for removal of a benign mediastinal mass, no significant differences between the conventional VATS technique and SITS were observed when comparing the therapeutic efficacy and diagnostic accuracy. We also noted that the more experience the surgeon had with SITS, the shorter the duration of surgery, with our last operation taking only 50 minutes, which was much shorter than the previous operations. Therefore, SITS for removal of a benign mediastinal mass could be feasible with results including a minimal postoperative scar and a brief chest tube placement and hospital stay.

The development of SITS instruments, accumulation of sur-

gical experience, and a prospective multicenter trial comparing it with conventional VATS will make SITS more applicable to various other diseases.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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