Brief Clinical Report

Microthoracoscopy:
At the Cutting Edge of Thoracic Surgery

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ABSTRACT

Two 2-mm microthoracoscopies were performed using two ports (Minisite 2-mm disposable introducer and Minisite 2-mm 0° laparoscope; U.S. Surgical Corporation, Norwalk, CT). A 47-year-old man with multiple bilateral pleural lesions had a right diagnostic 2-mm microthoracoscopy and multiple microthoracoscopic biopsies. He was discharged the next day with minimal discomfort and returned to work the following day. The second patient was a 74-year-old woman, 10 years after left radical mastectomy for carcinoma, with a multitude of medical problems and a right recurrent pleural effusion. She underwent a right diagnostic 2-mm microthoracoscopy, multiple microthoracoscopic biopsies, and electrocoagulation pleurodesis. She was not discharged because of concurrent conditions. She had no disability and no pain whatsoever from the procedure.

INTRODUCTION

RECENTLY, 2-MM MICROTHORACOSCOPY has brought up the greatest interest across this country. It has been used mostly in tubal ligation but also to stage abdominal malignancies and in trauma cases to ascertain the presence of blood in the abdominal cavity.

In search of a less invasive approach to endothoracic surgery, this method was devised to obtain faster patient recovery, a quicker return to work with less risk and discomfort, and shorter hospital stay.

MATERIALS AND METHODS

Selective intubation and one-lung ventilation is required in all cases of microthoracoscopy. The instrumentation consists of the following: MiniSite Endo Clinch 2-mm instrument, MiniSite Cup Grasp 2-mm instrument, MiniSite Endo Grasp Single Action 2-mm instrument, MiniSite Endo Sciz Single Action 2-mm instrument, MiniSite Blunt Probe 2-mm instrument, MiniSite Biopsy Punch 2-mm instrument, MiniSite C-Mount Coupler 28 mm for use with the MiniSite 2-mm 0° laparoscope, MiniSite C-Mount Coupler 35 mm
for use with the MiniSite 2-mm 0° laparoscope, MiniSite Endo Grasp Double Action 2-mm instrument, MiniSite Aspiration/Irrigation Cannula 2-mm instrument, MiniSite Universal Light Cable 3.5-mm instrument, MiniSite 2-mm 0° laparoscope, MiniSite Disposable 2-mm introducer for use with the Surgineedle 150-mm pneumoperitoneum needle, and Surgineedle 150-mm long instrument (U.S. Surgical Corporation, Norwalk, CT; see Figs. 1–3).

With the patient in a lateral recumbent position, a 2-mm incision is made with a size 11 blade generally at the level of the fourth or fifth interspace at the anterior mid or posterior axillary line.

The MiniSite disposable introducer (Fig. 4), featuring a similar mechanism as the Verres needle, is inserted through this incision and slowly advanced into the chest wall. As soon as it penetrates the pleural space, a “pop” is felt, and the blunt stylet pops out. The hollow stylet connects via its lateral openings to the outside air with resultant pneumothorax. The stylet is removed, and the collapse is accelerated via CO₂ insufflation that need not be continuous. Complete atelectasis can be obtained when needed for better exposure.
FIG. 3. Description of Minisite 2-mm laparoscopic instruments (U.S. Surgical Corporation, Norwalk, CT).

FIG. 4. A 2-mm Minisite disposable introducer with stylet (U.S. Surgical Corporation, Norwalk, CT).
Upon obtaining the desired collapse, the insufflation valve is removed, and the 2-mm laparoscope is inserted (Fig. 5). Additional introducers are inserted as needed, usually two to three, the position being chosen according to the location of the target area.

Visibility is good with this scope (Fig. 6); however, definition is not as optimal as with the 10-mm scopes on the market today.

Because of its small caliber, the temperature changes rapidly with each insertion and withdrawal, and fogging may be a problem more so than with its 10-mm counterpart. Antifog preparations and insertion in warm water are very helpful. Utmost care must be used in handling this instrument, which, because of the very small diameter, is quite fragile. Perfect eye-hand coordination is required in microthoracoscopy. Retraction of the lung if needed is accomplished by the 2-mm blunt probe.

Biopsies may be obtained via the 2-mm biopsy punch and the disposable 2-mm minishears with cautery (U.S. Surgical Corporation, Norwalk, CT). The same minishears with cautery can be used for “pericardial windows” and thoracic sympathectomies. Excellent hemostasis is obtained with the minishears with cautery.

At completion of the procedures, all instruments as well as the introducers are removed except one. The incisions are closed with one or two staples. The insufflation tube of the remaining introducer is attached to underwater drainage while the lung is reinsufflated. When adequate breath sounds are heard by the anesthesiologist and the underwater bubbling stops, the remaining introducer is removed and the incision closed with one or two staples.

A chest X-ray is taken in the operating room at the end of the procedure: a pneumothorax over 5% requires overnight observation and tube thoracotomy if needed.

RESULTS

On April 12, 1997, a 47-year-old man with multiple bilateral pleural lesions of unknown etiology underwent the first microthoracoscopy.

The patient was positioned in the left lateral recumbent position with selective endotracheal intubation—only the left lung being ventilated.

A 2-mm incision was performed with a size 11 blade at the level of the right fourth intercostal space at the anterior axillary line. A MiniSite disposable 2-mm introducer was inserted through this incision, and
FIG. 6. Laceration of the pleura and intercostal musculature after a motor vehicle accident, as seen on the monitor via the 2-mm scope.

collapse of the right lung was obtained. Insufflation to 12 mm Hg was used to obtain total atelectasis and, therefore, greater field of visualization. The MiniSite 2-mm 0° laparoscope was inserted.

A second Minisite 2-mm disposable introducer was inserted at the sixth intercostal space and the anterior axillary line. The pleural lesions were visualized. A Minisite 2-mm biopsy punch was inserted and biopsies obtained. Hemostasis was secured with minishears with cautery.

At the end of the procedure, the right lung was reinflated, the two 2-mm cannulas were removed and the incisions closed with one staple each, and bandages were applied. Since this was our first case and no information was available in the literature, the patient was kept in observation overnight. He had only minimal discomfort immediately after the surgery and no discomfort thereafter. Pathology report was "benign fibrotic lesions."

The second case was performed on April 25, 1997. It was a 74-year-old woman who had a left radical mastectomy for carcinoma 10 years earlier. The patient had been asymptomatic until February 1997, when she developed an upper respiratory infection followed by a right pleural effusion, which was tapped. Cytology report was negative and so were the cultures. The effusion recurred, and the decision to perform a thoracoscopy was made.

Also in this case, the Minisite 2-mm endoscope was used. Some 800 cc of fluid were drained, and multiple pleural biopsies were obtained. At the end of the procedure, electrocoagulation pleurodesis was performed with the minishears with cautery.

This patient complained of no pain whatsoever at anytime after surgery. Final pathology report was poorly differentiated adenocarcinoma, consistent with breast primary (right pleura, biopsy).

DISCUSSION

There are definite advantages of microthoracoscopy over regular thoracoscopy. Lack of discomfort, shorter length of hospital stay, and faster healing of the operative sites are the most obvious. Most cases could be treated as outpatient surgery, and the patients could return to work the next day.

Patients shown a pneumothorax over 5% at completion of the surgical procedure should be kept in observation overnight and considered for tube thoracotomy and/or additional procedures.

All cases of thoracic trauma should be kept in overnight observation even if the initial diagnostic microthoracoscopy was negative.

We feel that this procedure can be safely used for a gamut of thoracic conditions including pleural biopsies, cauteterization pleurodesis for recurring metastatic effusions, thoracic sympathectomies, mediastinal biopsies, pericardial windows, traumatic pneumothorax for diagnosis and possible cauterization of minor arterial bleeding, and for most conditions today treated with 10-mm thoroscopies. Additional procedures
will be safely performed with the new incoming generation of instrumentation, including the Mini-Stapler and the new minithoracoscopy with improved optics. It should be possible to perform wedge lung resection and treatment of spontaneous pneumothorax by bubble stapling and cauterization pleurodesis.

Even though this procedure will not completely replace the “classic” thoracoscopy, it will have a definite place in the thoracic surgeon’s armamentarium.

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