A simple maneuver to detect air leaks on the operating table after needlescopic video-assisted thoracic surgery

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The use of miniaturized, 2-mm needlescopic instruments for simple video-assisted thoracic surgical (VATS) procedures, such as thoracodorsal sympathectomy,¹ is gaining increasing popularity as a means of further minimizing chest wall trauma.² However, unlike conventional VATS, in which the initial port for the thoracoscope was created by finger-clamp technique (as in the insertion of a chest drain), in needlescopic VATS, the 2-mm trocar with the blunt introducer

(Figure 1) is placed percutaneously into the chest after a tiny stab incision has been made in the dermis. Because this is a blind maneuver, there is always a risk of inadvertent puncture of the visceral pleura which may go undetected. Because a chest drain is not routinely placed after needlescopic VATS, this may lead to troublesome postoperative pneumothorax if a visceral pleural puncture has indeed been missed. Worse still, during a bilateral VATS procedure, the patient could have a tension pneumothorax develop in the punctured, ventilating lung while the contralateral lung is collapsed. Even if there is no lung injury, it is often difficult to ascertain on the operating table that the lung being operated on is fully expanded after a needlescopic VATS procedure.

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A simple maneuver

At the end of the procedure, carbon dioxide insufflation is stopped (if its use was necessary to collapse the lung), and the lung on the operated side is allowed to re-expand. All the trocars except the most superior one are removed. A fine endoscopic sucker placed through the remaining trocar helps to evacuate the gas from the pleural cavity. The side arm of the trocar (used earlier for carbon dioxide insufflation) is then immersed under water. The water

Figure 1. Needlescopic trocar with an introducer (Mini Site 2-mm Introducer System; US Surgical, Norwalk, Conn).

Figure 2. Evacuation of intrapleural air underwater. Note tangential positioning of the trocar relative to chest wall to avoid impalement into lung.

column serves as a manometer of the intrapleural pressure and the pleural gas (if carbon dioxide has been used) escapes as bubbles underwater. The anesthesiologist continues to manually inflate the lung until all the bubbling stops, in which case the remaining trocar can be removed. If the bubbling persists, this signifies a continuous air leak and should prompt the insertion of a small chest drain. One technical detail is that the trocar at this time should be positioned as tangentially to the chest wall as possible (Figure 2), to avoid impalement of its tip into the expanding lung. We have used this maneuver in more than 40 cases now without complications. No

persistent leakage has been detected on the operating table, nor have there been any postoperative pneumothoraces or other complications.

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