The Inadvisability of Thoracoscopic Lung Biopsy on Patients With Pulmonary Hypertension*

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The use of video-assisted thoracoscopic surgery (VATS) sometimes leads to additional and unnecessary risks compared with thoracotomy. We report a troubling case of VATS lung biopsy in a 43-year-old woman with mild pulmonary hypertension. A progressive elevation of pulmonary artery pressure (PAP) was noted after the commencement of right unilateral ventilation. When the systolic PAP reached 90 mm Hg (390 min after induction of anesthesia), a massive blood discharge through the chest drain occurred. At repeat thoracotomy, continuous blood spouting was seen from >10 of the surgical sites. It was supposed that the endoscopic staplers were unable to maintain hemostasis with such a high PAP.

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Key words: complication; endoscopic stapler; lung biopsy; pulmonary hypertension; thoracoscopic surgery

Abbreviations: PAP = pulmonary artery pressure; PH = pulmonary hypertension; VATS = video-assisted thoracoscopic surgery

Video-assisted thoracoscopic surgery (VATS) has been established as a feasible option for many intrathoracic procedures because it is minimally invasive and gives a good cosmetic result. The use of VATS, instead of open thoracotomy, is particularly advantageous in lung biopsy. However, the use of VATS may lead to additional and unnecessary risks in some cases, particularly where there is underlying pulmonary hypertension (PH).

CASE REPORT

A 43-year-old Japanese woman with PH was referred to our department for lung biopsy. The patient had a history of breast implant placement at the age of 28 years and Sjögren syndrome from the age of 34 years. At a prior right-heart catheterization, the pulmonary artery pressure (PAP) was 65/30 mm Hg, although this fell to 55/25 mm Hg after inhalation of oxygen at 2 L/min (Fig 1). There was no evidence of a right-to-left shunt. A chest CT scan showed mild dilatation of the pulmonary trunk, but no lesions were noted in the lung parenchyma. It was considered likely that the moderate PH was secondary to Sjögren syndrome. However, a definite histologic diagnosis was needed in order to rule out primary PH and to justify the use of steroid therapy; for this reason, she was referred to our department for a lung biopsy.

VATS lung biopsy and removal of the breast implant were performed under general anesthesia using isoflurane and fentanyl. No cardiovascular agents other than sodium nitroprusside at a standard dose of 0.1 to 3.0 μg/kg/min were administered during anesthesia. Two pieces of lung parenchyma measuring 3 × 2 × 2 cm were resected from the left S1 and S8, and the surgical stumps were closed using an endoscopic stapler (EZ45B; Ethicon Endo-Surgery; Cincinnati, OH). The left lung was kept deflated for 53 min during the lung biopsy. The patient was in a right decubitus position for 97 min, and the VATS procedure lasted 70 min. VATS biopsy procedures were interrupted several times when anesthetists needed temporary inflation of the left lung to rescue the hemodynamic and respiratory instability. Although the PAP declined temporarily after resumption of bilateral lung ventilation, it became progressively elevated thereafter. When the systolic PAP
reached 90 mm Hg, a massive blood discharge through the chest drain occurred. An emergency repeat thoracotomy was performed, and continuous blood spouting was seen from > 10 of the surgical sites in both the left S1 and S2. No stapler-induced pulmonary damage was found. The patient died of PH and right-heart failure 8 days after the operation.

COMMENTS

The risk-benefit ratio should be considered seriously prior to undertaking lung biopsy in patients with PH.1,2 During the lung biopsy procedure, several factors may contribute to worsening of the underlying PH. These include the use of anesthetic agents, positive pressure ventilation, surgical manipulation to the lungs, pain, and psychological stress. In thoracoscopic lung biopsy, there may be two additional risk factors: unilateral lung ventilation with contralateral lung deflation, and the relatively low reliability of endoscopic instruments, particularly endoscopic stapling. Therefore, it is usually recommended that if a lung biopsy is required in patients with PH, this should be done via an open thoracotomy.1,3 However, there has been a report of a successful VATS biopsy in a patient with pressure in the pulmonary circulation greater than the systemic circulation.4

In our patient it was thought that, in view of her mild PH, the biopsy could be safely undertaken using VATS. The possibility that PH could progress during and after biopsy was not taken into account. Bleeding occurred abruptly when the PAP was > 90 mm Hg. At repeat thoracotomy, we found that blood was continuously spurting from the stapled surgical margins. No technical problems or lung injuries were found. It was clear that the endoscopic staplers were unable to maintain hemostasis with such a high PAP.

The manufacturer has been unable to provide any information regarding the safe upper pressure limit for the use of stapler in PH patients (S. Y. Park; Ethicon Endo-Surgery Japan; personal communication; February 2002). Through this troubling case, we have learned that VATS lung biopsy should not be performed in PH patients because of the safety limitation of endoscopic instruments and also because of the possibility that PH may deteriorate as a result of the VATS procedures.

REFERENCES


Figure 1. Changes in perioperative hemodynamics. Note that a massive blood discharge through the chest drain occurred when the systolic PAP reached 90 mm Hg. *Preoperative values of PAP. ABP = arterial BP; sys = systolic; dia = diastolic.