Awake video-thoracoscopic surgery for intractable pneumothorax in pregnancy by using a single portal plus puncture

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Abstract

A 31-year old female patient in the ninth week of pregnancy complained of chest pain and dyspnoea. The patient had experienced an episode of spontaneous pneumothorax on the left side at the age of 20 and had undergone chest tube drainage. Her medical history was unremarkable and she had no history of smoking. She had no family history of pulmonary disease. Thoracic radiography showed a pneumothorax on the right side. The patient underwent chest tube drainage in the thoracic space. When surgical intervention for continuous air leakage was unavoidable, we selected video-assisted thoracic surgery under local and epidural anaesthesia in consideration of her general condition. We conclude that awake surgical intervention is applicable in selected patients with pneumothorax in pregnancy and is particularly useful in those in whom general anaesthesia is best avoided.

Keywords: Awake surgery • Pneumothorax • Pregnancy

INTRODUCTION

The optimum management of pneumothorax in pregnancy is controversial because anaesthetic and surgical interventions during the altered physiological state of pregnancy could result in increased risks to the mother and baby, including teratogenicity and abortion. Therefore, it is appropriate to avoid surgical intervention under general anaesthesia in pregnant women. We report a case of intractable spontaneous pneumothorax in pregnancy, successfully treated by uniporal video-assisted thoracic surgery (VATS) with the patient in a conscious state.

CASE REPORT

A 31-year old female patient in the ninth week of pregnancy complained of chest pain and dyspnoea. The patient had experienced an episode of spontaneous pneumothorax on the left side at the age of 20 and had undergone chest tube drainage. Her medical history was unremarkable and she had no history of smoking. She had no family history of pulmonary disease. Thoracic radiography showed a pneumothorax on the right side. The patient underwent chest tube drainage in the thoracic space. When surgical intervention for continuous air leakage was unavoidable, we selected video-assisted thoracic surgery under local and epidural anaesthesia in consideration of her general condition. We conclude that awake surgical intervention is applicable in selected patients with pneumothorax in pregnancy and is particularly useful in those in whom general anaesthesia is best avoided.

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CASE REPORT

A 31-year old female patient in the ninth week of pregnancy complained of chest pain and dyspnoea and consulted the referring hospital. Thoracic radiography showed a pneumothorax on the right side. The patient was initially treated with chest tube drainage, but air leakage continued for 2 weeks because she rejected surgical intervention. We were undecided between surgery and conservative therapies because of the possible influence of chemical pleurodesis or administration of drugs under general anaesthesia on both the mother and the baby. We obtained informed consent from the patient about surgical interventions in awake conditions. Finally, when surgical intervention for continuous air leakage was unavoidable, we selected VATS under local and epidural anaesthesia in consideration of her general condition. A thoracic epidural catheter was inserted at the T7/8 level before the operation, and continuous infusion of 0.2% ropivacaine was started. The patient maintained spontaneous respiration throughout the operation and was provided with oxygen. The patient was placed in the left lateral decubitus position. To avoid desaturation during conscious surgical intervention, the chest drainage tube inserted before surgery was left in place and used to extract the air from the pleural cavity, thereby temporarily re-expanding the lung. The new chest tube was changed immediately before the operation.

The fifth to seventh intercostal nerves were blocked locally using 1% lidocaine. A 25-mm access port was inserted in the sixth intercostal space at the axillary line, and a 5-mm flexible scope (TF TYPE 260; Olympus, Tokyo, Japan) was introduced. A focal pleural adhesion was seen at the apex of the lung, and a ruptured bulla was found near the adhesion (Fig. 1A). We exfoliated the adhesion by using the LigaSure vessel sealing system (Valleylab, Boulder, CO, USA). A MiniLap grasper with percutaneous capabilities and a diameter of 2.3 mm (Stryker, San Jose, CA, USA) was inserted in the fifth intercostal space at the axillary line to grasp the bulla, and the bulla was resected using an endoscopic stapler (Endo GIA 60–3.5; Tyco Healthcare Japan, Tokyo, Japan), which was introduced through the access port together with the scope (Fig. 1B). The staple line was reinforced with non-woven polyglycolic acid (PGA) sheets (NEOVEIL; Gunze Co., Ayabe, Japan) fixed with a few PGA sheets around the suturing area, and then with intrapleural administration of fibrin glue on these areas. A chest drainage tube was inserted and placed on suction with a negative pressure of 10 cmH₂O. The lowest functional oxygen saturation during the operation was 99% (Fig. 2B). A postoperative chest radiograph showed good re-expansion of the right lung, and the postoperative course was uneventful. The chest drainage tube was removed on postoperative day 1. The patient was discharged on day 2. Frequent foetal assessments during pregnancy were...
normal. At the 39th week of gestation, the patient underwent vaginal delivery and gave birth to a normal male infant with a birth weight of 2690 g and Apgar scores of 8 at both 1 and 5 min, respectively. There were neither complication nor recurrence of the pneumothorax (Fig. 2A).

DISCUSSION

Surgical interventions during pregnancy expose the mother and child to a potential increased risk of teratogenicity and abortion. Therefore, surgeons are generally hesitant to operate for intractable pneumothorax during pregnancy. To our knowledge, there are no guidelines that specifically address management of pneumothorax during pregnancy.

Regarding the foetus, it is safer to perform surgery after the first 8 weeks of gestation when organogenesis of the vital organs is complete [1]. In the present case, because the patient was in the ninth week of pregnancy, after the period of organogenesis, we considered surgery safe with respect to teratogenicity. However, the risk of teratogenicity with newer inhalational anaesthetics is unknown in human subjects, because it is often unclear what specifically may have been unsafe during pregnancy and what may have caused the complication under general anaesthesia.

Regarding the mother, the main concern with general anaesthesia during pregnancy is the possibility of reduced flow of oxygen. During surgery under general anaesthesia, the oxygen levels of not only the mother, but also the foetus, must be carefully monitored. Because oxygen supports brain function and development, a lack of oxygen can affect the growing baby’s brain.

Awake thoracoscopic surgical interventions have been reported in high-risk patients [2]. In our study, awake VATS could be performed with an acceptable overall morbidity for patients with secondary spontaneous pneumothorax [3]. Surgical stress hormones response is reduced after awake videothoracoscopy in comparison with the equivalent procedure performed under general anaesthesia [4]. Moreover, the use of the single port in thoracic surgery results in less postoperative pain. This is related to the port’s protective effect over the periosteum and the intercostal nerve, relieving them of direct contact with surgical instruments [5].

Conclusion

We performed a minimally invasive thoracoscopic approach, with the patient in an awake condition for intractable pneumothorax of pregnancy. We conclude that awake surgical intervention is applicable in selected patients with pneumothorax in pregnancy and is particularly useful in those in whom general anaesthesia is best avoided.
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REFERENCES