CASE REPORT

Tension pneumothorax complicating autologous "blood patch" pleurodesis

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Autologous "blood patching" has been used successfully for the treatment of persistent air leak in patients with spontaneous secondary pneumothorax. The case history is presented of a 19 year old woman with cystic fibrosis who developed tension pneumothorax following this procedure, with rapid clinical deterioration until the obstruction was cleared. To avoid this potentially fatal complication we recommend that "blood patch" pleurodesis be performed only through large bore intercostal catheters, that blood is rapidly transferred into the catheter tubing, a sterile saline flush and full resuscitation equipment is available, and the operator is skilled in the management of tension pneumothorax.

A potentially life threatening complication of the autologous "blood patch" pleurodesis procedure performed for a case of secondary pneumothorax with persistent air leak is described.

CASE REPORT

A 19 year old woman with cystic fibrosis and advanced lung disease (forced expiratory volume in 1 second 0.85 l; 26% predicted) presented with a large right sided spontaneous pneumothorax. In line with the 2003 BTS guidelines,¹ a 12 French (2.6 mm internal diameter) intercostal catheter was inserted in the fifth intercostal space, mid axillary line, and connected to an underwater seal drain, resulting in re-expansion of the right lung. However, there was persistent air leak on coughing despite 10 days of conservative treatment including a sustained period of continuous suction at 25 cm H₂O. At this time a CT scan of the thorax confirmed a small right sided pneumothorax and changes in keeping with advanced cystic fibrosis lung disease. Given the advanced lung disease and the possibility of future lung transplantation, we were reluctant to consider either surgical or chemical pleurodesis. After discussion with our transplant centre we elected to perform autologous "blood patching" as described by Dumire *et al.*²

On day 15 of the admission, 50 ml of blood was aspirated from the antecubital fossa via an 18 gauge (0.9 mm internal diameter) cannula, the catheter tubing was clamped distally, and the blood was injected through the self-sealing rubber tubing under sterile technique. The tubing was unclamped and suspended 60 cm above the patient for 2 hours to prevent blood drainage and then lowered. The patient was not willing to be attached to further continuous suction. Although the procedure went without complication, a moderate air leak persisted the following day.

Previous series have shown success following repeat procedures,²⁻⁴ with larger volumes of blood,⁵ and with suction.^{2,4,6} We therefore decided to repeat the procedure, aiming to instil 100 ml of autologous blood and to apply suction after 2 hours of free drainage. Initially, 50 ml of blood was aspirated from a peripherally inserted central catheter and injected into the clamped intercostal catheter. However, subsequent aspiration of

blood was slower and the next 50 ml took approximately 2 minutes to obtain. Towards the end of this second injection the patient started to develop breathlessness. The procedure was immediately aborted. Despite injecting 20 ml of sterile normal saline into the catheter, the drain was no longer functioning and the patient developed rapidly increasing respiratory distress. A diagnosis of tension pneumothorax secondary to blood clot blocking the chest tubing was made and oxygen was immediately administered. A further 50 ml of sterile normal saline was injected forcibly into the tubing which succeeded in clearing the obstruction and restoring function of the chest drain. There was immediate resolution of respiratory distress and a subsequent chest radiograph on suction showed the lung was re-expanded.

Due to the severe lung disease, both we and the patient were reluctant to proceed to surgical pleurodesis. After 71 days of conservative treatment the air leak stopped and the drain was successfully removed. There has been no recurrence of pneumothorax after 6 months of follow up.

DISCUSSION

Autologous "blood patching" has been described as a simple, inexpensive, and safe treatment for persistent air leak from secondary pneumothorax^{2-4,7} and following surgery,^{2,5} with success rates ranging from 59% to 100% in published series.^{3-5,7} It has proved to be successful even in cases where the lung is not re-expanded.^{4,6} The only serious complication described in the literature is empyema which, although thought to be rare by some authors, affected three of 32 patients (9%) in one series.⁷ With regard to the methods used for "blood patch" pleurodesis, there is little or no mention of the tube size used in these case series, although it is important to note that they were probably large bore.

Tension pneumothorax has, to our knowledge, never been described previously with this procedure, although the possibility was raised in a letter by Shackcloth *et al.*⁸ In patients with existing lung disease the deterioration can be very rapid due to lack of respiratory reserve, as was the case with our patient. We believe several factors contributed to catheter obstruction in this case. The use of a small bore catheter, prior instillation of blood during the first procedure, and slow venesection are all likely to have contributed to blood clot formation within the catheter and subsequent tension pneumothorax.

Based on our own clinical experience and published case series, we believe autologous "blood patching" is a useful therapeutic option in a selected group of patients with pneumothorax and persistent air leak. However, it is important that clinicians undertaking this procedure have an awareness of, take steps to avoid, and have the facility to deal with the potentially life threatening complication of tension pneumothorax. We recommend that (1) autologous "blood patching" be performed through large bore catheters only; (2) venesection from the patient be performed using 50 ml syringes from an intravenous cannula (≤ 18 gauge; 0.9 mm internal diameter) in an upper limb vein with rapid transfer of blood into the catheter tubing; (3) the catheter should be

flushed with sterile saline after each injection of blood and a 50 ml sterile saline flush should be available during the procedure to be used in the event of catheter obstruction; and (4) resuscitation equipment (including oxygen and pulse oximetry) should be to hand and the operator should be experienced in the management of tension pneumothorax with large bore cannulae and emergency chest drain insertion.

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