EMERGENCY CASEBOOK

Haemothorax after pig-tail catheter removal in a patient with primary spontaneous pneumothorax

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A case of haemothorax is described which occurred after the removal of a small pig-tail chest tube (8.5 F) that was inserted in the second intercostal space in the mid-clavicular line, for primary spontaneous pneumothorax management. The patient was successfully resuscitated and 0.85 l of blood was aspirated. There was no evidence for pre-existing haemothorax, no metal instrument was used and no precipitating factor was present. Thus, it is possible that bleeding was due to a tear of a vessel proximal to the second intercostal space during pig-tail catheter removal by a "grapple-hook" mechanism. Whether a pig-tail catheter in itself carries an additional risk of complications compared with other catheter types is questionable. However, this report highlights the potential danger that accompanies pig-tail drain insertion into the second intercostal space in the mid-clavicular line, and suggests that insertion in other sites is technically easy and potentially safer for pneumothorax drainage.

CASE REPORT

We describe the case of apparent haemothorax that occurred after the removal of a small pig-tail chest tube that was inserted for pneumothorax management in a 25-year-old active smoker. The patient had an unremarkable medical history and he was hospitalised in our centre after his first episode of left-sided spontaneous pneumothorax (fig 1A). Pneumothorax was drained according to a validated protocol¹: an indwelling small lumen pig-tail catheter (8.5 F) was inserted using the Seldinger technique into the second intercostal space in the mid-clavicular line (2ISMC). Correct chest tube placement was confirmed by radiography (fig 1B). The system was attached to an underwater seal drainage system, resulting in a resolution of the patient's symptoms, with no presence of air leaks or of other complications. Consequently, on the fifth day of treatment, the chest tube was removed. In the absence of precipitating factors, bleeding was observed immediately after catheter removal at the site of insertion, to our surprise. The patient rapidly became distressed with sweating, tachycardia and arterial hypotension, and developed a left-sided lumbar pain. Chest radiography showed left-sided pleural effusion without pneumothorax recurrence (fig 1C). The patient was successfully resuscitated and 0.85 l of blood was aspirated. The patient's condition was progressively improved, and no further intervention was required. A follow-up 1 week later showed no recurrence of pneumothorax or haemothorax.

DISCUSSION

This report demonstrates the potential danger imminent in the use of the 2ISMC as a site for chest drainage in pneumothorax. Data on the incidence of complications in spontaneous

pneumothorax, with respect to the site of chest drain insertion or removal, are limited. However, serious complications related to pleural drainage through the 2ISMC have been reported previously in patients with pneumothorax.² The most plausible explanation is injury of either the internal mammary artery and its branches or of the subclavian vessels that are in medial or anterior proximity to the 2ISMC.

In this case, initial chest radiographs showed pneumothorax with no air-fluid levels, which suggest that bleeding occurred at a time separate from the pneumothorax and from chest tube insertion. The complications of intercostal tube drainage can be life threatening, and are associated with inexperience and inappropriate application of sharp metal trocars during the procedure of insertion but not during catheter withdrawing. In our patient, haemothorax occurred but no metal instrument was used and no precipitating factor was present. Although it is impossible to prove directly that the haemorrhage was caused by chest tube removal, it is a clear possibility that bleeding was due to a tear of a vessel proximal to the 2ISMC during pig-tail catheter removal by a "grapple-hook" mechanism.

This is the first report that associates haemothorax with the removal of a pig-tail catheter used for pleural drainage. Despite the use of a small tube (8.5 F) and the appropriate application of the Seldinger technique for catheter insertion, the removal of the tube was associated with haemothorax in our case. Whether a pig-tail catheter in itself carries an additional risk of complications compared with other catheter types is questionable. Small-calibre chest drain systems have gained acceptance for the treatment of pneumothoraces,^{1 4} and, in this respect, pig-tail catheter insertion offers additional cosmetic advantages. However, this case demonstrates that serious complications are possible if the pig-tail catheter is inserted in the 2ISMC.

There is no consensus for the site where a chest tube should be placed in the case of primary pneumothorax. British Thoracic Society guidelines suggested an axillary approach, although no precise point is identified.⁴ The second intercostal space in the mid-clavicular line is recommended for tension pneumothorax management.⁴ The insertion of small chest tubes in the second or third intercostal space in the mid-clavicular line is considered to be quick and safe, and hence can also be performed in the emergency setting.¹ However, in respect of this case, we suggest that placement of pig-tail catheters in the 2ISMC should be avoided. The third intercostal space in the mid-clavicular line, or the fifth intercostal space in the anterior axillary line, can be alternative approaches that may provide a safer option for spontaneous pneumothoraces, as major vessels are avoided.

Abbreviations: 2ISMC, second intercostal space in the mid-clavicular line

Figure 1 Top: Chest radiography (A) before and (B) after pleural drainage by 8.5 F pig-tail catheter. Bottom: Chest radiography showing left-sided haemothorax (C) before and (D) after aspiration of 850 ml of blood from the pleural cavity.

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