Hemorrhagic Shock Due to Intercostal Artery Laceration after Thoracocentesis — A Case Report

Chang-Ke Chu, Chang-Wen Chen, Wu-Wei Lai*, Wei-Chieh Lin, Tzuen-Ren Hsiue

Thoracocentesis is a commonly employed diagnostic and therapeutic procedure in patients with pleural effusion. We encountered a patient in whom thoracocentesis resulted in hypovolemic shock due to a massive amount of intrathoracic bleeding. We review the literature and discuss the possible complications of thoracocentesis. *(Thorac Med 2005; 20: 648-651)*

Key words: hemothorax, shock, thoracocentesis

Introduction

Thoracocentesis is a well established diagnostic procedure for the evaluation of pleural effusions [1]. While pneumothorax and small amounts of bleeding are not uncommon, significant complications have been reported only rarely. Herein, we present a case of significant intrathoracic bleeding due to intercostal artery laceration after thoracocentesis.

Case Report

An 84-year-old female patient with a history of diabetes mellitus (DM), hypertension, and chronic renal insufficiency was admitted due to pneumonia. She was transferred to our respiratory care center 3 weeks later because of ventilator dependency. A follow-up chest X-ray revealed haziness on the right side (Figure 1). Pleural effusion was considered. A diagnostic thoracocentesis was performed in order to determine the cause of pleural effusion. We inserted an 18-gauge needle catheter at the right mid-axillary line just above the upper edge of the 9th rib. Fresh blood was aspirated at the first attempt. The chest tap was stopped after 2 additional trials.

Four hours later, the patient developed a

Fig. 1. Chest radiograph (AP view) revealing field haziness on the right side.
blood pressure drop with increasing shortness of breath. Physical examination revealed a decreased breathing sound in the right lung. Massive pleural effusion with a mediastinal shift was found on the emergency chest X-ray (Figure 2). Fluid resuscitation and chest tube insertion were then performed. An estimated 1000 ml of bloody fluid was drained. As hemothorax was suspected, the patient underwent emergency video-assisted thoracoscopic surgery. A lacerated right 8th intercostal artery with active bleeding was found. Immediately thereafter, a mini-thoracotomy was performed, and the bleeding stopped following ligation of the artery. The patient stabilized after the operation and was later transferred to a respiratory care ward for further care.

**Discussion**

Thoracocentesis is a non-thoracotomy invasive procedure that involves thrusting a trocar, a needle, or a cannula into the pleural space to remove accumulated fluid or air. Since it was first described in 1852 [2], thoracocentesis has been frequently performed by physicians at all levels of training.

The complications associated with thoracocentesis can be classified as major and minor. Pneumothorax, splenic laceration, sheared-off catheter, and hemothorax are the major complications. With the exception of pneumothorax, the major complication rate is usually less than 1%. On the other hand, up to 22% of patients may suffer from minor complications, such as pain, persistent cough, dry taps, subcutaneous hematoma, or subcutaneous seroma [3].

The reasons for intercostal artery laceration following thoracocentesis in our patient may be many. First, the age of our patient must be considered. Although the physician who performed the procedures attempted to insert the needle just over the superior surface of the rib horizontally, how accurately this had been achieved clearly is still open to question. Maureen and colleague have reported 2 elderly patients who suffered from intercostal artery laceration during thoracocentesis by a recommended method, but shock developed in 1 patient shortly after the procedure [4]. A retrospective analysis of 29 cases of intercostal angiography demonstrated that the intercostal arteries become increasingly tortuous with age. As tortuosity increases, the amount of space available for the safe insertion of a thoracocentesis needle decreases. This may be the reason why significant intrathoracic bleeding caused by intercostal artery laceration tends to occur in elderly patients, despite the fact that thoracocentesis had been performed in the recommended manner [4].

Second, the technique and the catheter we used might also have played a role. Donna and colleague have undertaken a prospective study to determine what role the technique plays in complications associated with thoracocentesis [5]. The sonography-guided procedure was associated with significantly fewer complications.
(20-gauge needle, 0 of 19) than the needle-catheter (14-gauge needle with 16-gauge catheter, 9 of 18; \( p = .0003 \)) or needle-only method (20-gauge needle, 5 of 15; \( p = .01 \)). The explanation for the safety of the sonography-guided procedure is intuitively obvious, as the exact location as well as the depth of the fluid can be seen by the sonography while thoracocentesis is being performed. The size of the catheter may also be a contributing factor, as the complication rate associated with the needle-catheter system was higher than that of the needle-only method, although this was not statistically significant [5].

As thoracocentesis using the sonography-guided needle (a 20-gauge, 1.5-in needle attached to a syringe) technique has proved to be the safest method, we recommend its application in elderly patients, especially those with risk factors for bleeding, such as chronic renal failure as in our case. The needle-catheter method should be used only for therapeutic reasons [5]. Furthermore, when the needle-only method results in a dry tap or inadequate fluid with complications, the procedure should be repeated under sonographic guidance [5].

References

肋膜積液穿放術引起之肋間動脈撕裂所造成的出血性休克
—病例報告

曲長科 陳昌文  賴吾為*  林偉傑  薛尊仁

對於肋膜積液的病人而言，肋膜積液穿放術是常用的診斷及治療方式。氣胸及少量的出血是常見的併發症，但嚴重的併發症卻鮮少報告。我們遇到一位病人在穿放術後造成大量的胸內出血。我們回顧文獻並探討肋膜積液穿放術所可能造成的併發症。(胸腔醫學 2005; 20: 648-651)

關鍵詞：血胸，休克，肋膜積液穿放術

*國立成功大學醫學院附設醫院外科部
索要抽印請聯絡：陳昌文醫師，成功大學醫學院內科部，台南市勝利路138號