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Case Report

Control of bleeding from intercostal artery laceration

Bruce F. Sabath^{*}, Julie Lin, Moiz Salahuddin, Horiana Grosu

Department of Pulmonary Medicine, The University of Texas M.D. Anderson Cancer Center, Houston, TX, USA

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ABSTRACT

Laceration of an intercostal artery is a rare but potentially catastrophic complication of pleural procedures such as thoracentesis. Recognition of this problem often occurs late in the bleeding process, only after hemodynamic decompensation has occurred. Aggressive and emergent measures are usually undertaken such as angiographic embolization or thoracotomy. In our review of the literature, manual pressure over the pleural space is not described as an intervention in case reports or case series. We demonstrate the first video proof of the immediate success of direct pressure over an intercostal site as a simple, rapid, and effective method for definitively stopping intercostal arterial hemorrhage after a pleural procedure.

1. Case report

A 68-year old man with metastatic prostate cancer presented to our interventional pulmonology clinic with a right pleural effusion. He was diagnosed with prostate cancer several years earlier and was presently on systemic therapy with clinical and radiographic control of his disease. However, his prostate specific antigen level had been rising steadily without any other apparent site of recurrence.

Thoracentesis demonstrated an exudative pleural effusion with no malignant cells. Given continued suspicion for malignant pleural involvement, he then underwent medical thoracoscopy for inspection of the pleura and pleural biopsies. In order to minimize post-operative pain, an intercostal nerve block was performed under direct visual guidance. An entry site was anesthetized with 1% lidocaine and the chest cavity entered after blunt dissection as per our usual practice. A trocar was placed and a rigid thoracoscope was inserted, allowing for direct vision of the intercostal block at the posterior axillary line at the same intercostal space as well as one space above and one space below.

During injection of the local anesthetic, pulsatile bright red blood was seen jetting into the pleural space from the nerve block needle puncture site, demonstrating that an intercostal artery had been lacerated. The needle was immediately removed and external pressure was placed at the needle penetration site. Bleeding immediately ceased ([video](#)). When external pressure was released, bleeding resumed instantly. Firm external pressure was again applied and held for several minutes after which the injury site clotted and no further tamponade was needed. The procedure was resumed, multiple parietal pleural biopsies were obtained, and an indwelling pleural catheter was placed. No further bleeding from the needle site was observed throughout the remainder of the thoracoscopy and no further interventions were needed. In followup, the patient only drained clear yellow fluid from his pleural catheter without any blood.

^{*} Corresponding author. Department of Pulmonary Medicine University of Texas M.D. Anderson Cancer Center 1515 Holcombe Boulevard Houston, Texas, 77030, USA.

E-mail address: bsabath@mdanderson.org (B.F. Sabath).

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2. Discussion

Laceration of an intercostal artery is a rare but potentially catastrophic complication of pleural procedures [1,2]. Recognition of this problem often occurs late in the bleeding process, only after hemodynamic decompensation has occurred. In our review of the literature, aggressive and emergent measures are typically described, including angiographic embolization or thoracotomy. However, a much more simple and fast intervention is not applied in these case reports or case series [3–5]. We provide the first video proof that direct external manual pressure can be a rapid and effective method of definitively stopping intercostal arterial hemorrhage.

Intrapleural hemorrhage is an infrequent complication of pleural procedures. Studies have consistently demonstrated an incidence of less than 1% after thoracentesis or chest tube placement, even in patients deemed to be at increased bleeding risk for various reasons [6,7]. When bleeding does occur, however, the recognition of this is almost always delayed. Post-procedural chest X-ray is typically done immediately after the procedure to rule out pneumothorax, but this may not allow sufficient time for fluid to accumulate to an appreciable degree. If some blood has accumulated and is seen in the pleural space, this may be erroneously assumed to be residual pleural fluid rather than frank blood. As a result, intrapleural hemorrhage may not be recognized until sufficient bleeding has occurred to be clinically apparent, such as in the form of hemodynamic compromise. At that point, blood loss will have been significant and interventions will need to be emergent and life-saving.

Typical interventions in such acute settings include emergent angiographic embolization and/or thoracotomy with arterial ligation. Such procedures take time to setup and transportation of the patient during which further blood loss and hypoperfusion occur. External pressure is the usual method of preventing arterial bleeds after removal of arterial catheters (e.g. from the radial or femoral artery) but this intervention has not been described in case reports or case series of intercostal artery hemorrhage [3–5]. Of course, the effectiveness of this maneuver depends on counterpressure on the other side of the artery. The intercostal space is a firm space typically composed of three layers of muscle (the external, internal, and innermost intercostal muscles), an intercostal membrane, and endothoracic fascia. Intercostal arteries course embedded with these structures (more specifically, the latter two) and, thus, are in a location where sufficient external pressure should be able to occlude an artery and stop any bleeding until clotting can occur.

We demonstrate here the first visual evidence of the successful use of external manual pressure to definitively stop a potentially serious intrapleural bleed from a lacerated intercostal artery without the need for surgery or embolization.

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Declaration of competing interest

None by any author.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.rmcr.2022.101783>.

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