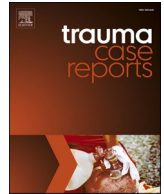




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Case Report

Management of massive hemothorax due to internal mammary pseudoaneurysm treated with angioembolization post-cesarean section involving traumatic fetal extraction: A case report

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ABSTRACT

Introduction: Pseudoaneurysm, or false aneurysm, is a clinical entity caused by rupture of the arterial wall, leading to blood leakage that is confined by surrounding tissue. Massive hemothorax constitutes a life-threatening condition demanding timely and accurate medical response.

Case report: A puerperal presented with a massive hemothorax precipitated by a traumatic cesarean section due to hemorrhage from a pseudoaneurysm of the left internal thoracic artery. Initial treatment involved a sternotomy, followed by a conclusive therapy via angioembolization.

Conclusion: Precise assessment, including the measurement and localization of the ITA pseudoaneurysm is crucial to formulate an appropriate therapeutic strategy. Current medical practice favors endovascular embolization as a reliable and minimally invasive alternative to open surgery, establishing it as the treatment of choice.

Introduction

Aneurysms and pseudoaneurysms of the internal thoracic artery (ITA) are infrequent occurrences. Etiologies include non-iatrogenic factors such as vasculitis, exemplified by Kawasaki disease [4], polyarteritis nodosa and systemic lupus erythematosus. Additionally, connective tissue disorders like Marfan syndrome [5] and Ehlers-Danlos syndrome [6], neurofibromatosis type 1 [7], fibromuscular dysplasia [8], atherosclerosis and infections of the chest wall infections (e.g., tuberculosis, actinomycosis or *Staphylococcus* spp. [9,14]) have been implicated. Idiopathic origins, as well as traumatic/iatrogenic events such as penetrating injuries, sternotomies, percutaneous biopsies, deep subclavian venous access, and rarely, blunt trauma, are also recognized as causative. Given that vascular lesions rupture commonly results in hemothorax, the presence of such anomalies is associated with a significant mortality risk [3,5–7].

The present report delineates a case of a pseudoaneurysm rupture leading to massive hemothorax in a postpartum woman, following cesarean delivery wherein the Kristeller maneuver was employed for fetal extraction.

Case report

A previously healthy 24-year-old patient, presented emergently to our institution following transfer from a secondary facility for

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management of massive hemothorax, without an adequate response to chest drainage, performed six days postpartum. Allegedly during the cesarean delivery the Kristeller maneuver was employed for fetal extraction.

Upon arrival, the patient exhibited pronounced tachycardia, pallor, and diminished breath sounds in the left lung auscultation, accompanied by 500 ml of bloody effluent. Laboratory findings on admission were consistent with significant blood loss (Hemoglobin: 8.8g/dL). The CT scan disclosed a left retained hemothorax, of unknown etiology, associated with contralateral mediastinal shift (Fig. 1).

Subsequent to clinical stabilization, the surgical team proceeded with a sternotomy along with an incision through the mediastinal pleura. Intraoperative findings included a non-pulsatile, well-localized nodular mass beneath the clavicle on the left side, with absence of active bleeding. The pleural cavity was cleared of extensive clotting, yet the lesion was not directly intevened upon (Fig. 2). Postoperative course wa unremarkable with no evidence of recurrent hemorrhage.

Further radiologic assessment with CT angiography revealed a pseudoaneurysmal formation originating from the left internal thoracic artery (Fig. 3). Definitive treatment was accomplished through angioembolization, utilizing a combination of cyanoacrylate and lipiodol, delivered via radial access (Fig. 4).

Following the endovascular procedure, the patients recovery was unevenful, the patient evolved with no further instances of dyspnea, chest pain or bleeding reported. The patient was discharged following an eleven-day hospitalization. Post-treatment monitoring was limited to a single asymptomatic visit, with no subsequent data acquired related to potential syndromic conditions due to loss of patient follow-up.

Discussion

The internal thoracic artery (ITA) is a relatively large artery with an average flow of 60 ml/min [10], which, under different conditions, can increase to up to 175 ml/min [11,12]. Therefore, its injury can cause anything from intense bleeding to death of the patient.

Internal thoracic artery pseudoaneurysms are extremely rare and frequently caused by trauma. Procedures such as sternotomy [13], as well as diagnostic or therapeutic vascular interventions and penetrating trauma are identified as precipitating events [14]. The effect of sustained blood pressure can lead to the dissection of the damaged segmet of the artery, resulting in the formation of a saccular dilatation that remains in communication with the arterial lumen. Vessels subjected tot trauma of any nature are prone to pseudoaneurysms development, with TIA being no exception.

Accurate delineation of the size and location of the ITA pseudoaneurysm is critical for planning the appropriate therapeutic approach. Among the various non-invasive imaging modalities, CT angiography stands as the modality of choice for diagnosis [15], while arteriography is typically reserved for endovascular intervention. Endovascular embolization has emerged as an efficient, effective and safe therapeutic alternative to conventional surgical repair and is currently the treatment of choice [15–17].

Instances of ITA injuries following blunt trauma are not thoroughly documented within contemporary literature. A review of existing studies indicates a predominant incidence of such injuries among males, with the left ITA being more commonly affected. Blunt trauma to the ITA can manifest as anterior mediastinal hematomas, hemothorax, pseudoaneurysms, arteriovenous fistulas and extra-pleural hematomas [18]. The most commonly associated blunt trauma with ITA injuries are motor vehicle accidents.

Conclusion

This singular case of an ITA pseudoaneurysm atributable to the Kristeller maneuver highlights how ITA injuries can result from mechanisms other than high energy traumas, such as car accidents. A heightened degree of clinical vigilance is imperative for early diagnosis. Endovascular embolization constitutes an efficient, effective and safe therapeutic alternative to classic surgical intervention



Fig. 1. CT scan shows a massive left hemothorax in the axial plane. The inserted chest tube is visible (arrow).

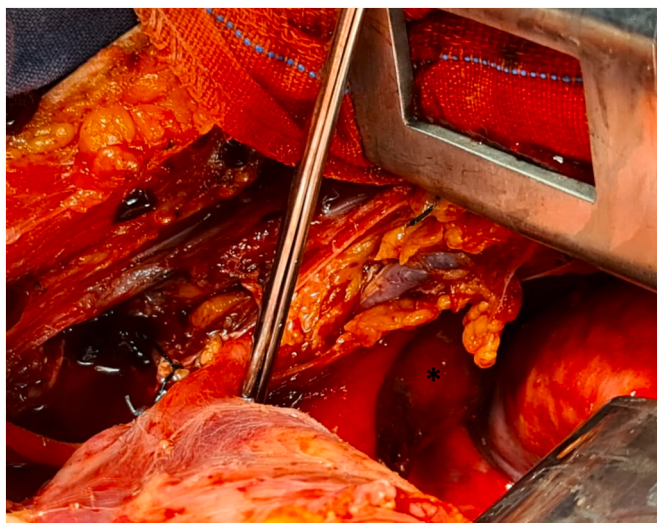


Fig. 2. Left infraclavicular nodular formation (asterisk) was observed.

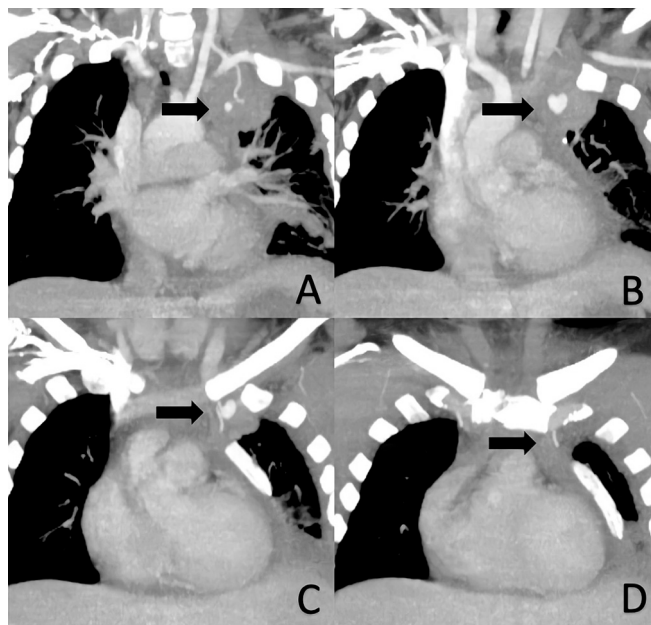


Fig. 3. Enhanced sagittal CT scan images. Enhanced left infraclavicular pseudoaneurysm of internal thoracic artery is identified (arrows).

and has, thus far, become the preferred treatment modality.

CRediT authorship contribution statement

Bruna Mohr Franciosi: Methodology, Project administration, Writing – original draft, Writing – review & editing. **Eduardo Zanotta Rodrigues:** Methodology, Project administration, Writing – original draft, Writing – review & editing. **Israel Dumont Pedroso de Oliveira:** Methodology, Project administration, Writing – original draft, Writing – review & editing. **Maria Fernanda Oliva Detanico:** Methodology, Project administration, Writing – original draft, Writing – review & editing.

Declaration of competing interest

Bruna Mohr Franciosi: none.

Eduardo Zanotta Rodrigues: none.

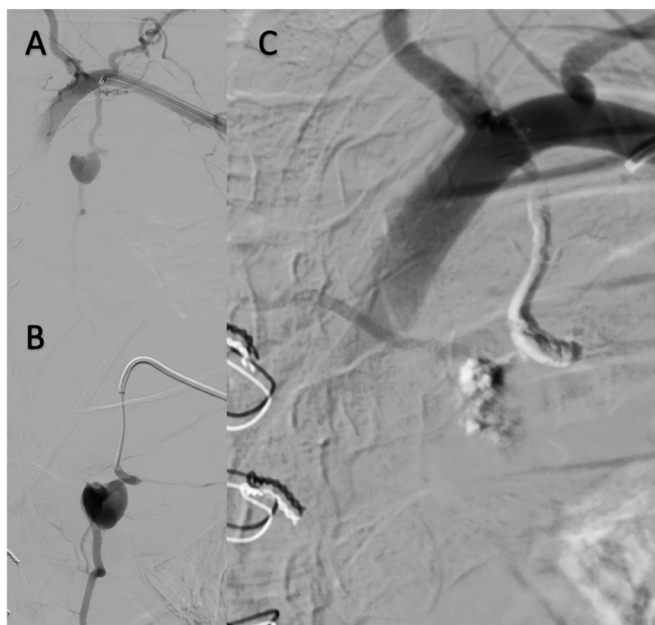


Fig. 4. Therapeutical angiography showing successful embolization.

Israel Dumondt Pedroso: none.

Maria Fernanda Oliva Detânico: none.

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