

## Stab Injury Causing Intercostal Artery Pseudo Aneurysm: A Rare Case Scenario

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### Abstract

**Background:** Intercostal artery pseudo aneurysm (ICPA) is a rare disease entity, with only a few cases reported so far in English literature. They form as a result penetrating thoracic trauma, infection or iatrogenic injury. ICPA can be asymptomatic or can present with massive hemothorax. **Case report:** An elderly man presented with hemothorax following stab injury, he was managed with intercostal tube drainage (ICTD) and discharged in satisfactory condition, only to return with recurrent hemorrhage from ICTD site two weeks after discharge. We excised the aneurysm and removed the clots from thoracic cavity via posteriolateral thoracotomy. **Conclusion:** Due to their rarity ICPA can be misdiagnosed and patient might present late. Our case highlights the importance of keeping high index of suspicion in patients of stab injury to chest presenting with recurrent hemothorax.

**Keyword:** Intercostal Artery Pseudo Aneurysm; Intercostals Artery Aneurysm; Thoracocentesis.

### Introduction

Intercostal artery pseudo aneurysm (ICPA) is a rare disease entity, with only a few cases reported so far in English literature. Patients with true intercostal artery aneurysm usually have underlying disease processes like coarctation of the aorta, neurofibromatosis, or Kawasaki disease. A patient with more than one true intercostal artery aneurysm (ICA) in the absence of genetic diseases has not been reported [1].

Aneurysms encountered after thoracic operations, thoracocentesis, trauma or infection are usually Intercostal artery Pseudo aneurysms (ICPA) [2]. These pseudoaneurysm can be asymptomatic or can present with massive hemothorax due to spontaneous rupture of fragile pseudoaneurysmal tissues [3].

Although historically surgical intervention used to be the only option, with the advances in interventional radiology, percutaneous techniques have become the preferred modality of treatment for

this type of disease especially for hemodynamically unstable patients or those with severe comorbidities [4].

However, still thoracotomy may be needed in few cases to evacuate blood clots and infective material from thoracic cavity [5].

We present a case report of elderly man who presented with hemothorax following multiple stab injury to thorax, he was managed with intercostal tube drainage (ICTD) and discharged in satisfactory condition, only to return with recurrent hemorrhage from ICTD site. His Contrast Enhanced Computed Tomography thorax (CECT) revealed intercostal artery pseudo aneurysm (ICPA) arising from right 10<sup>th</sup> posterior intercostal artery.

Since, Our centre has no catheter based intervention facility we operated upon him and excised the aneurysm and removed the clots from thoracic cavity. Our case highlights the importance of keeping high index of suspicion in patients of stab injury to chest presenting with recurrent hemothorax late after injury.

### Case Report

A 55 year male patient presented in emergency department with history of active bleeding from multiple stab injuries right chest sustained with a sharp object (Figure 1), after evaluation he was found to have hemothorax and was managed with intercostal tube drainage (ICTD) in right 6<sup>th</sup> intercostal space. He progressed well and was discharged with expanded lung on 6<sup>th</sup> day. He presented after a week with recurrent bleeding from ICTD site. His Chest X Ray showed blunting of right costophrenic angle and blood investigations revealed anemia. He underwent CECT chest which revealed multiple fractures of 9<sup>th</sup>-12<sup>th</sup> rib right side with hemothorax with pseudo aneurysm of right posterior 10<sup>th</sup> intercostal artery communicating with pleural cavity (Figure 2). On the night before surgery he collapsed with massive bleeding from ICTD site and was immediately shifted to operation theatre. Right hemithorax was full of clots and active bleeding was present from 10<sup>th</sup> intercostal artery with multiple points of ooze from 6<sup>th</sup> to 10<sup>th</sup> intercostal spaces. Aneurysm was resected along with limited portion of 9<sup>th</sup>, 10<sup>th</sup> and 11<sup>th</sup> ribs (Figure 3). The patient progressed well and was extubated on 1<sup>st</sup> post operative day and all his inotropes were stopped on 2<sup>nd</sup> Post Operative day. Patient was discharged in satisfactory condition on 10<sup>th</sup> post operative day .



Fig. 1: Sharp object used to break ice

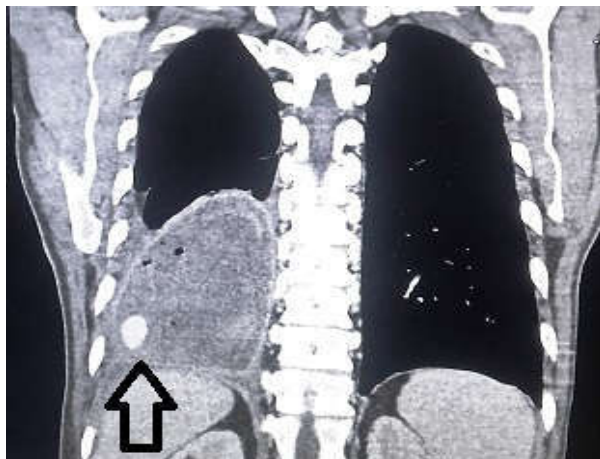


Fig. 2: CECT showing aneurysm arising from intercostal artery with right hemothorax



Fig. 3: Excised Psuedo aneurysm arising from intercostals artery

### Discussion

Intercostal artery pseudo aneurysm is a rarely encountered disease entity. Intercostal artery aneurysms are of two types - true and pseudo aneurysms. Pseudo aneurysms (ICPA) form as a result of thoracic trauma, infection or iatrogenic injury [2]. Recently an ICPA secondary to corrosive acid poisoning has been reported [6]. ICPA can be asymptomatic or can present with delayed hemothorax two to four weeks after trauma or surgical procedures [3,7]. Our patient also had a delayed presentation with recurrent bleeding from ICTD site. ICPA are also at high risk for early rupture because of fragile nature of aneurysmal tissues, hence early diagnosis and prompt management before rupture is important to prevent sudden death [5].

Computed tomography, digital subtraction angiography and magnetic resonance angiography can be used to study the anatomic details of aneurysm and plan the management accordingly. In patients with traumatic lesions and hemorrhagic pleural effusion, who may have multiple bleeding sources contrast-enhanced CT (CECT) is a valuable diagnostic tool. Classical angiography alone would be too time consuming in patients with unclear diagnosis, however it has advantage of doing intervention in the same setting [4]. Magnetic resonance angiography again is time consuming which becomes detrimental for hemodynamically unstable patients. In patients with iatrogenic lesions, CT is usually not necessary, because the bleeding source is obvious, in most of these patients chest x-ray or ultrasound is sufficient [6].

There are mainly two options for managing aneurysm – open surgery and percutaneous interventions. With advance in catheter based techniques, it has become the procedure of choice especially in patients with comorbidity, hemodynamically unstable and polytrauma patients. There are several percutaneous techniques available like coil embolization, glue embolization and thrombin injection [4].

The choice of embolic material in vascular interventional procedures depends on anatomy, pathology, flow characteristics and personal preference of the interventional radiologist [6]. Gelfoam cubes have been successfully used to embolize intercostals arteries[3]. n-butyl cyanoacrylate (NBCA) has been successfully used for embolization of pseudo aneurysm which are difficult to control by coil embolization alone [8].

Covered coronary stents have also been used to manage intercostal artery pseudoaneurysm [9].

Percutaneous interventions are not without complications as spinal cord ischemia related to embolization of ICAs and has been reported by several authors [10].

Surgical treatment is usually reserved for failed embolisation or where embolisation could not be accomplished [1]. Conservative management of asymptomatic cases has also been described and surgical intervention is usually advocated for aneurysms >1cm in diameter [7]. Surgical repair is complex and challenging because of arterial fragility, and it involves clipping, excision, and/ or ligation of aneurysms. At times, operation can also be used as complementary therapy to remove blood clots and infected material from thoracic cavity to help in lung expansion [5].

## Conclusion

Intercostal artery pseudo aneurysm(ICPA) is a very rare condition and it is of significance due to risk of early rupture leading to massive hemorrhage and sudden death. Percutaneous intervention is the first therapeutic option now everdays, however in few cases open surgery is required to save life and remove infected material from thoracic cavity .

## References

1. Carr JA, Vadlamudi Venu, and Azher Qazi S.. Intercostal Artery Aneurysm. *The Annals of Thoracic Surgery*. 2013 Nov;96(5):1870-1873.
2. Sekino S, Takagi H, Kubota H, Kato T, Matsuno Y, Umemoto T. Intercostal artery pseudoaneurysm due to stab wound. *J Vasc Surg* 2005;42:352-6.
3. Wen-Yu Yu, Chung-Pang Wang, Kim-Choy Ng, Wei-Kung Chen, Iuan-Hong Tzeng. Successful embolization of a ruptured intercostal artery after violent coughing. *The American Journal of Emergency Medicine*, 2006 March;24(2):247-249.
4. Chemelli AP, Thauerer M, Wiedermann F, Strasak A, Klocker J, Chemelli-Steingruber IE. Transcatheter arterial embolization for the management of iatrogenic and blunt traumatic intercostal artery injuries. *J Vasc Surg*. 2009;49:1505-13.
5. Dominguez J., Sancho C., Escalante E., Morera J. R., Moya J. A., Bernat R. Percutaneous treatment of a ruptured intercostal aneurysm presenting as massive hemothorax in a patient with type I neurofibromatosis. *J Thorac Cardiovasc Surg* 2002;124:1230-2.
6. Chalapathi Rao M, Rathi AA, Reddy SP, Sahu S. Intercostal artery pseudoaneurysm complicating corrosive acid poisoning: Diagnosis with CT and treatment with transarterial embolisation. *The Indian Journal of Radiology & Imaging*. 2014;24(2): 135-138. doi:10.4103/0971-3026.134397.
7. Bluebond-Langner R, Pinto PA, Kim FJ, Hsu T, Jarrett TW. Recurrent bleeding from intercostal arterial pseudoaneurysm after retroperitoneal laparoscopic radical nephrectomy. *Urology* 2002;60:1111.
8. Yamakado K, Nakatsuka A, Tanaka N, Takano K, Matsumura K, Takeda K. Transcatheter arterial embolization of ruptured pseudoaneurysms with coils and n-butyl cyanoacrylate. *J Vasc Interv Radiol*. 2000 Jan;11(1):66-72. PubMed PMID: 10693716.
9. Callaway MP, Wilde P, Angelini G. Treatment of a false aneurysm of an intercostal artery using a covered intracoronary stent-graft and a radial artery puncture. *Br J Radiol*. 2000 Dec;73(876):1317-9. PubMed PMID: 11205677.
10. Finstein JL, Chin KR, Alvandi F, Lackman RD. Postembolization paralysis in a man with a thoracolumbar giant cell tumor. *Clin Orthop Relat Res* 2006;453:335-40.