


# Late Concomitant Pseudoaneurysm and Arteriovenous Fistula of the Subclavian Artery: A Developing Country Perspective

Vascular and Endovascular Surgery  
44(6) 503-505  
© The Author(s) 2010  
Reprints and permission:  
sagepub.com/journalsPermissions.nav  
DOI: 10.1177/1538574410372147  
http://ves.sagepub.com  


Saulat Hasnain Fatimi, MBBS<sup>1</sup>, Ranish Deedar-Ali-Khawaja, MBBS Year III<sup>2</sup>,  
Samiullah Khan Niazi, MBBS<sup>1</sup>, and Zubair Luqman, MBBS, FCPS<sup>1</sup>

## Abstract

Concomitant subclavian artery pseudoaneurysm and arteriovenous (AV) fistula has been rarely reported. We report a case of late concomitant pseudoaneurysm and AV fistula of the subclavian artery caused by a gunshot wound. Open surgical approach with an infraclavicular approach was used; subclavian artery was repaired with a Gortex interposition graft and subclavian vein was ligated. The postoperative course was uneventful. In developing countries, where the endovascular expertise is unavailable or if the lesion is large, open surgical approach provides similar results as an endovascular approach.

## Keywords

pseudoaneurysm, arteriovenous fistula, subclavian artery, open surgical approach, infraclavicular approach

## Introduction

Subclavian artery pseudoaneurysm is a rare clinical entity and a concomitant arteriovenous (AV) fistula has been rarely reported.<sup>1</sup> They are mostly caused by penetrating trauma. There have been few case reports that mentioned its repair by endovascular technique. We present a case of subclavian artery pseudoaneurysm with AV fistula caused by gunshot injury in a young female, which was managed successfully by open surgical approach.

## Case Report

We present a case of 25-year-old female executive who presented with gunshot wound to the upper right chest. At the time of presentation, she was vitally stable with a single entry wound on the right side of chest along fourth intercostal space and exit wound along right upper scapular border. Her physical examination was unremarkable with equal bilateral upper extremity pulses. She, however, had decreased air entry on the right side. Chest x-ray showed hemothorax that was managed with tube thoracostomy. Patient was managed conservatively and she was discharged home in a stable condition. Six weeks after discharge, patient noticed a pulsatile swelling on the right upper chest with palpable thrill and paresthesia along the C8-T1 distribution. She was advised a computed tomography (CT) scan of chest (Figure 1), which showed a pseudoaneurysm arising from the right subclavian artery measuring 5.8 × 2.6 cm associated with marked disruption

of distal right subclavian vein, raising the possibility of traumatic AV fistula. She was planned for urgent surgical excision of pseudoaneurysm and fistula.

During surgery, a right infraclavicular incision was given. Pectoralis major was divided and a distal control of subclavian artery and vein was achieved (Figure 2). A large subclavian artery pseudoaneurysm was noted, which was adherent to cords of brachial plexus. Proximal control of the subclavian artery and vein were achieved without median sternotomy. Pseudoaneurysm was opened, excised, and proximal and distal end of right subclavian vein, which were opening into aneurysm and forming post-traumatic AV fistula, were ligated. The defect of artery was repaired with 5-mm ringed Gortex interposition graft, and defect of vein was repaired with a simple ligature. There were no preoperative or postoperative complications and patient was discharged home on fifth postoperative day. Patient has been doing well on follow-up visits.

<sup>1</sup> Section of Cardiothoracic Surgery, Department of Surgery, Aga Khan University Hospital, Karachi, Pakistan

<sup>2</sup> Medical College, Aga Khan University, Karachi, Pakistan

## Corresponding Author:

Saulat Hasnain Fatimi, A-602 Al-Aman Housing Society, Gulshan-I-Iqbal Plot: 14 Behind Aga Khan Hospital, 75300 Karachi, Pakistan  
Email: ali.ranish@gmail.com



**Figure 1.** Contrast-enhanced computed tomographic scan showing a well-circumscribed pseudoaneurysm (arrow) of the right subclavian artery measuring  $5.8 \times 2.6$  cm with homogenous enhancement.

## Discussion

Subclavian vessel injury is a rare and challenging entity. Most commonly, penetrating injuries such as gunshot injury or iatrogenic perforation during subclavian vessel cannulation are the causes of formation of AV fistula. Blunt injuries cause mostly aneurysm or pseudoaneurysm and are usually associated with musculoskeletal or brachial plexus injury.<sup>2</sup> Combined pseudoaneurysm and AV fistula of subclavian artery and vein and its surgical management has been rarely reported in literature.

Patients present with history of penetrating or blunt injury to clavicular region. They may remain asymptomatic for few weeks to months after initial trauma and then present due to its complications or increase in size. On examination, they have a pulsatile mass; they may have associated brachial plexus injury as in our case. Overall morbidity of such a case is usually restricted to brachial plexus injuries.<sup>3</sup> This condition needs active management because of possible complication arising from pseudoaneurysm such as life-threatening hemorrhage due to rupture, thromboembolism, and associated nerve compression. Ischemia is rare due to rich collateral circulation around shoulder.<sup>4</sup> Preoperative CT scan and angiography is helpful in planning an operative approach.

There have been few treatment options reported for pseudoaneurysm and AV fistulas such as external ultrasound compression (for femoral artery pseudoaneurysm), ultrasound guided thrombin injection, combination of coils and Onyx,<sup>5</sup> and transcatheter coil embolization.<sup>6</sup> Surgical management requires good exposure and proper proximal and distal control, which require supraclavicular incision with clavicular resection or median sternotomy combined with supraclavicular incision.

Recently, there have been few case reports that describe endovascular stent placement for separate lesion,<sup>7,8</sup> that is, either pseudoaneurysm or AV fistula of subclavian vessel; this approach seems to be very useful as it prevents the patient from unnecessary dissection and subsequent injury to surrounding important structures such as phrenic nerve, vagus nerve, recurrent laryngeal nerve, and innominate vein. We found only 1 case report suggesting successful endovascular management of combined lesion.<sup>4</sup> Where endovascular expertise is not readily available or the lesion is large, open surgical approach as described above is a useful approach to this rare entity.

## Conclusion

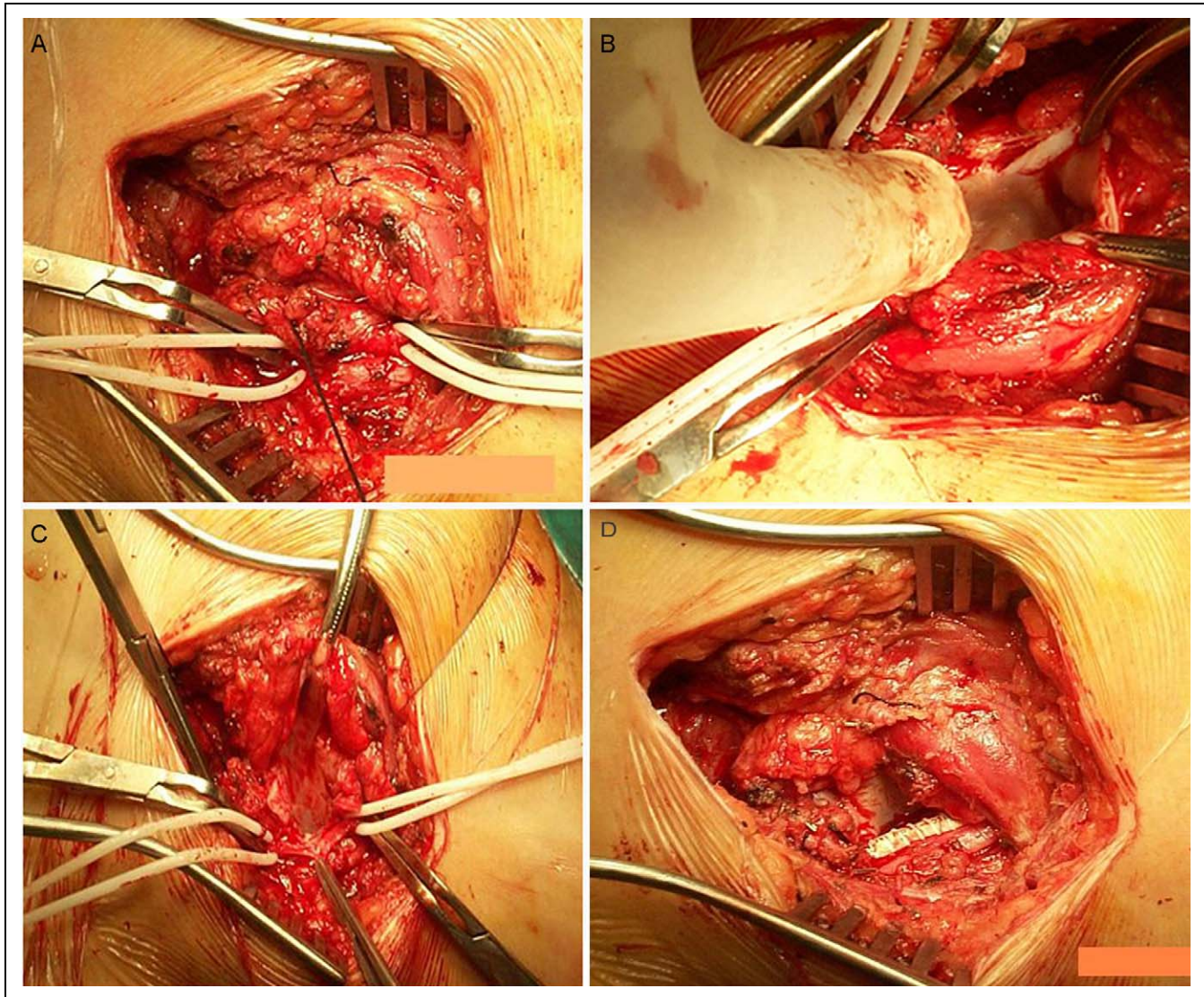
Late concomitant pseudoaneurysm and AV fistula of subclavian artery is a rare clinical scenario. Complicated local anatomy, difficult exposure of proximal mediastinal vessels, and restricted clinical experience pose a significant surgical challenge. In developing countries, where the endovascular expertise is unavailable or if the lesion is large, open surgical approach provides similar results as an endovascular approach.

## Declaration of Conflicting Interests

The author(s) declared no conflicts of interest with respect to the authorship and/or publication of this article.

## Funding

The author(s) received no financial support for the research and/or authorship of this article.



**Figure 2.** Open surgical approach through right infraclavicular incision. Subclavian artery pseudoaneurysm was noted adherent to cords of the brachial plexus.

## References

1. Tabata S, Saito H, Takizawa M, Imagawa T. Atherosclerotic aneurysm of the right subclavian artery: report of a case. *Ann Thorac Cardiovasc Surg.* 2007;13(2):139-142.
2. Bechini J, Cuadras P, Tenesa M, Lisbona C, Casas D, Olazabal A. Chronic traumatic pseudoaneurysm of right subclavian artery. *Eur Radiol.* 1998;8(1):63-65.
3. Vines FY, Sperling DC. Endovascular treatment of a combined pseudoaneurysm and arteriovenous fistula of the subclavian artery caused by a gunshot wound to the chest. *J Thorac Cardiovasc Surg.* 2005;130(1):225-227.
4. Renger RJ, de Bruijn AJ, Aarts HC, van der Hem LG. Endovascular treatment of a pseudoaneurysm of the subclavian artery. *J Trauma.* 2003;55(5):969-971.
5. Babatasi G, Massetti M, Le Page O, Theron J, Khayat A. Endovascular treatment of a traumatic subclavian artery aneurysm. *J Trauma.* 1998;44(3):545-547.
6. Karkos CD, Mair R, Markose G, Fishwick G, London NJ, Naylor AR. Hybrid procedures combining open and endovascular surgical techniques for the management of subclavian artery injuries. *J Trauma.* 2007;63(5):E107-E110.
7. Sobnach S, Nicol AJ, Nathire H, Edu S, Kahn D, Navsaria PH. An analysis of 50 surgically managed penetrating subclavian artery injuries. *Eur J Vasc Endovasc Surg.* 2010;39(2):155-159.
8. Amiridze N, Trivedi Y, Dalal K. Endovascular repair of subclavian artery complex pseudoaneurysm and arteriovenous fistula with coils and Onyx. *J Vasc Surg.* 2009;50(2):420-423.