

ORIGINAL RESEARCH**Pseudoaneurysm Arising from Branch of Subclavian Artery- A Rare Entity****Srivenkatapratap¹, Preeth Pany², Dilip S Phansalkar³**

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ABSTRACT

Background:Subclavian artery vascular lesions are rare and can present with catastrophic complications. Pseudo aneurysms can develop in subclavian artery and represent less than 5% of all vascular lesions. They are usually seen secondary to trauma or iatrogenic procedures. We present a rare case of pseudo aneurysm arising from branch of subclavian artery with imaging findings and followed by intervention. A 47 year old female came with complaints of swelling in the right supraclavicular region for 3 months which was gradual in onset and associated with mild pain there is no history of significant trauma or recent invasive procedures and No significant surgical history, No co-morbidities present. Ultrasound of the neck done elsewhere showed a well-defined heterogenous vascular lesion in the right supraclavicular region showing arterial wave form on colour Doppler and CT angiography was suggested for further evaluation and patient referred to radiology department. Management options include both surgical and less invasive procedures. Surgical procedure remains a challenge and generally requires either a sternotomy or supraclavicular / infraclavicular approach and Risk of significant blood loss and injuries to adjacent neurovascular structures can occur. Various methods of endovascular treatment includes coil placement, covered stents, injection of Polyvinyl alcohol particles, gel foam and endoluminal thrombin injection. Pseudoaneurysm is a important vascular abnormality to be recognised by imaging and Potential complications carry high morbidity and mortality rates. Early diagnosis and intervention can prevent potential complications and Endovascular management offers a safe and effective option with faster recovery.

Keywords: Subclavian artery, Pseudoaneurysms, CT angiography, CT angiogram.

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INTRODUCTION

Subclavian artery aneurysm is an extremely rare disease that develops in < 1% of all aneurysms. Previously, true aneurysm caused by atherosclerosis or thoracic outlet syndrome was the main cause, but recently, traumatic aneurysm has been the most common cause.^[1,2] Surgical treatment has been established as the standard treatment for subclavian aneurysm, but currently, less invasive endovascular repair has replaced surgical repair.^[3] However, caution should be taken as many collateral vessels and the highly mobile subclavian artery can cause endoleak. Herein, we present a case of surgical treatment for a type II endoleak that occurred after endovascular repair.

Pseudoaneurysm develops when there is a lack of integral arterial wall structure, resulting in blood leakage through the wall, and then wrapped by perivascular tissue. Subclavian artery pseudoaneurysm (SAP) is rare, and the reported incidence is about 12%. Subclavian artery vascular lesions are rare and can present with catastrophic complications. Pseudoaneurysms can develop in subclavian artery and represent less than 5% of all vascular lesions. They are usually seen secondary to trauma or iatrogenic procedures. We present a rare case of pseudoaneurysm arising from branch of subclavian artery with imaging findings and followed by intervention. In this case report, the traditional therapeutic method, but it is sometimes difficult to expose the SAP completely, and the risk of nerve injury and massive hemorrhage is high because of the complex anatomical conditions of the subclavian artery. In recent years, endovascular treatment of SAP has been recommended by many experts due to its advantages such as less invasiveness and lower complication rate. At present, reports on endovascular treatment of SAP are mostly case reports and case series. As supplementary data, we present our study of 8 patients with SAP treated in our hospital, and to evaluate the safety and efficacy of the endovascular treatment of SAP.^[4]

CASE REPORT

A 47 year old female came with complaints of swelling in the right supraclavicular region for 3 months which was gradual in onset and associated with mild pain there is no history of significant trauma or recent invasive procedures and No significant surgical history, No comorbidities present Ultrasound of the neck done elsewhere showed a well defined heterogenous vascular lesion in the right supraclavicular region showing arterial wave form on colour Doppler and CT angiography was suggested for further evaluation and patient referred to radiology department.

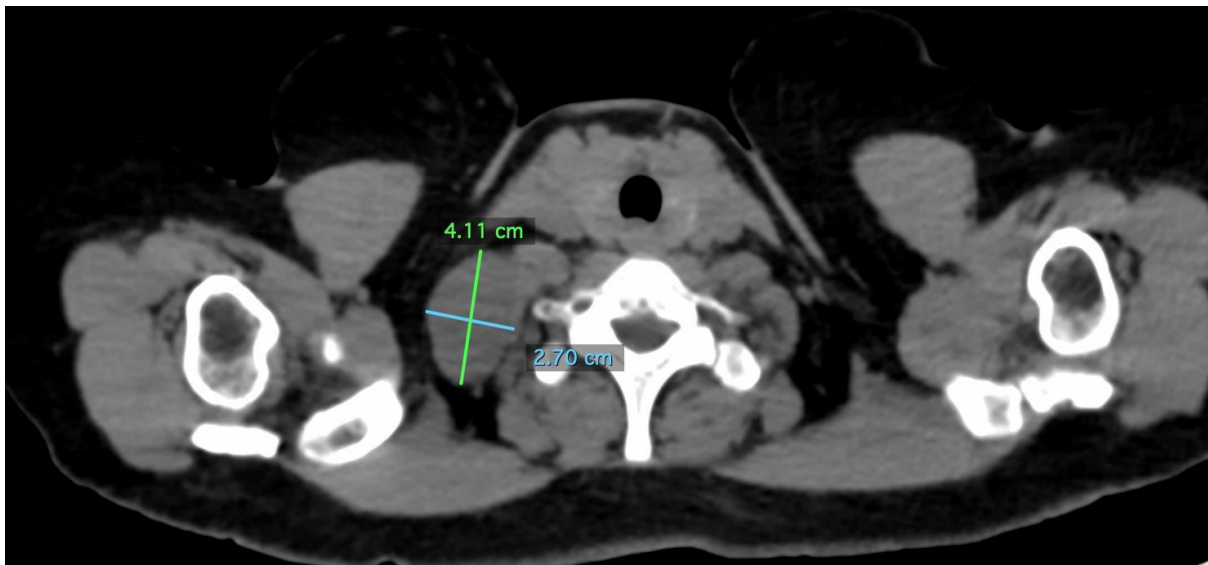


Figure 1: CT ANGIOGRAPHY - Plain CT axial image shows a well defined smoothly margined heterogenous density lesion in right supraclavicular region lateral to right middle scalene muscle.



Figure 2: CT ANGIOGRAM - Arteriogram axial section: The lesion shows few areas of enhancement similar to artery and non-enhancing areas (suggestive of thrombus)



Figure 3: Arteriogram coronal section: The lesion is seen communicating with an artery (likely common trunk of suprascapular and dorsal scapular artery) arising from third part of subclavian artery.

Diagnosis

Final diagnosis- Partially thrombosed pseudoaneurysm arising from branch of third part of right subclavian artery.

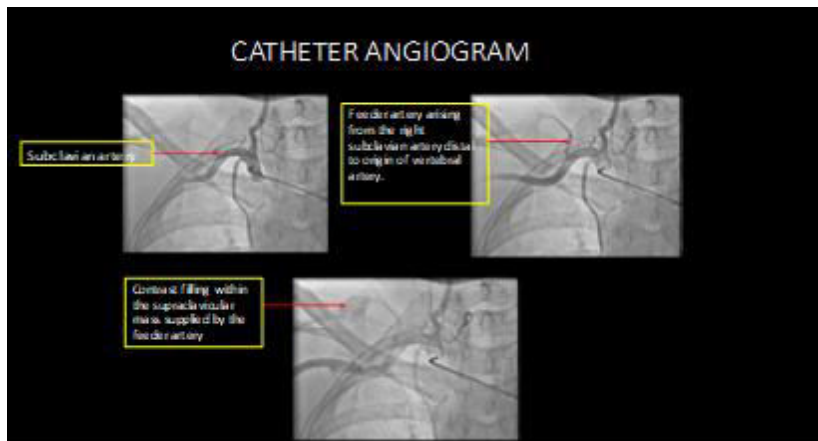


Figure 4: Catheter Angiogram

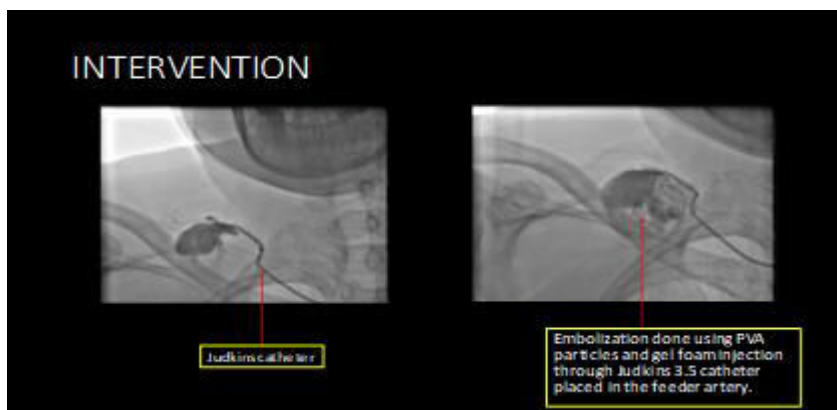


Figure 5: Intervention

DISCUSSION

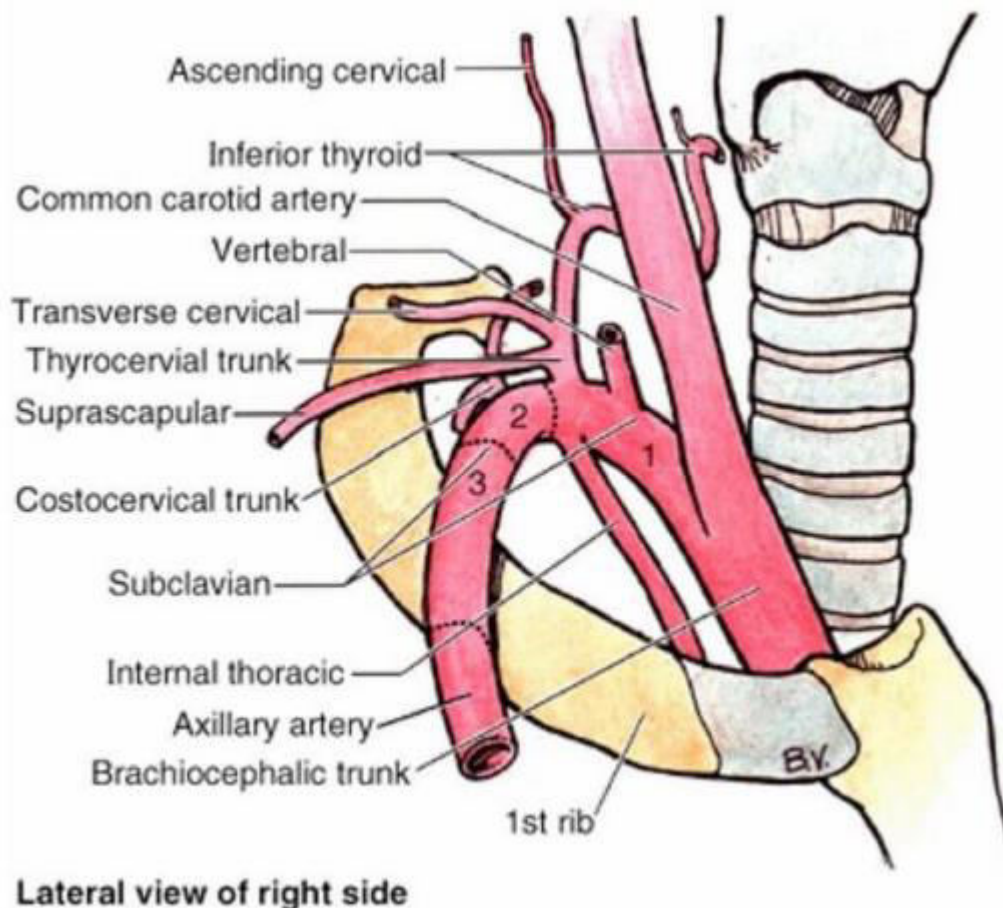


Figure 6: Subclavian artery

A pseudoaneurysm is a false aneurysm caused by damage to arterial wall, resulting in locally contained hematoma. Unlike a true aneurysm, a pseudoaneurysm does not contain any layer of vessel wall and the most common site of pseudoaneurysm is common femoral artery. Majority are secondary to arterial catheterisation, infections and surgical procedures.

Subclavian artery pseudoaneurysm is rare with reported incidence about 1-2% among pseudoaneurysms. Pseudoaneurysm arising from a branch of subclavian artery is very rare with only few case reports in literature and Patients can be asymptomatic or have milder symptoms.

The subclavian artery is divided into proximal, middle, distal parts, according to its anatomical location. The proximal part is from its origin to the medial border of the anterior scalene muscle. At this site, the VA originates from the superior surface of the subclavian artery, the internal thoracic artery from its inferior surface, and the thyrocervical trunk from its anterior surface. The distal part is from the lateral border of the anterior scalene muscle to the lateral border of the first rib. The middle part is located between these two parts and at the dorsal part of the anterior scalene muscle. The usual branches of the subclavian on both sides of the body are the vertebral artery, the internal thoracic artery, the thyrocervical trunk, the costocervical trunk and the dorsal scapular artery, which may branch off the transverse cervical artery, which is a branch of the thyrocervical trunk.

There are different causes of aneurysm in the subclavian artery depending on the site. Atherosclerosis is the most common cause of aneurysm in the proximal part, collagen disorders in the middle part, and thoracic outlet syndrome in the distal part. However, trauma is the most

common cause of all aneurysms regardless of the site due to the increasing number of percutaneous catheterizations recently.^[5] Even so, subclavian artery aneurysm is a rare disease with an extremely low incidence. Symptoms of subclavian artery aneurysm vary depending on its location and size. In some cases, it is found by chance without symptoms or as a simple palpable mass on the neck. Local compression may cause dysphagia, hoarseness, or Horner's syndrome. It can also cause ischemia of the arm or cerebral infarction due to embolism caused by internal thrombus. If proper treatment is not provided, rupture can occur. Although there are no clear guidelines for treatment, it is an indication for treatment if the patient has symptoms or a high risk for rupture or thromboembolism.

Subclavian artery aneurysm was traditionally treated surgically, but the part of the clavicle or sternum needs to be resected according to the location of the aneurysm. Moreover, in the process of manipulating the subclavian artery, injury to adjacent vessels or brachial plexus may occur. Recently, with the development of endovascular techniques, the use of less invasive stent-graft insertion has gradually increased. However, the subclavian artery has a risk of endoleak due to several branch vessels originating from each anatomical part. Furthermore, since the subclavian artery has several movements and passes through the first rib, stent kinking or fracture may occur.^[6-8]

Endoleak is an important complication of endovascular repair that requires additional intervention. Although intraoperative endoleak occurred in 6.1% of cases in a systematic review, the exact prevalence of endoleak for subclavian artery aneurysm is unknown. Moreover, since type II endoleak is often detected during follow-up, the actual incidence of endoleak is estimated to be higher. The reason for the many endoleaks is thought to be that the subclavian artery has several movements and the upper limb arteries are rich in the collaterals. However, type II endoleak can also occur because of the surrounding small arteries, even if the branches of the subclavian artery are well managed. Therefore, periodic follow-up is essential because type II endoleaks may subsequently develop because of newly grown small vessels around the aneurysm. In our case, the patient voluntarily avoided follow-up after endovascular repair, resulting in an enlarged aneurysmal sac by the surrounding small arteries. When the size of the aneurysmal sac gradually increases due to type II endoleaks, symptoms due to the mass effect are mainly present. Therefore, surgical removal of the aneurysm is helpful, rather than treatment of the endoleak through additional endovascular repair. However, in some cases, endovascular repair may be helpful in repairing the remaining fistula after surgery.

Complications – Rupture leading to haemorrhage, thrombosis, compression of neighbouring neurovascular structures and overlying skin necrosis.

CT angiography has advantages over other imaging modalities including US and MR imaging. It is less operator dependent and has shorter acquisition time and Gives additional information like associated injuries and other disease entities. Conventional angiography remains main standard of reference for diagnosis of pseudoaneurysm with real time hemodynamic assessment of vascular bed.

Management options include both surgical and less invasive procedures. Surgical procedure remains a challenge and generally requires either a sternotomy or supraclavicular/infraclavicular approach and Risk of significant blood loss and injuries to adjacent neurovascular structures can occur.

Less invasive procedures include US guided compression, US guided percutaneous thrombin injection and endovascular management. Endovascular management is safe and effective with fewer complications, shorter hospital stay and faster recovery. Various methods of endovascular treatment includes coil placement, covered stents, injection of Polyvinyl alcohol particles, gel foam and endoluminal thrombin injection.

Endovascular surgery is an innovative, less invasive procedure used to treat problems affecting the blood vessels, such as an aneurysm, which is a swelling or "ballooning" of the blood vessel. The surgery involves making a small incision near each hip to access the blood vessels. An endovascular graft, which is a special fabric tube device framed with stainless steel self-expanding stents, is inserted through the arteries in a catheter, a long, narrow flexible tube, and positioned inside the aorta. Once in place, the graft expands and seals off the aneurysm, preventing blood from flowing into the aneurysm. The graft remains in the aorta permanently.

Procedure:

Before the procedure begins, you will have either a sedative and regional anesthesia to make you more comfortable and numb the area of operation, or general anesthesia that will put you to sleep completely. The area of insertion will be cleaned and shaven to prevent infections. Your doctor will make a small incision around the hip, near the crease between the hip and thigh, to access your blood vessels. A guide wire is inserted through the incision and a pushed through a blood vessel to the aneurysm.

Special X-rays will be taken so your doctor can see the exact location of the aneurysm. At that point, he or she will insert a catheter — a long, flexible narrow tube – over the guide wire. The catheter is used to carry the graft through your blood vessels to the aorta above the aneurysm. Once in place, the graft is released from the catheter and expands, blocking the flow of blood to the aneurysm, which will shrink the aneurysm over time.

Before the procedure is finished, X-rays will be taken to confirm that blood in the aorta is flowing through the graft, not through the aneurysm. The incisions near your hip will then be closed with sutures.

Complications

As with any procedure, endovascular surgery does have potential complications, which may include:

- Blockage of the blood flow through the graft
- Fever and an increase in white blood cell count shortly after the surgery
- Graft fracturing
- Infection
- Leaking of blood around the graft
- Movement of the graft away from the targeted position
- Other complications that are rare, but serious may include:
 - Blocked blood flow to the abdomen or lower body
 - Burst artery
 - Delayed rupture of the aneurysm
 - Injury to kidneys
 - Paralysis.^[9-11]

CONCLUSION

Pseudoaneurysm is an important vascular abnormality to be recognised by imaging and Potential complications carry high morbidity and mortality rates. Early diagnosis and intervention can prevent potential complications and Endovascular management offers a safe and effective option with faster recovery.

Acknowledgment

The author is thankful to Department of Radiodiagnosis for providing all the facilities to carry out this work.

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