BMH MEDICAL JOURNAL

**BMH Med. J.** 2021;8(2):89-91. **Case Report**

# Traumatic Dissection of Subclavian Vein

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**Abstract:**

Dissection of veins is very rarely reported, of which inferior vena cava (IVC) dissection had been found or documented in a few articles or journals. Their occurrence is less due to the particular anatomy and physiology of the veins. Veins are not as rigid or strong as their arterial counterparts. More than this, inherent low pressure inside their lumens prevent dissections.

Usually documented situations were low-speed motor vehicular accidents and bullet shot wounds, where the shot doesn't care for the target. The stretch and the breadth of IVC are prominent and in most of the cases, the target is IVC itself.

Other long and prominent veins like jugular, brachiocephalic, superior vena cava and subclavians are also susceptible, but documentation is quite few.

**Keywords:** Subclavian Vein, Dissection And Trauma.

## Introduction

Presence of injuries to subclavian vessels are rarely reported, it is because the position of vessels is in such an intrigue manner. They are safely hiding behind the clavicle with the presence of fat pads and loose tissue in the supraclavicular fossa. Case reports of subclavian vessel dissection are quite few. Even in military causality, where the gunshot injuries are one of the major causes, reported cases of subclavian vein dissection is negligible.

The percentage of involvement varies from 3-30% [1-4]. Formation of intima flaps leads to the functional obstruction to the drainage, resulting in oedema and bluish discolouration in the skin of arm and shoulder.

## Case history

A young motor vehicle accident victim was bought for venous Doppler of the right upper limb. The patient had an anterior dislocation of right shoulder, which had been manually corrected. Had multiple rib and T2 -T7/vertebral body fractures with anterior wedge-shaped compression. Upper limb was well strapped after reducing the dislocated shoulder.

Other signs which drew attention and called for immediate venous Doppler study were, extensive soft tissue edema, bluish discolouration, and ecchymoses detected over his right arm and shoulder region.

Colour venous Doppler study of right upper limb venous system showed an area of a focal contusion in the wall of right subclavian vein at it's a cranial segment and soft tissue oedema was noted at that site. Venous lumen at that level showed two intimal flaps separated from the media and it stretched up to a distance of 2 cm each (**Figure 1**). The venous flow could be documented in the lumen as well as in the false lumen (**Figure 2** and **3**). The further venous flow could not be traced out away from the contusion site. A mechanical obstruction had been created by the moving intimal flaps. No venous thrombosis noted.

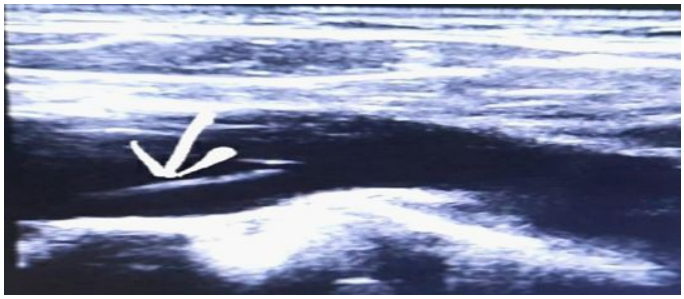

**Figure 1:** Venous flap in the subclavian vein

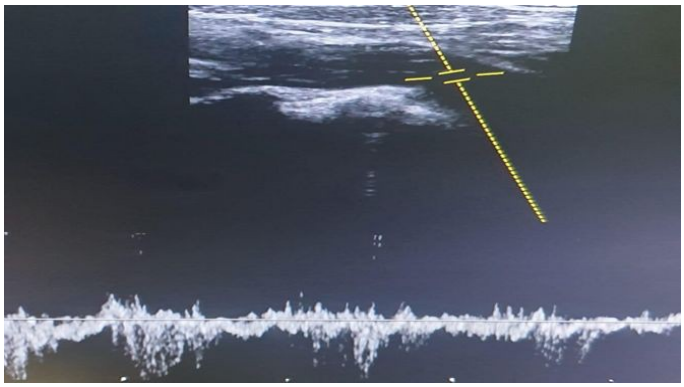

**Figure 2:** Venous flow on pulsed Doppler

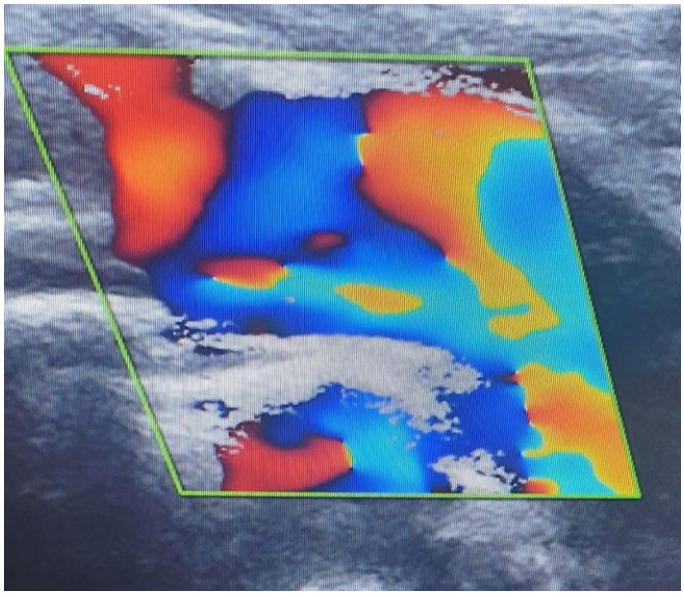

**Figure 3:** Venous flow on Color Doppler

## Discussion

Subclavian vessels are protected by the bony structures in that region, shielding the vessels from penetrating injuries. The subclavian vein is prone to stretching injuries caused by the fall on an outstretched hand or dislocated shoulder or fracture at or near to that site [3-5]. The shearing pressure wave splits the intimal flap or it stretches or separates away from the medial layers resulting intimal flap formation. No venous was thrombosis noted.

The intimal flap creates mechanical obstruction to the moving blood flow. The venous flaps also allow the ante grade venous flow. Sometimes flaps can be mistaken as normal venous valves.

Here we speculate a theory of venous transmural pressure. When the venous trans mural pressure is high, the vein attains circular shape in cross sectional imaging. As the transmural pressure decreases, they pass through a stage of increasing ellipticity, leads to collapse of the vein. Intimal flap attached to the vessel wall at it's lateral edge, implies as the flap, could have altered according to the cross section of the vein.

During circular cross section, the flap becomes extended in the lumen, by it's attachments with the vessel wall, which would result in obstruction of the flow.

As soon as the vein attains elliptical cross section, flap could hang loose along the vessel wall and causing mild resistance or minor obstruction. This theory explains minor symptoms at rest, when transmural pressure is low. During exercise, when the transmural pressure is high fully extended intimal flap significantly obstructs the blood flow.

But in our case the patient presented in the emergency department following trauma and edema and echymoses are very evident on presentation itself.

In conclusion, it is interesting to note the traumatic separation of intimal flap following trauma over the shoulder. The separated intimal flap lies in the direction of blood flow in subclavian vein, leading to disabling symptoms of venous obstruction of the upper extremity. Venous reconstructive surgery was done and patient was relieved of the symptoms.

## References

1. Rich NM, Rw II Geer TM. Subclavian artery trauma. J Trauma 1973; 3: 485-496.

2. Graham JM, Feliciano DV, Mattox KL, Beall AC, Debakey ME. Management of subclavian vascular injuries. J Trauma 1980; 20:537-544.

3. Mccready RA, Procter D, Hyde GL. Subclavian - axiUary vascular trauma. J Vasc Surg 1986; 3: 24-31.

4. Bricker DL, Noon GE Beall AC, Debakey ME. Vascular injuries of the thoracic outlet. Trauma 1970; 10: 1-15.

5. Bergentz SE, Bergqvist D, Ericsson BF. Vascular trauma. A Review. Acta Chir Scand 1983; 149: 1-10.