

CONGESTIVE HEART FAILURE IN YOUNG BOY DUE TO A POST TRAUMATIC ARTERIOVENOUS FISTULA

Shagufta Wahab,¹ Arif Wahab,² Vasantha Kumar,¹ Rizwan Ahmad Khan³

¹ Department of Radiodiagnosis, JNMCH, AMU, Aligarh, India

² Department of Cardiology, Government Centre of Cardiovascular Science and Research, Bikaner, Rajasthan, India.

³ Division of Pediatric Surgery, Department of Surgery, JNMCH, AMU, Aligarh, India

PJR January - March 2012; 22(1):18-20

Introduction

Arterio-venous fistulas are uncommon but treatable cause of congestive cardiac failure in all age groups. Early diagnosis and early corrective surgery is the cornerstone in the management of such cases and leads to almost complete cure of heart failure. Trauma either in the form of iatrogenic interventions or penetrating injuries is the most common cause of AV fistulas in adult population.¹ Here we present a case of 16 years old male patient who developed congestive cardiac failure due to post traumatic femoral AV fistula 8 years after an accidental gunshot injury. This case emphasises the importance of early diagnosis in such cases using non-interventional modalities such as colour Doppler and the often neglected thorough physical examination.

Case Report

A 16 year old male patient was admitted to our hospital with complaints of exertional dyspnoea and pedal edema of 2 years duration, which had worsened in the past 3 months. Echocardiography revealed cardiomegaly with dilatation of all four chambers and poor left ventricular ejection fraction (LVEF- 35%). Patient was treated with many anti-failure medications but no definite diagnosis for the cause of heart failure was made. On inquiring relevant past medical and surgical history, the patient's parents revealed that he had an accidental penetrating gunshot injury at a marriage party in his left thigh 8 years back. The bullet

was removed and appropriate surgical management was done during that period. On auscultation in the left inguinal area a bruit was heard.

Then a colour Doppler sonographic examination was done. The diameter of the common femoral artery and vein appeared to be markedly increased (3.2 cm, 2.7 cm respectively) with to and fro flow in the vessels (Fig.1). Multiple dilated superficial veins were also detected in the inguinal region and upper thigh due to longstanding left to right shunt (Fig.2).

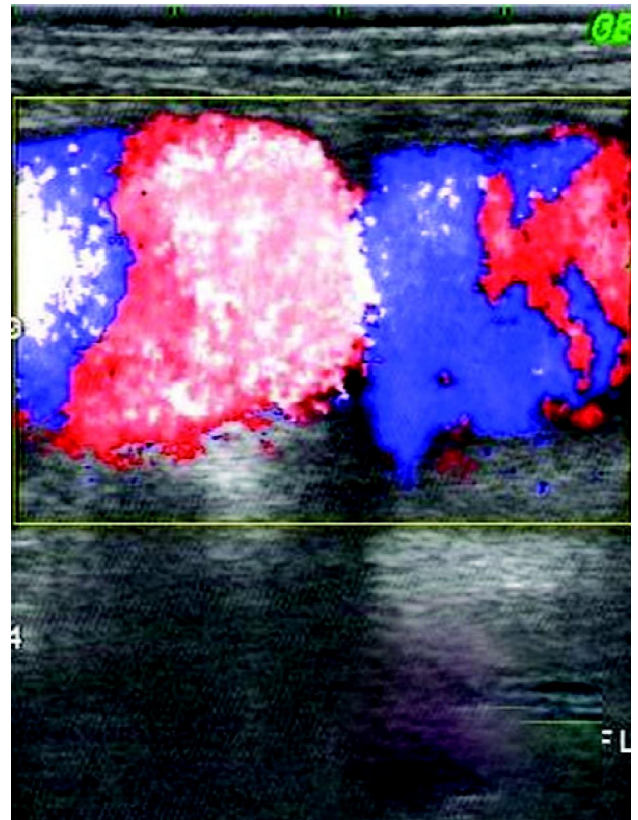


Figure 1: Dilated common femoral artery and vein with altered to and fro flow.

Correspondence : Dr. Shagufta Wahab
Department of Radiodiagnosis
JNMCH, AMU, Aligarh,
India.
Email: drshaguftawahab@rediffmail.com

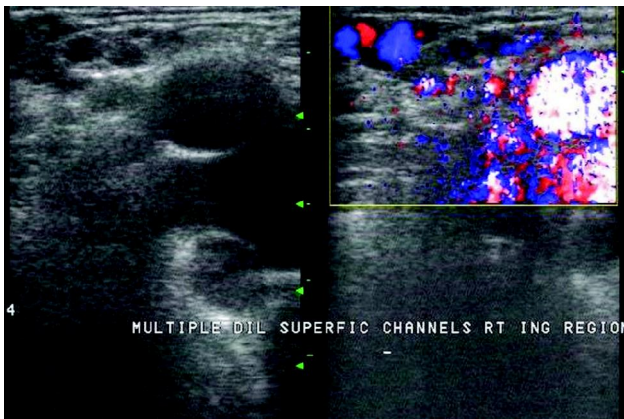


Figure 2: Multiple dilated superficial channels adjacent to the fistula.

A focal area of persistent flow throughout the cardiac cycle in the common femoral artery was noted which became more evident in the diastole when the forward flow in the rest of the femoral artery was not seen. A high velocity jet was seen along the communication between common femoral artery and vein in the inguinal region (Fig. 3).

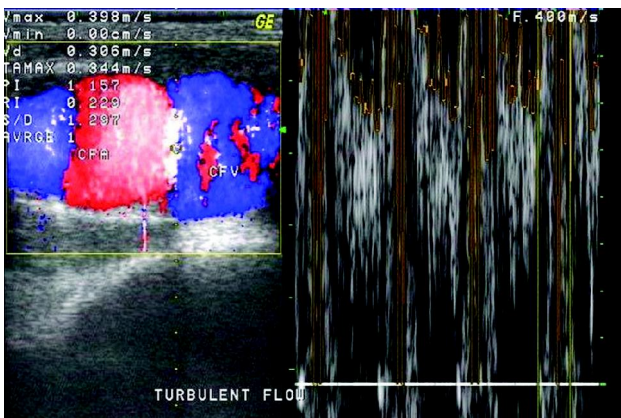


Figure 3: A high velocity waveform between the femoral artery and vein

Pulsed Doppler spectral analysis distal to the fistula revealed a typical triphasic peripheral arterial waveform. Proximal to the site of communication, an abnormal low resistance waveform with elevated velocity and persistent antegrade diastolic flow throughout the cardiac cycle was noted. The venous waveform showed pulsatile increased flow with increased turbulence at the site of the fistula. Even the small dilated superficial veins showed pulsatile flow.

The patient underwent surgical correction of the fistula and per-operatively the presence and location of the fistula was confirmed. With the occlusion of the proximal

and distal ends of the vessels, the artery and the vein were separated and the fistula was closed. Post-operative course was smooth and one year after surgery, the patient's symptoms were relieved and the echocardiography showed normalised ejection fraction.

Discussion

Any direct communication between an artery and a vein is called an arterio-venous fistula. Trauma is one of the most important causes of AV fistulas.^{1,2,3} Trauma, in majority of cases, is in the form of penetrating injury -gunshot injuries, stab injuries or therapeutic interventional procedures.³ If untreated, arterio-venous fistula may cause congestive heart failure, thrombo-embolism or even rupture complications and the possibility can never be ruled out in a young patient presenting with heart failure. Due to the long time, after which the heart failure manifests the history of trauma, is often not forthcoming.

Colour Doppler sonography is a non-invasive diagnostic means of screening patients suspected of having an arterio-venous fistula, and is a convenient follow-up method after intervention.⁶ It has the advantage of providing both the morphologic and the hemodynamic details of the anastomosis. Through out the cardiac cycle there is a gradient of pressure between the arteries and the veins which is responsible for the continuous flow of blood between the vessels. Localisation of the region of abnormal diastolic flow is the single most important finding in determining the level and site of fistula.⁴ This is more precisely delineated during the diastolic phase due to cessation of flow in the rest of the vessel. The high velocity blood flow entering the more compliant venous system causes turbulence of blood flow and results in a pulsatile wave form. Another finding that can be observed is the result of the focal tissue vibration manifesting as a mixture of blue and red echoes as observed in our case.

However more detailed information regarding the exact anatomical relationships, the exact extent, site and severity of fistulous communication for treatment requires MR or CT reconstructed angiography. Angiography is still considered the gold standard investigation for arterio-venous fistulas.⁵

In conclusion the role of detailed physical examination and color Doppler sonography cannot be undermined in the evaluation of suspected cases of arteriovenous fistulas. This is particularly important in our part of the world where not many patients can afford expensive investigations - CT and MR angiography. Despite its drawbacks it is quite reliable and sensitive. So the emphasis is laid on possession of accurate knowledge of the hemodynamic and morphological findings of AV fistulas for early diagnosis and management of such cases.

References

1. Kittredge RD, Kanick V and Nathaniel F. Arteriovenous fistulas. *Am. J. Roentgenol*; 1967; **100**: 431-45.
2. Spencer T, Smyth S, Wittich G, Hunter G. Delayed presentation of traumatic aortocaval fistula: A report of two cases and a review of the associated compensatory hemodynamic and structural changes; *Journal of Vascular Surgery* 2006; **43(4)**: 836-40.
3. Chen JY, Chan SH, Lin LJ, and Luo CY. Late-onset congestive heart failure with multiple carotid-jugular fistulae and pseudoaneurysm after penetration injury. *Journal of the Formosan Medical Association* 2006; **105(10)**: 844-7.
4. Igidbashian VN, Mitchell DG, Middleton WD, Schwartz RA, Goldberg BB. Iatrogenic femoral arteriovenous fistula: Diagnosis with color Doppler imaging. *Radiology* 1989; **170**: 749 -52.
5. Enge I, Aakhus T, Evensen A. Angiography in vascular injuries of the extremities. *Acta Radiol Diagn* 1975; **16(2)**: 193-9.
6. Middleton WD, Kellman GM, Melson GL, Mandrazo BL. Postbiopsy renal transplant arteriovenous fistulas: Color Doppler US characteristics. *Radiology* 1989; **171**: 253-7.
7. Abreo G, Lenihan D J, Nguyen P, and Runge M S. High-output heart failure resulting from a remote traumatic aorto-caval fistula: Diagnosis by echocardiography. *Clinical Cardiology* 2000; **23**: 304-6.