

## Treatment of Arteriovenous Fistula Following Iatrogenic Trauma: A Case Report

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### ABSTRACT

Arteriovenous fistula is rare but the first to be diagnosed by Doppler ultrasonic imaging and confirmed by CT scan, MRA and Angiography. This fistula depending on the location and size, have various symptoms including abdominal pain, CHF, ischemic heart disease and AHF. A Young woman with a history of penetrating trauma to abdomen, with occasional symptoms of abdominal pain, vomiting, nausea and petitions in the left flank area referred. Doppler sonography showed left Aortorenal and superior mesenteric artery to splenic vein fistula so surgical repair and ligation of fistula is done. Diagnosis of aortovenous fistula is difficult due to rarity of them. To avoid its complications, after diagnosis with Doppler sonography they should be restored.

**Key words:** Aortovenous fistula, Trauma, Surgical treatment, Repair.

### INTRODUCTION

Arteriovenous fistula of the kidney is rare and classified as acquired, idiopathic, or congenital malformation<sup>1</sup>. In addition, with the more widespread use of interventional procedures such as percutaneous needle biopsy and percutaneous nephrostomy, iatrogenic fistula have become more frequent<sup>2</sup>. Congenital arteriovenous malformations have a cirroid or angiomatous configuration and comprise 14 - 27% of arteriovenous malformations. The term idiopathic is used to describe that fistula in which the exact etiology cannot be precisely determined<sup>1</sup>. It has been reported that Duplex Doppler sonography is very effective in diagnosing arteriovenous fistula and helpful in the long term follow up after surgery<sup>1</sup>.

Aortovenous fistula can be one of the uncommon complications of abdominal aortic

aneurysm. Most of them happen between aortic artery and IVC vein and rarity in aortic artery to renal vein<sup>3</sup>.

Aortovenous fistula may be asymptomatic or may present with arteriovenous shunt. Symptoms such as chest pain, acute heart failure with or without electrocardiograph sign, acute coronary ischemic and chronic heart failure are some complication happen when these fistulas do not repair<sup>4</sup>. The main symptoms of aortovenous fistula are abdominal pain, Back pain, abdominal bruit<sup>5</sup>. Symptoms varies depend of size, duration and location of the fistula<sup>6</sup>. The anatomic location of fistula must be defined clearly to avoid intraoperative misadventures. Currently sonography, CT, MRA and angiography are well established diagnostic imaging techniques that precisely localized left aortorenal vein fistula<sup>2-7</sup>.

This case report describes a rare case of a patient who had left aortorenal fistula and SMA fistula to splenic vein concurrently.

### Patient and Case Description

Fourteen years old woman had a trauma in left side following bomb blast and shrapnel hit about 2 years ago. After laparotomy 0.2 m object was taken out of her body. About 2 months before admission, the patient had abdominal pain, vomiting, and nausea. The patient had no signs of jaundice, nonfunctional GI and any urinary problems. Patients' vital sign were as below:

On physical examination, she was awake and a little pale. Due to previous laparotomy, there was a scar in midline. The examination showed no tenderness, guarding, Ryband tenderness, and also other organs were normal. Distal pulses in every 4 limbs had symmetrical feather.

### RESULTS

The results of laboratory tests are presented in Table 1.

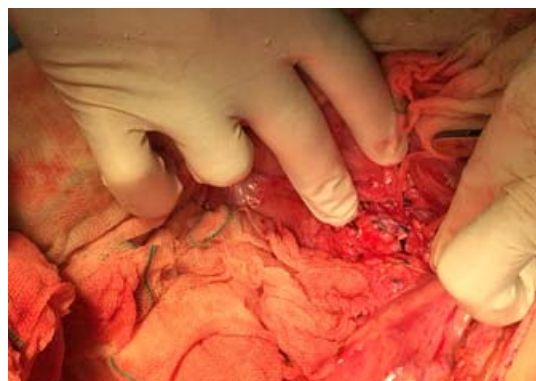
The ultrasound images of the patient showed dilated veins of kidney (Right renal vein 22 mm and left renal vein 32 mm). Venous wave observed in the IVC and Renal veins increased that stated the possibility of arteriovenous shunt. Therefore, we advised to perform CT Angiography with suspect to aortovenous fistula, vascular Doppler ultrasound was done and the result showed increased of abdominal aortic speed and also its diameter in 11mm. Celiac artery blood flow velocity increased in the superior mesenteric blood flow near the aortic. Left renal vein totally distend and there was area like pseudoaneurysm with the size of 40 to 20 mm in the upper left renal vein between the aorta and superior mesenteric artery. There was a dilated vein in the epigastric area which was splenic vein. The patient underwent CT angiography. There was a defect in the bottom left such that the renal vein enhancement occurred earlier than other abdominal veins so the first diagnosis of the patient was left aortorenal fistula as well as dilation of splenic vein. Before surgery, patient underwent aortography that showed a 5-10 mm defect between the aorta and left renal vein in

the posterior and left side of aorta.

Three days after admission and evaluation, we performed a surgery on the patient. After general anesthesia and preparation for surgery, the patient was opened in the midline (from the previous scar). There was some fascia adhesion to the intestinal. Adhesions were released and we enter into the abdomen and then in retroperitoneal. On the left there was a large pulsative mass in the aortorenal fistula. Adhesion of the pulsative mass released and a proximal control taken.

**Table 1: Results of the laboratory tests performed on the patient**

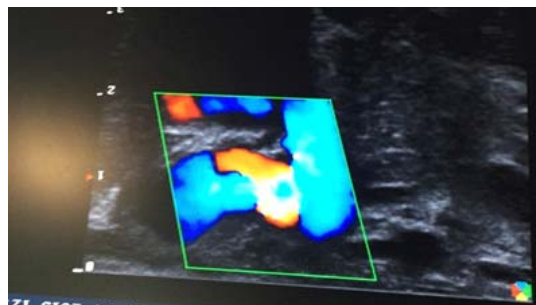
BP	110/70 mmHg
RR	17 min <sup>-1</sup>
PR	88 min <sup>-1</sup>
BS	87 mg/dl
BUN	13 mg/dl
Cr	0.6 mg/dl
SGPT	10 U/ml
SGOT	15 U/ml
Bilirubin T	0.5 U/ml
Bilirubin T	0.5 U/ml
Hb	11.8 gr/dl
HCT	37.9 gr/dl
Na	138 meq/dl
K	4.4 meq/dl
T	37.5 Oral
WBC	8.5 × 10 <sup>3</sup> in μl
PT	13.5
PTT	46
INR	1.3
PLT	285 × 10 <sup>3</sup>



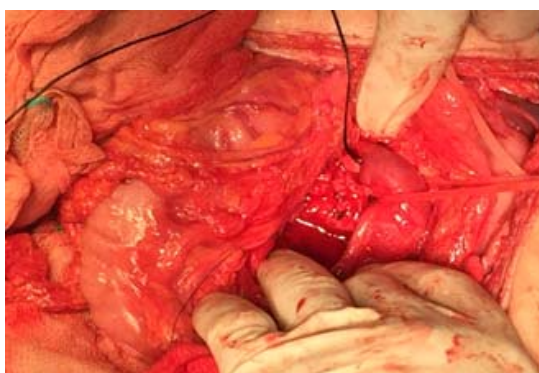
**Fig. 1: Explore of abdominal aorta and renal vein (Location of aortorenal fistula)**



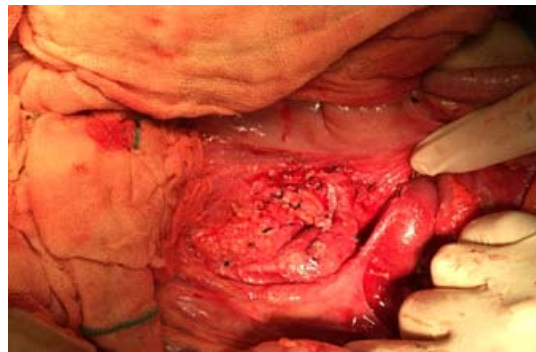
**Fig. 2: Ligation of fistula from renal vein base**



**Fig. 3: Sonography image after taking proximal control**



**Fig. 4: Fistula ligated in the side of splenic vein, and superior mesenteric artery repaired**



**Fig. 5: Ligation of fistula**

Fistula was ligated from base of the renal vein and aorta repaired at the side of fistula. Then splenic vein in epigastric examined and assessed which was also distended and had arterial pulse so intraoperation Doppler Sonography performed for patient in which (showed) there was a mesenteric artery fistula with splenic vein.

After ligation of fistula, splenic vein and left renal vein clearly showed a reduction in size and there were no sign of arterial pulse.

After haemostasis and irrigation of abdominal, operation was completed. After complete remission of symptoms (after 4 days), she discharged.

## DISCUSSION

Since the first description of renal aortovenous fistulas by Varela in 1928, their exact classification varies, but generally separates acquired malformations from congenital malformations. The term idiopathic is used by some authors to describe those malformations in which the exact etiology cannot be determined (1, 2, 3). Due to history of trauma, our patient is placed in the category of traumatic.

It should be noted that since most of arteriovenous fistulas are asymptomatic and remain undetected, their real incidence is unknown. It should also be kept in mind that arteriovenous fistulas may cause severe cardiologic

manifestations, including congestive heart failure or hypertension.

Clinical manifestations of the arteriovenous fistulas depend on their location and size. The most frequent clinical signs are: widened pulse pressure, brisk arterial pulsation, mild tachycardia and a bruit over the region where the fistula is localized. It has been reported that a bruit is less frequent in cirroid arteriovenous malformations and haematuria is more common in congenital malformations<sup>1, 8, 9, 10, 11</sup>. Our patient did not have urinary symptoms and blood pressure in the field of cardiovascular and most of patient's symptoms localized at abdominal area and consisted of abdominal pain, nausea and vomiting

may be because of traumatic history of fistula. The presence of an arteriovenous fistula was first suspected on the basis of duplex Doppler examination. This is in accordance with the reports of other authors indicating the high effectiveness of duplex Doppler sonography in diagnosing and following patients with arteriovenous malformations<sup>12, 13</sup>. Spiral computed tomography and magnetic resonance imaging may be useful in detecting arteriovenous fistulas, although the definite diagnosis of arteriovenous malformations must be confirmed by angiography<sup>14-16</sup>. Our patient was diagnosed through Doppler sonography of abdominal vascular and then the fistula was localized by CT angiography and aortography.

## REFERENCES

1. Abud O, Chechile GE, Sole-Balcells F. Aneurysm and arteriovenous malformation. In: Novick AC, Scoble J, Hamilton G (eds). *Renal Vascular Disease*. WB Saunders Company: London, 35-46 (1996).
2. Leopold GR, Goldberg LE, Bernstein EF: Ultrasonic detection and evaluation of abdominal Aortic Aneurysms. *Surgery* **72**: 939-945 (1972).
3. Celloria GM, Friedmann P, Berman J. Fistulas between the aorta and the left renal vein. *J Vasc Surg* **6**: 191-193 (1987).
4. Abbadi AC, Deldime P, Van Espen D, Simon M, Rosoux Ph: The spontaneous aortocaval fistula: a complication of the abdominal aortic aneurysm. *J Cardiovascular Surgery* **39**: 433-436 (1998).
5. Gilling-Smith GL, Mansfield AO: Spontaneous abdominal arteriovenous fistulae: report of eight cases and review of the literature. *Br J Surg* **78**(4):421-425 (1991).
6. FaucherreM, Haftgoli-BakhtiariN, Menthm, GaudeJ and LehmannB: Aorto-venous fistula between an abdominal aortic aneurysm and an aberrant renal. *JMed case report* **4**:68-71 (2010).
7. Axelbaum SP, Schellinger D, Gomes MN, Ferris RA: Computed tomographic evaluation of Aortic Aneurysm. *AJR* **127**: 775-78.11342 (1976).
8. Alscher DM, Hupp T, Mettang T, Kuhlmann U. A patient with hypertension was cured after resection of a renal AV fistula. *Nephrol Dial Transplant* **15**: 249-250 (2000).
9. Iko BO, Jones GW. Idiopathic renal arteriovenous fistula. Spontaneous closure. *Urology* **29**: 86-89 (1987).
10. Crotty KL, Orihuela E, Warren MM. Recent advances in the diagnosis and treatment of renal arteriovenous malformations and fistulas. *J Urol* 1993; **150**: 1355-1359.
11. Givertz MM, Colucci WS, Braunwald E. Clinical aspects of heart failure: high-output heart failure: pulmonary edema. In: Braunwald E, Zipes PP, Libby P (eds). *Heart Disease*. WB Saunders Company: Philadelphia, 1534-1561 (2001).
12. Renowden SA, Blethyn J, Cochlin DL. Duplex and colour flow sonography in the diagnosis of post-biopsy arteriovenous fistulae in the transplant kidney. *Clin Radiol* **45**: 233-237 (1992).
13. Deane C *et al.* Arteriovenous fistula in renal transplants: color doppler ultrasound observations. *Urol Radiol* **13**: 211-217 (1992).
14. Barkhausen J, Verhagen R, Muller RD. Successful interventional treatment of renal insufficiency caused by renal artery

- pseudoaneurysm with concomitant arteriovenous fistula. *Nephron* **85**: 351–353 (2000).
15. Mansueto G *et al.* Therapeutic embolization of idiopathic renal arteriovenous fistula using the 'stop-flow' technique. *J Endovasc Ther* **8**: 210–215 (2001).
  16. Paschalis-Purtak K, Januszewicz M, Rokicki A, Puciłowska B, Imiela J, Cybulska I: Arteriovenous fistula of the kidney: A Case report of 47-year old female patient treated by embolization. *J Of Human Hypertention* **17**:293-296 (2003).