

Ruptured Renal Artery Aneurysm in Young Female, a Clinical Dilemma

Waqar Ahmed Ansari*, Saad Abdullah Al Fares**, Abdu Alzobydi**, Ahmed Al Qarni***, Mohd Amin AW Ansari+, Suhaila Fatima++

Abstract

The incidence of renal artery aneurysm is very rare event and rupture of the same is still rare. Rupture of renal artery aneurysm is associated with high mortality and morbidity. When patient presents in emergency with haemodynamic instability, usually nephrectomy is the treatment of choice.

Here we present a case of 30 year old Filipino unmarried female who presented in emergency with severe abdominal pain, severe pallor and shock. Exploratory Laparotomy was done and rupture of right renal artery aneurysm was found. As patient was in shock right from presentation to throughout surgery, right Nephrectomy was done as the treatment for same.

Introduction

Renal artery aneurysm is rare having an incidence of approximately 0.01%, and rupture of this aneurysm is very rare. Aneurysm are said to be present when dilatation of an artery is more than one and half times its normal diameter. Renal artery aneurysm can be either congenital or acquired and can be either extraparenchymal (85% of cases) or intraparenchymal. Majority of the renal artery aneurysm are asymptomatic, and are detected during abdominal investigation for some other cause. This aneurysm can present with hypertension, flank pain, haematuria, collecting system obstruction, renal infarction or rupture.

Risk factors for rupture are hypertension, Size more than 2 cm, incomplete calcification, and pregnancy.

*Assistant Professor and Consultant Surgeon, **Specialist, ***Senior Resident, Department of General Surgery; +Pathology specialist; ++Pathology Resident; Asir Central Hospital, Abha, Kingdom of Saudi Arabia.

There are many Modalities of treatment for renal artery aneurysm, including repair of aneurysm, excision with reconstruction using bypass, and extracorporeal vascular reconstruction with auto transplantation. For rupture of renal artery aneurysm, in emergency, if the patient is not haemodynamically stable, nephrectomy is the treatment of choice.

Case Report

A 30 year old Filipino, unmarried, female was brought by her friends in emergency room. As patient was in severe shock, history was taken from the friends. There was history of severe pain in abdomen, of 1 hour duration, and over this time, patient became restless and agitated. She had normal menstrual cycle. On examination, patient was severely pale with pulse and blood pressure not recordable. Rapid infusion of i.v. fluid was given. Abdominal examination revealed marked tenderness all around. Emergency diagnostic peritoneal lavage (D.P.L.) was done to diagnose/rule out intraperitoneal bleed. D.P.L. revealed blood in the pelvic cavity.

Thinking that it is an intraperitoneal bleed, patient was taken immediately to the operation theater, and patient was started O+ve blood immediately.

Midline laparotomy was done, and there was about

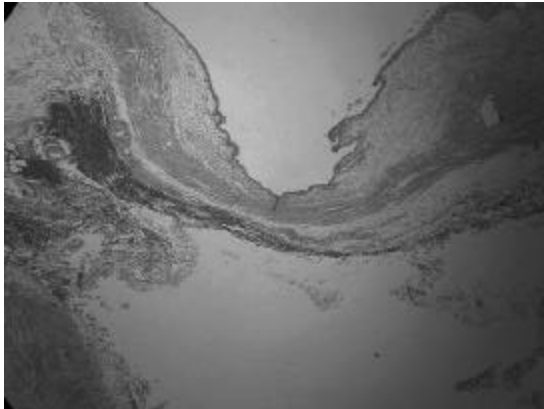


Fig. 1 : Histopathology of aneurysm vessel wall



Fig. 2 : Histopathology of aneurysm vessel wall showing degenerative changes

100 ml of blood in pelvic cavity and uterus and ovaries were normal. Whole of the retroperitoneum extending from diaphragm to the pelvic cavity showed a large haematoma forming a mass of about 20-25 cm in diameter in right renal area.

Immediately vascular surgeon and urologist were called. The haematoma was expanding and because it was mainly on right side, mobilization of right colon was done and haematoma evacuated. There was gush of blood which was stopped by compression of aorta above the renal branches. Dissection in the area, lead to the other finding of a rupture of approximately 2 cm in size, extraparenchymal aneurysm of right renal artery. Because throughout the procedure patient was in shock, committee of surgeons decided to go ahead with right nephrectomy. Till the end of procedure, patient received approximately 18 units of blood. Left kidney was normal on palpation. Postoperative also patient received fresh frozen plasma and blood.

Patient has good urine output post operatively. But her renal parameters deranged, i.e. increase in S. creatinine and B.U.N., which became normal after 10-12 days.

2-D echo was normal, chest X-ray was normal. Left renal angiography showed the normal vasculature.

Once patient recorded from emergency phase, she gave history of hypertension since one year for which she was on Atenolol 25 mg and hydrochlorothiazide 25 mg, both once a day, and had normal blood pressure with these medicines. Now she has been put on amlodipine 5 mg once a day with good control of blood pressure.

Discussion

- Aneurysmal dilatation of an artery is present when its diameter exceeds one and half times of a normal appearing artery.
- Pathophysiology of aneurysm- Two theories has been proposed in development of renal artery aneurysm.
 1. Sudden anterior displacement of relatively mobile kidney and rapid deceleration. This causes tear in vascular intima which lead to subintimal dissection.
 2. Direct arterial wall contusion against the vertebral bodies.

Rupture occurs when the tangential stress any point exceeds the tensile stress of the wall. Arterial wall strength is dependent on collagen. The collagen content of Aneurysmal vessel is less than in atherosclerotic and normal vessel, thus leading to greater load on each fibre. The Laplace's Law, which relates to tensile stress to wall pressure and radius, traditionally has been used to explain why larger aneurysm rupture. The stress on arterial wall is best expressed as pressure times radius divided by wall thickness, a modification of Laplaces' law, that is

applicable only to thin walled structure, in which the difference between inside and outside radius is negligible. ¹

Renal artery aneurysm is a rare pathology. The incidence of renal artery aneurysm is 0.01%. Selected patients who undergo renal angiography have incidence of 0.3-1%.² Out of all renal artery aneurysms, 20% have bilateral pathology and 30% have multiple aneurysms. Renal artery aneurysm can be Extraparenchymal [85%] or Intraparenchymal. There is high rate of complications in pregnancy as far as renal artery aneurysms are concerned.

Renal artery aneurysm could be asymptomatic, can be associated with hypertension, flank pain, haematuria, collecting system obstruction, renal infarction or rupture.

Risk factor for rupture includes size more than 2 cm, pregnancy, incomplete calcification. Rupture of renal artery aneurysm in pregnancy is rare and well described catastrophic event.^{3,4} Many of the renal artery aneurysms are diagnosed incidentally during abdominal sonography and colour Doppler examination. Duplex examination, C.T. abdomen, C.T. angiography and MR angiography are non invasive investigation, carried out in work up of patient with renal artery aneurysm. Arteriography was useful to define the exact anatomy before an intervention. But because of its invasiveness, now it has been replaced by C.T./M.R. angiography. Lumsden *et al* concluded that indications for surgery are:

1. Symptomatic or enlarging aneurysm.
2. Renal embolisation
3. Aneurysm in pregnant females and those

who are planning pregnancy

4. Renovascular hypertension
5. Size more than 2.5 cm

Other patients with asymptomatic renal artery aneurysm can be safely observed.⁶

In emergency with rupture of renal artery aneurysm, salvage of kidney may not be possible because of haemodynamic instability, and nephrectomy may be the option of choice, as it was with our case. Other modes of management, especially in elective surgery are repair of aneurysm, tangential excision with primary repair or patch angioplasty, excision with reconstruction using bypass and extracorporeal vascular reconstruction with autotransplantation.

Mortality rate from rupture of renal artery aneurysm has dropped from 62% before 1949 to 6% after 1970.

References

1. Principle's of Surgery, Seymour I. Schwatz, Seventh Edition, Chapter 20 –arterial disease – 938.
2. E Medicine – Renal Artery Aneurysm, Hassan Tehrani Page 2.
3. Seppala FE, Levey J. Renal Artery Aneurysm: Case report of a ruptured calcified renal artery aneurysm. *Am Surg* 1982 Jan; 48(1) : 42-44.
4. Lacroix H, Bernaerts P, Nevelsteen A, Hanssens M: Ruptured renal artery aneurysm during pregnancy: Successful ex situ repair and auto transplantation. *J Vasc Surg* 2001; 33(1) : 188-90.
5. Lumsden AB, Salam TA, Walton KG. Renal artery aneurysm: a report of 28 cases. *Cardiovascular Surg* 1996; 4(2) : 185-189.
6. Dayton B, Helgerson RB, Sollinger HW, Acher CW. Rupture renal artery aneurysm in a pregnant uninephric patient: Successful ex vivo repair and auto transplantation. *Surgery* 1990; 107(6) : 708-11.