

Surgical Management of Large Infra Renal Abdominal Aortic Aneurysm

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ABSTRACT:

BACKGROUND:

Abdominal aortic aneurysm is a common disease of the elderly, with a complex etiology.

OBJECTIVE:

This study aimed to review the management and the outcomes of surgical treatment of the abdominal aortic aneurysm.

PATIENTS AND METHODS:

This is a retrospective study of 20 patients who had been referred to the surgical department at Ibn al-nafees hospital from 1st of January 2007 to 31st of December 2011 as cases of abdominal aortic aneurysm. The clinical features, imaging techniques, surgical operations, morbidity, mortality and follow up were analyzed.

RESULTS:

out of 20 patients with abdominal aortic aneurysm, there were 16 male and 4 female patients in a ratio 4:1. 70% were smokers, 20% were diabetics and 65% were hypertensive. History of ischemic heart disease was present in 55% of the patients. 20% of the patients were asymptomatic, 70% of the patients were presented with backache followed by abdominal pain and 10% were presented with lower limb ischemia. Pulsatile abdominal mass was felt in 75% of the cases. 75% had left ventricle dysfunction. The transverse aortic diameter was 6-7cm in 20%, 7-8cm in 50% and more than 8 cm in 30%. All of the patients underwent surgical intervention. The overall mortality was 20%.

CONCLUSION:

Patients who underwent urgent surgery had poor outcome in comparison with those who did the procedure on elective basis.

KEY WORDS: abdominal, aneurysm, aorta.

INTRODUCTION:

Aneurysm can be defined as a permanent and irreversible localized dilatation of a blood vessel. Aortic aneurysms are most commonly located in the infrarenal aorta. ⁽¹⁾ Abdominal aortic aneurysms (AAAs) are rare in women under the age of 55 and in men under the age of 60. However, in men older than 60, AAAs are nearly 10 times more common in men than in women. ⁽²⁾ More than 90% of aneurysms are associated with atherosclerosis, which has traditionally been considered the primary cause. ⁽³⁾ Abdominal aortic aneurysm (AAA) and atherosclerosis are common causes of mortality and

morbidity in an aging population. ⁽⁴⁾ The known risk factors for abdominal aortic aneurysm are age, male gender, presence of family history of AAA, presence of aneurysms elsewhere (especially at the femoral and popliteal artery), smoking, diabetes mellitus, atherosclerosis and hypertension. ⁽⁵⁾ Most cases of AAA are asymptomatic and often discovered incidentally. ⁽⁶⁾ The natural history of an AAA is to expand and rupture. ⁽⁷⁾ Clinical presentations depends whether aneurysm is ruptured or not. Approximately the initial presentation in 12% of cases of AAA is sudden rupture with subsequent high mortality up to a 90%. ^(6,8) Aortic aneurysms may be suspected or diagnosed by physical examination of the abdomen or by an imaging test. Tests to help determine the location, size, and rate of growth include abdominal ultrasound and Computed tomography (CT) to evaluate related blood vessels and organs, presence of dissections and blood clots. ⁽⁹⁾ The aneurysmal

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diameter is the most important factor to select patients for treatment meaning that many aneurysms are treated where rupture should never have occurred.⁽¹⁰⁾ The goal of elective repair is to prevent rupture and prolong life. For open repair, several exposures can be used, each with its own merits and disadvantages.⁽¹¹⁾ If the aneurysm is >5 cm, it can be surgically repaired to prevent a life-threatening rupture. Although current AAA screening recommendations focus on men between the ages of 65 and 75 years, who have ever smoked, recent evidence suggest many men of ages 50 to 80 years, regardless of smoking status, may also be at risk for developing an AAA.⁽⁶⁾

PATIENTS AND METHODS:

This is a retrospective study of 20 patients who had been referred to the surgical department at Ibn Al-Nafees Teaching Hospital for Cardiovascular and Thoracic Surgery from 1st of January 2007 to 31th of December 2011 as cases of infra renal abdominal aortic aneurysm. All the clinical and surgical data were obtained from hospital records. The case sheets of patients were reviewed to collect

information relevant to management of these patients, which were include; age, sex, risk factors as well as the presenting symptoms. Diagnosis was made by physical examination, Duplex ultrasound, in addition to one or more of the diagnostic vascular tools including CT Angiography and the conventional angiography. Other investigations were done routinely as part of the preoperative evaluation including routine blood investigations (hematological and biological), chest x-ray, electrocardiography (ECG), echocardiography and pulmonary function test done for all of our patients. Depending on clinical considerations the urgency of operation and the presence of medical comorbidities, objectives were prioritized and accomplished as time and circumstances permit. All of the patients underwent open surgical repair which performed under general anesthesia. The patients had been transferred to the surgical intensive care unit (ICU) after the operation. Postoperative complications were evaluated together with operative mortality. After discharge, all patients were followed up regularly

RESULTS:

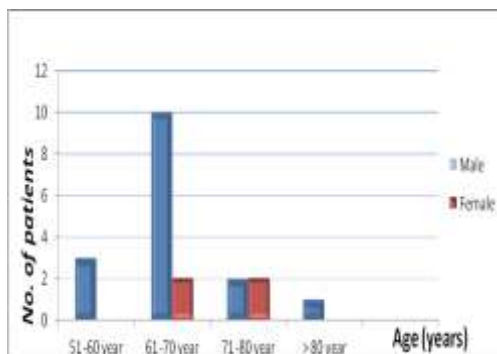


Fig 1: Shows age-gender distribution.

- 80% of patients were male which is the most common risk factor in our study followed by smoking and Hypertension, in a percentage of

70% & 65% of patients respectively as shown in table (1) below.

Table 1: Comorbid diseases & Risk factors.

Risk factor	Number of patients	Percentage
Male gender	16	80%
Smoking	14	70%
Hypertension	13	65%
AHD*	11	55%
Hyperlipidemia	10	50%
DM*	4	20%
Cerebrovascular disease	1	5%

* {DM: Diabetes mellitus, AHD: Atherosclerotic heart disease}

• Four patients (20%) of the patients were asymptomatic and discovered accidentally by abdominal ultrasonography done for other reasons, 70% of the patients were presented with backache followed by abdominal pain and 10% were presented with lower limb ischemia. Pulsatile

abdominal mass was felt in 75% of the cases. Leaking AAA was found in 5 patients (25%), two of them presented with signs of retroperitoneal hematoma (Cullen's & Turner's signs), as shown in table (2)

Table 2: Presenting symptoms & signs.

Presentation	Number of patients	Percentage
Asymptomatic	4	20%
Abdominal mass	15	75%
Backache followed by abdominal pain	14	70%
Lower limb ischemia	2	10%
Cullen's & Turner's signs*	2	10%

* Signs of retroperitoneal bleeding

• The transverse aortic diameter, as determined by ultrasonography and CT angiography, was 6-7cm in 4 patients (20%), 7-8cm in 10 patients (50%) and more than 8 cm in 6 patients (30%).

• Abdominal ultrasonography was done routinely for all patients in the study as part of the preoperative assessment. Conventional angiography was done for four patients in the first two years of this study, while CT Angiography was done for sixteen patients. MR angiography was done for only 1 patient.

• Echocardiography was done for all of our patients, because of the increased risk for atherosclerotic heart diseases. 75% of the patients had left ventricular dysfunction (45% had moderate to severe left ventricular dysfunction and 30% had mild left ventricular dysfunction). 25% had good left ventricular function.

• Iliac arteries were involved in 80% of the cases so bifurcated Dacron grafts were needed and the distal anastomosis for those 80% of patients had been done either to the common femoral arteries (in 75% of them) or to the iliac arteries (in the remaining 25%). In 20% of the cases the iliac arteries were free of diseases so straight Dacron tube grafts were used.

• All cases were of infrarenal type and the surgical approach used in all cases was the transperitoneal approach performed through standard midline laparotomy.

• Complications that have occurred in our study are listed in Figure (2) below. Wound infection occurred in 15% of the patients. Re-exploration was needed in two patients (10%), due to bleeding from the anastomotic site in one patient and due to development of lower limb ischemia in the second patient. Other complications encountered were incisional hernia, cardiac arrhythmia, renal impairment and neurological dysfunction.

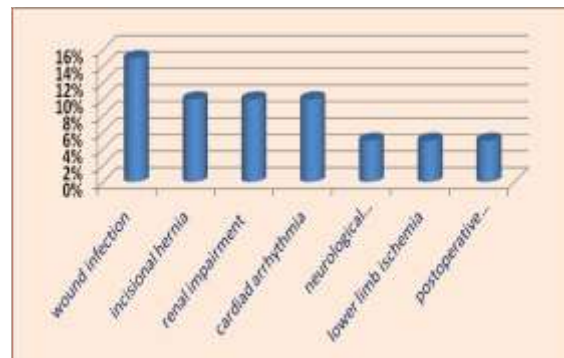


Figure 2: Showing the percentage of complication had been seen postoperatively.

• The overall mortality was 4 patients (20%). Three patients died during the operation and one patient died postoperatively. Of the patients who died 3 of them were male and 1 patient was female so mortality was 18 % among male and 25% among female. Two patients died due to intraoperative cardiac arrest and one patient died due to uncontrollable bleeding. One patient died 60 days after surgery due to complicated lower limb ischemia; bed sore and acute renal shutdown. Those patients who died due to intraoperative cardiac arrest and uncontrollable bleeding had leaking AAA and underwent an emergency operation.

DISCUSSION:

Abdominal aortic aneurysm is not so common in our country due to reduced life expectancy in our population as compared to western countries. Age distribution of the patients with abdominal aortic aneurysm in the current study ranged from 54 to 83 years, 60% of the patients was in the 7th decade, so AAA is a disease of elderly patients which coincide with other studies (David C Sabiston Jr. and Skow, G) ^(1,2)

The male predominance in this study matched that done in Michigan school of public health, where AAA was more predominant among male than female with ratio of 5:1 ⁽¹³⁾, while in the presented study the ratio was 4:1. In Norway, screening program which was done, the AAA was present in 8.9% of men and 2.2% of women. ⁽¹⁴⁾ In the current study 70% of the patients were smokers, 65% of the patients were hypertensive, ischemic heart disease was present in 55%, hyperlipidemia in 50% of patient, and 20% of the patients were diabetic. Compared to Orhan Findik et al study the most common risk factors for abdominal aortic aneurysm were smoking (76.7%), hypertension

(67.6%), hyperlipidemia (30.9%), chronic obstructive pulmonary disease (35.7%) and diabetes mellitus (10.1%). ⁽⁶⁾ A recent Swedish study showed that the instances of AAA in elderly patients have been decreasing which can be attributed to a nationwide decline in smoking for the past 30 years. ⁽¹⁵⁾ The result in this study goes with other study ^(6,15), that the risk factors for atherosclerosis are also associated with increased risk for abdominal aortic aneurysm.

AAA usually found incidentally during work-up for chronic back pain or kidney stones ⁽¹⁶⁾ in the current study Only 20% of the patients are asymptomatic and most of the patients were presented with Backache followed by abdominal pain 70%, and 10% were presented with lower limb ischemia, This is due to the late presentation and accordingly late diagnosis of the patients as all of them presented with aneurysm size more than 6cm. In the current study The transverse aortic diameter, as determined by ultrasonography and CT angiography, was 6-7cm in 4 patients (20%), 7-8cm in 10 patients (50%) and more than 8 cm in 6 patients (30%), while in Mirsharifi R et.al Mean diameter of detected aneurysms was 3.93 ± 1.435 cm. In 4 (1.7%) subjects, aneurysms greater than 5.5 cm in diameter were detected. ⁽⁸⁾ This may be due to absence of screening program for AAA. The infrarenal aortic diameter was measured by abdominal ultrasonography, but CT angiography was found to be the investigation of choice especially in the last years of this study because of its unavailability in the first two years of the study (2007 and 2008), whereas conventional angiography was the investigation of choice. Computed tomography of the abdomen provides additional information that can determine if the aneurysm is leaking has ruptured, is

expanding rapidly, and for those without signs of rupture, whether or not symptoms are likely to be related to the aneurysm or due to other abdominal pathology.⁽⁹⁾A large number (75%) of patients in the presented study had some degree of left ventricular dysfunction pointing to the fact that some of cases are old aged patients with poor preoperative cardiac state.

We used an infrarenal bifurcated graft in (80%) of patients in current study, while in Castelli, P. et al study this type of graft was used in (68%).⁽¹⁷⁾This may be due to advance stages of the disease in our study.

Surgical complications were observed in 40%, the most common complication was wound infection, which had occurred in 3(15%) of the patients followed by cardiac arrhythmia in 10%, while in M.A.Mohammadzade et al study surgical complications, were observed in 29.6% patients. The most common complication was bronchopneumonia which occurred in 8.4%.

⁽¹⁸⁾Whereas in our study bronchopneumonia was not recorded, the high percentage of morbidity in our study may be due to poor rapid preparation of the patients. In the current study the overall mortality was 20% of the patients, those who died 3 patients were male and 1 patient was female so mortality was 18 % among male and 25% among female. So the women had higher mortality rate and this is comparable with the study done in Michigan school of public health where women who had operation for AAA had a 1.4 times greater risk of dying compared with men.⁽¹³⁾The Brigham and Women's Hospital reported a 4.7% mortality rate in 128 high-risk patients and a 0.9% mortality rate in 444 average-risk patients.⁽¹⁹⁾In Tehran 126 patients had been operated on and the operative mortality was 8.4%.⁽⁸⁾This high morbidity and mortality in this study as compared with other studies was attributed to the delayed presentation, as many of our patients presented as an emergency case, and may be due to associated ischemic heart disease as 75% of the patients had left ventricular dysfunction.

CONCLUSION:

Patients who underwent urgent surgery had poor outcome in compares with those who do procedure on cold basis

RECOMMENDATIONS:

1. Increased public awareness and availability of screening will lead to increased aneurysm detection in early stages. AAAs can be detected noninvasively and relatively inexpensively

through ultrasound imaging, which has a sensitivity and specificity of nearly 100% for this disorder.

2. Early detection of AAA can be life-saving, giving patients the opportunity of undergoing elective surgical repair, a much safer and effective intervention than emergency repair after rupture.

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