PERIOPERATIVE MANAGEMENT OF CHALLENGING AND COMPLICATED EVAR CASES FOR INFRA RENAL ABDOMINAL AORTIC ANEURYSM

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Abstract

Aim: *The aim of this study is to highlight the peri-operative management of challenging and complicated EVAR cases for infrarenal abdominal aortic aneurysm.*

Patients & methods: *In this study, 7 patients with infra renal abdominal aortic aneurysm were treated with endovascular repair at the Surgical Endovascular unit in Kas rAlainy Hospital between Aug 2011 and Oct 2013.*

Results: *we use aortouni-iliac graft in one patient due to narrow aortic bifurcation and the procedurewas completed with femorofemoral bypass, another patient needed femorofemoral bypass due to graft limb occlusion. Two patientwith common iliac artery aneurysm necessitated sacrificing one of the internal iliac arteries to achieve adequate distal sealing. Two patients of type IA endoleaks treated successfully by either ballooning or extension cuff. One patient of type Ib needs iliac extension. 30 days post operative mortality was 0%. Patients were followed at 1,3,6 months post implantation with no aneurysm related complications nor mortality.*

Conclusion: *The technical success rate for abdominal aortic endografting is high, and the overall rate of severe perioperative complications is low. Complications associated with endovascular abdominal aortic repair are usually related to some anatomical and technical challenges .With future advances in endograft technology, expanding operator experience, and improved surveillance techniques, the current trend of expanding indications for EVAR procedures is likely to continue.*

Key word: *endo graft, endoleaks ,iliac aneurysm , aortouni-iliac*

Introduction

Endovascular aneurysm repair (EVAR) is an important advance in the treatment of abdominal aortic aneurysm (AAA). EVAR has improved the perioperative morbidity and mortality of patients undergoing AAA repair compared to open surgical repair. Complications associated with endovascular abdominal aortic repair are usually related to some technical aspect of endograft placement such as problems with vascular access, or due to the structural integrity and stability of the endograft such as endoleak, endograft migration, or endograft collapse. **(1,3,6)**

Endograft complications rarely lead to a need to convert to open surgery at the time of placement, and when they occur , can usually be managed using endovascular means. [3,6,13]

Endovascular aortic aneurysm repair (EVAR) is being increasingly applied as a less-invasive alternative to open surgical repair of abdominal aortic aneurysms (AAAs). It is an excellent treatment option for AAA when performed on appropriately selected patients and with adequate preoperative planning. [3,6]

The aim of this study is to highlight the perioperative management of challenging and complicated EVAR cases

Patients & methods

Study population

7 male patients with infra renal abdominal aortic aneurysm who were treated with endovascular repair at the Surgical Endovascular unit in Kasr Alainy Hospital between Aug 2011 and Oct 2013.

All patients were smokers ,5 were Hypertensive and 2 were ischemic heart disease.

According to the presentation , patients are categorized to have:

presentation	Number of patients	Percentage
Asymptomatic	2	28.5%
Symptomatic	5 (abdominal &back pain)	71.5%

Table 1: clinical presentation

Anatomical distribution:

4 patients had only infrarenal abdominal aortic aneurysm and 2 patients had associated with unilateral common iliac aneurysm .

Type	Number	Percentage
Infrarenal AAA	5	71.5%
Infrarenal AAA and unilateral CIA aneurysm	2	28.5%

Table 2: anatomical distribution.

Patient Preparation

Laboratory parameters: (Coagulation tests. Renal and liver function tests. Blood cell count, hematocrit). Cross-match four units of blood. Chest X-ray, ECG, Cardiac assessment, Informed consent. Ankle Brachial index, and duplex mapping for any patient with impalpable peripheral pulsation. Ultrasonography was the basic tool for the diagnosis , CT Angiography (CTA) was the main method used for measurement and planing. Cross-sectional image reconstruction 3 mm slice, reconstruction index (RI) 2 mm. 3D reconstruction - 1 mm slice, RI 0.5 mm, thin maximum intensity projection (MIP).

Device: Zenith Flex® (Cook) & Endurant® (Medtronic) .

Technique of EVAR

Combined spinal epidural anesthesia was used in all patients; Bilateral surgical femoral arteriotomy · Intra-procedural medications include Heparin 5000 IU& Broad spectrum antibiotics.

Procedure

The contra lateral femoral artery is catheterized and a 6F sheath is inserted. A diagnostic pigtail catheter is inserted via this access into the aorta to the level of T12/L1.The ipsilateral femoral artery is catheterized. · A standard guide wire and selective catheter (e.g., multipurpose) are advanced into the upper thoracic aorta. The standard guidewire is exchanged for a very stiff guide wire (curved 260-cm long Lunderquist® boston scientific USA), which is placed with the tip in the ascending aorta. The stent-graft is inserted carefully under fluoroscopic guidance, and if resistance was felt during passage we tried advance with little side to side movement , if resistance still there, then withdrawal of the device and dilatation with either balloon or coov's dilator of the iliac arteries to avoid dissections or rupture.

Completion angiography was done searching for patent stent-graft, patent endograft limbs, and absence of flow into the aneurysm sac (endoleak)

Immediate Post-procedure Care:

All patients spend the first 24 hours in ICU.

Follow-Up and Post-procedure Medications

Follow-up 1,3,6 months post implantation using duplex ultrasound & CT angiography. Follow-up medication consists in most cases of once daily antiplatelets , and a statin, e.g., Simvastatin.

Results

Device used: Zenith Flex (Cook) was used in 2/7 (28.5%) of the patients, while in 4/7 (57%)of patients bifurcated Endurant (Medtronic) was used, one patient (14%) aortouniiliac Endurant graft was uesd .

Characteristics of the aneurysm repair procedures

Combined spinal epidural anesthesia were used in all patients. The mean (±SD) of duration of the procedure was 180 ±40 minutes. The estimated blood loss was 410±118 ml with 4/7 (57%) patients needed intraoperative blood transfusion

All patients ended in a bifurcated graft except one patient (14%) we use aortouni-iliac graft due to narrow aortic bifurcation (16.9mm) and the procedure was completed with femorofemoral bypass.

2 patient (28.5%) with common iliac aneurysm(32&41 mm) necessitated sacrificing one of the internal iliac arteries to achieve adequate distal sealing.

Endoleaks: In 3 patients (42.5%)there was a detectable endoleaks on completion angiography .
2 patients (28.5%) type IA endoleak one respond to proximal ballooning and the other needed an aortic cuff extension. 1 patient (14%) type IB endoleak treated with iliac extension.

Graft limb occlusion occurs in one patient (14%) with left common iliac stenosis and previous suboptimal angioplasty and stenting and needed femrofemoral bypass .

Characteristics of postoperative care procedures

All patients routinely admitted to the ICU postoperatively. The mean duration of ICU stay was 24 hours The mean (±SD) change in hemoglobin level was a decrease by 1.5±0.4 g/dL .

Post operative complications:

superficial wound infection occurs in one patient (14%) and respond to conseravative treatment.
groin hematoma occurs in one patient (14%) and respond to conseravative treatment.

Complication	No of patients	Incidence	Management
Endoleak	3	42.5%	Ballooning Aortic cuff Iliac extension
Wound infection	1	14%	Superfacial wound infection respond to conservative ttt
Groin hematoma	1	14%	conservative ttt
Other complications	Iliac limb occlusion	14%	Fem fem bypass

Table 3: procedural and post procedural complications

Mortality:

30 days post operative mortality was 0%.All patients were followed at 1,3,6 months post implantation with no aneurysm related complications nor mortalities.

Follow up:

Follow up duplex and or CTangiography was done 1 ,3,6 months post implantation for all patients and revealed 100% patency rate of the main graft and both iliac limbs, No further increase in aneurysm diameter, Absence of detectable flow in aneurysm sac, Absence of device migration.

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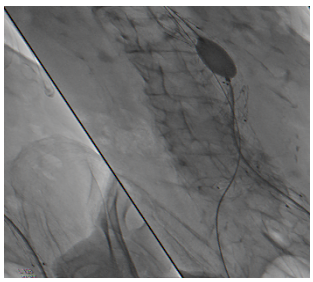

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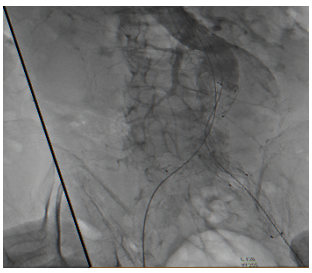

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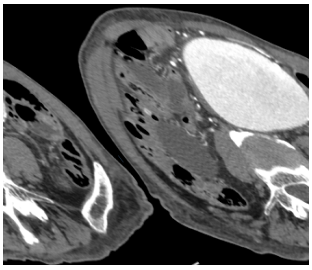

Figure (1): 64 years old male with infra renal aortic aneurysm8.5 cm treated by EVAR, type Ia endoleaks treated by aortic ballooning,the left distal landing zone extended to external iliac artery as the left common iliac was aneurismal (41 mm)

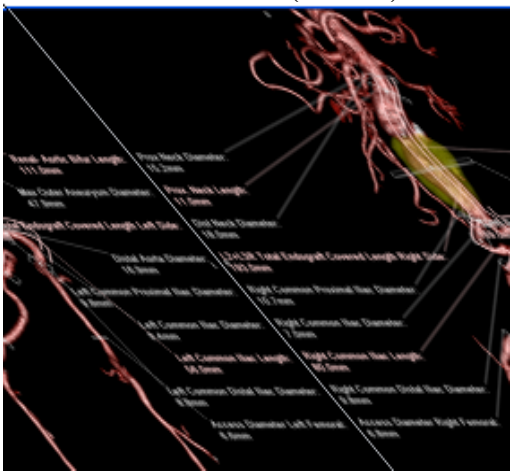

Figure (2): 79 years old male with infra renal aortic aneurysm 4.79. cm with narrow distal aortic diameter16.9 mm, treated by aorto uni-iliac graft and femorofemoral bypass.

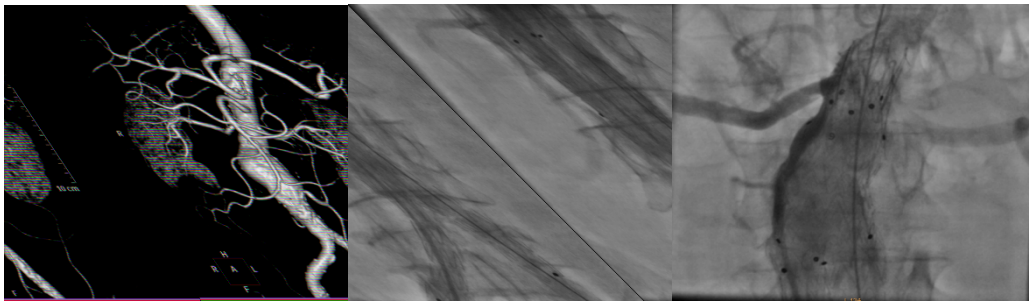

Figure (1): 67 years old male with infra renal aortic aneurysm5.6 cm treated by EVAR, type Ia endoleaks treated by aortic cuff ,minimal residual endoleaks that disappear on one month follow up scan.

Discussion

The technical success rate for abdominal aortic endografting is high, and the overall rate of severe perioperative complications is low compared with open surgical repair; however, the endograft remains a dynamic entity and late complications are more likely. Complications associated with endovascular abdominal aortic repair are usually related to someanatomical and technical aspect of endograft placement such as problems with vascular access, or due to the structural integrity and stability of the endograft such as endoleak, endograft migration, or endograft collapse. [12]

EVAR is an FDA-approved alternative for open AAA repair. Patients with large (>5–5.5 cm) aneurysms or patients with smaller size (4–5 cm) aneurysms but rapidly enlarging should be considered for repair. Although many published series for endovascular AAA repair include patients with small AAA, findings of randomized clinical trials showed that, compared with surveillance by CT or ultrasonography, a strategy of immediate repair did not improve survival among patients who had AAA of 4–5.4 cm in diameter. [4,5,7,12]

In our study all patients were male aged between 63-79 years with 50% aged above 66 years, this reflect that the AAA is a disease of aging male. Smoking, hypertension, and dyslipidemia advancing aged male sex ischemic heart disease were the main risk factor in our patients with smoking present in 100% hypertension 80%,dyslipidemia 80% .

Kent et al assure that these are Well-defined clinical risk factors are associated with the pathogenesis of AAA except for diabetes. [2]

In our study 2 patients (28.5%) were asymptomatic and 5 patients (71.5%) are symptomatic, symptomatic patients presenting with abdominal and back pain .
the symptoms are directly related to the size of the aneurysm and 2 patients (28.5%) of infra renal AAA associated with unilateral CIA aneurysm.

In our study subgroup analysis found no relation between the advanced age and the maximum diameter of the aneurysm present in older group of patient but with rapid growth rate.
endoleaks occurs in 3 patients(43%) of patients post implantation with 14% (one patient) persistent type Ia endoleaks on completion which followed up with spontaneous regression in one month duration. Limb occlusion occur in 1 cases 14%
Veith et al. found that after successful EVAR an endoleak rate of 24%. Of these endoleaks, 66% were present immediately after stent graft placement and 37% were persistent over time. The clinical significance of endoleaks and their impact on the natural history of aneurysms is uncertain and poorly understood.[1,10,11]
The stent grafts used were Bifurcated Medtronic (endurant) in 4 patients (57 %) and uin-iliac Medtronic in one patients 14% of patients and cook (zenith) in 2 patients(28.5%) with endoleaks type Ia occur in 2 cases of the aneurysm received endurant stent graft.

Brown et al. found that there are no clear advantages of one stent-graft design over another. The overall performance among the available devices is similar and the available data confirm uniformly low complication rates. The choice of a particular device design is based upon multiple factors, including patient anatomy, operator preference, and cost. An endograft system that can handle all types of AAA, including those with angulated or tortuous anatomy, has yet to be achieved. [14]

Endograft complications rarely lead to a need to convert to open surgery at the time of placement, and when they occur late, can usually be managed using endovascular means. Device-related complications are the main reason for reintervention (including late conversion).

Conclusions

- Endovascular repair of AAA has improved the perioperative morbidity and mortality of patients undergoing AAA repair compared to open surgical repair,
- The technical success rate for abdominal aortic endografting is high, and the overall rate of severe perioperative complications is low.
- Complications associated with endovascular abdominal aortic repair are usually related to some anatomical and technical challenges.
- With future advances in endograft technology, expanding operator experience, and improved surveillance techniques, the current trend

of expanding indications for EVAR procedures is likely to continue.

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