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Endovascular Repair of infra-renal Abdominal Aortic Aneurysm (Retrospective study)

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Abstract

Patients can be treated by traditional open careful fix (OSR). Nonetheless, there are as yet a few complexities related with OSR. The point of this examination was to layout an edge for location and analysis of patients with stomach aneurysms by means of various clinical and radiological strategies, to consider the patients appropriate for EVAR as per the patient choice standards, to feature the advantages and benefits of endovascular systems and to evaluate the conceivable complexity of endovascular methods and how to dodge it. Patient and strategies: Retrospective investigation of 20 patients went through endovascular fix of infra renal stomach aortic aneurysm . Patients gave convoluted AAA (burst or thrombo-embolism) required crisis intercession were excluded from the investigation. Duplex blood vessel investigation of lower appendages was accomplished for all patients to look at presence of fringe blood vessel infections . CTA is the key examination instrument for full assessment of the condition and arranging the techniques for treatment. It gives every one of the required models and information to choose whether the condition is reasonable for EVAR or not, and if yes what will be required in the gadget to be utilized. So CT Angiography was fundamental in arranging the treatment as well as in deciding the sign of treatment and determination of cases for the examination in any case. Results: No patients showed endoleak. At one year, all patients showed absolute aneurysm apoplexy, 94.4 showed patent unite appendage, and no patients showed endoleak. At a year, 94.4% of patients showed patent unite appendage after one patient had join appendage apoplexy. End: Endovascular fix of stomach aortic aneurysms has improved the perioperative horribleness and mortality of patients going through stomach aortic aneurysms fix contrasted with open careful fix**.**

Keywords: abdominal aortic aneurysm, Endovascular Repair, conventional open surgical repair.

1. Introduction

Most stomach aortic aneurysms (AAASs) are distinguished by chance during clinical examination (e.g., ultrasound or X-beam) for different conditions. Since most AAAs are asymptomatic, it is hard to gauge their commonness. The rate of indicative AAA in men is roughly 25 for each 100,000 at age 50, expanding to 78 for every 100,000 in those more seasoned than 70 years [1].

Manifestations that can happen as an aneurysm augments remember a throbbing sensation for the mid-region, back torment, and stomach torment that may spread to the back. Patients with an indicative AAA need fast clinical consideration. Among patients with a cracked AAA the death rate is about 80% which increments up to 90% when in-clinic passings are incorporated. In any event, when they go through crisis medical procedure, just about half get by past 30 days. It has for quite some time been set up that, for huge aneurysms in any event, prophylactic measures are needed to forestall aneurysm burst and one of every three aneurysms will crack whenever left untreated [2].

Elective medical procedure is for the most part suggested for patients with aneurysms bigger than 5.5 cm in breadth and with aneurysms bigger than 4.5 cm in measurement that have expanded by more than 0.5 cm in the previous a half year. Current rules from the Vascular Society and the National Screening Committee suggest that patients with asymptomatic aneurysms of under 4.5 cm in breadth ought to be circled back to ultrasonography at regular intervals, and aneurysms of 4.5–5.5 cm in distance across ought to be followed up each 3 or a half year [1].

Patients can be treated by ordinary open careful fix (OSR) which includes laparotomy and addition of a prosthetic join to supplant the aneurismal aorta. OSR can likewise be performed laparoscopically, either by hand-helped laparoscopic medical procedure or absolutely laparoscopic medical procedure. Nonetheless, AAAs can likewise be treated by a negligibly obtrusive methodology which includes position of an endoluminal stent–join through the transfemoral approach. This strategy called as endovascular aneurysm fix (EVAR) has reformed the treatment of AAAs over the most recent twenty years. For over 50 years, OSR has been utilized as the standard treatment methodology for AAA with a serious level of accomplishment, death rates having been decreased from 20 to ~5% in the previous 30 years [3]

Nonetheless, there are as yet a few entanglements related with OSR: it is a profoundly intrusive method (an entry point is produced using the sternum to the pubic bone or across the abdomen) that is regularly performed on the old. Furthermore, despite the fact that death rates are sensibly low in simple cases (5%), higher rates are frequently related in those with co-dreary illnesses like coronary supply route infection and renal disappointment [4].

OSR may likewise bring about critical damage to the patient, with myocardial dead tissue, respiratory and renal disappointment, and changes in practical status potentially happening. At long last, recuperation rates are in the locale of a while, bringing about a decrease in personal satisfaction for the patients for as long as 3 months post-operatively [1].

Endovascular aortic aneurysm fix (EVAR) is by and large progressively applied as a less-obtrusive choice to open careful fix of stomach aortic aneurysms (AAAs).

It is a fantastic treatment choice for AAA when performed on properly chose patients and with sufficient preoperative arranging. Ongoing preliminaries have announced lower transient usable death rates for EVAR than open careful fix, yet the drawn out aftereffects of endograft fix are obscure [5].

Preoperative arranging and patient determination are fundamental for acceptable present moment and long haul results and vital to the effective far and wide appropriation of EVAR. A careful comprehension of the fundamental anatomic measures for EVAR is fundamental prior to mulling over the methodology or choosing the suitable gadget. While surveying the blood vessel life systems of a patient for possible EVAR, different variables should be thought of. These incorporate the nature of ilio-femoral access, the proximal landing zone (infrarenal neck), the life systems of the actual aneurysm, the life structures of the distal aorta, and the distal landing zones (most ordinarily in the basic iliac veins however can be more distal, contingent upon the patient's pelvic life systems) [5].

Anatomical appraisal directs the specific endograft generally reasonable, as each endograft configuration tends to various anatomical issues and may better oblige an individual patient's aneurysm. An intensive comprehension of these gadgets is likewise essential before a sound clinical choice can be made about which gadget is the most suitable fit for a specific patient's aneurysm. Helpless patient or endograft choice will definitely prompt helpless outcomes and critical long haul complexities [5].

The point of this examination was to diagram an edge for discovery and finding of patients with stomach aneurysms by means of various clinical and radiological strategies, to consider the patients appropriate for EVAR as indicated by the patient determination rules, to feature the advantages and benefits of endovascular systems and to evaluate the conceivable confusion of endovascular methods and how to evade it**.**

2. Patient and Method

Retrospective analysis of 20 patients underwent endovascular repair of infra renal abdominal aortic aneurysm from Benha and Cairo university hospitals and Nile hospital for health insurance between January 2017 and December 2019 . Followed up till December 2020.

For every patient the whole procedure planned to him was explained and the possible benefits and risks including failure, complications and possible alternatives were discussed and an informed consent was obtained following the ethical committee requirement of the university.

2.1 Inclusion criteria

An abdominal aortic aneurysm meeting any of the following criteria:

- Aneurysm diameter of > 5.0 cm documented by CT angiography
- Aneurysm diameter with a documented expansion of > 0.5 cm in six months or > 1.0 cm in 12 months documented by CT angiography.
- Symptomatic AAA with impending rupture, regardless of its size.

2.2 Patient has all of the following suitable aneurysm morphology:

- Proximal neck diameter of 32 mm or less for secure proximal fixation.
- An inner vessel diameter approximately 10 to 20% smaller than the labeled device diameter
- Infrarenal non-aneurysmal neck length of ≥ 1 cm at the proximal and distal ends of the aneurysm as all currently available aortic endografts require a minimal neck length of 1-1.5 cm between the most caudal renal artery ostium and the onset of the aneurysm to adequately seal to prevent proximal endoleak (type Ia).
- An aortic neck angle (the angle between the aortic neck and the main longitudinal flow axis of the aneurysm) < 60 degrees.

2.3 Exclusion Criteria

- Aortic neck of significant thrombus or circular calcification, which may interfere with both appropriate proximal sealing and secure proximal fixation of the stent-graft
- Iliac artery tortuosity, calcification.
- Ruptured or Dissecting AAAs
- Distally embolizing or Inflammatory aneurysms
- Juxtarenal, Pararenal, Suprarenal or thoracoabdominal aneurysms
- An aortic neck angle > 60 degrees
- Morbidly obese patients whose weight exceeds 350 lbs (150 kg) because it may obstruct accurate fluoroscopic imaging
- Mesenteric Vascular Occlusion Disease
- Sensitivities or allergies to the device materials, which include polyethylene-terephthalete (PET), nickel, titanium, tantalum, stainless steel, polyetheresterblock- copolymer (Hytrel), polyetherblockamide (Pebax), polyetheretherketone (PEEK), platinum, ethyl cyanoacrylate, poly (methyl methacrylate), and hydroquinone.
- Preexisting renal insufficiency because use of this device requires administration of radiographic agents
- Terminal Malignancy & poor life Expectancy.
- Refusal of the patient.

Some of the patients were asymptomatic.They were discovered accidentally. Majority of patients presented with symptoms such as back pain and sense of abdominal pain/fullness and pulsations.

Patients presented with complicated AAA (rupture or thrombo-embolism) needed emergency intervention were not included in the study.

Duplex arterial study of lower limbs was done for all patients to check out presence of peripheral arterial diseases

Ankle Brachial index for every patient was measured to judge out associated peripheral arterial disease.

CTA is the key investigation tool for full evaluation of the condition and planning the strategies for treatment. It provides all the needed criteria and data to decide whether the condition is suitable for EVAR or not, and if yes what will be needed in the device to be used.

So CT Angiography was essential not only in planning the treatment but also in determining the indication of treatment and selection of cases for the study in the first place. Data extracted from the CTA included:

1. The size of the aneurysm.
2. Diameter, length, morphology and possible pathology of the neck.
3. Angulation of the neck (infra renal angle).
4. Length, diameter and angulation (tortuosity) of the iliac vessels, and if the iliac bifurcation is included in the aneurysm or not.
5. Renal arteries and accessory renal arteries.
6. Diameter and calcification of the common femoral artery.

2.4 Procedure Anesthesia

Either general or combined spinal-epidural anesthesia was used according to every patient characteristics and according to the anesthesiologist.

Access

Reciprocal open access by means of femoral cut-down was done open on the whole cases. The decision of the ipsi-parallel side (for example side of the principle body) was chosen for each case as indicated by the life systems with inclination to the more convoluted iliacs. On the off chance that both iliacs were comparable in convolution the correct side was picked of course for the ipsi sidelong side.

Introductory access was accomplished reciprocally with traditional presentation 6Fr sheaths followed by two-sided floppy 0.035" Terumo wire addition and advance till the aortic curve.

Ponytail inclusion from the contra parallel side utilized for angiography and kept somewhat higher than the level of the renal courses (L1-L2). An angiography is taken and the view obliquity is changed by the foreordained life structures to ideally picture the renal conduits and the site of renals is stamped and guide is utilized and the table is fixed. The ipsi horizontal wire is traded over a catheter with a super-solid wire (Lunderquist, Amplatz or Rosen) which is kept in the aortic curve.

Conveyance

The principle body is embedded after change of its particular markers direction under fluoroscopy over the patient's body, since direction change after inclusion isn't suggested on the grounds that twist may happen.

As per the gadget markers the join is situated with the goal that the contra horizontal entryway is inverse to the contra parallel iliac course in a sidelong or somewhat antero parallel position. Inability to change the direction may make the entryway be inverse to the ipsi parallel iliac supply route which will make the door cannulation troublesome and will bring about the "Ballet performer" arrangement of the join at fruition, so this ought to be kept away from. After addition the join is progressed till the level of the renal supply routes.

Organization

Change the markers to the least renal corridor at that point start arrangement of the initial 2-3 stent-cells, at that point shoot another angiography to affirm the connection between the most minimal renal and the markers. It was conceivable with the join we utilized (Endurant and Zenith Flex) to straighten out the situation now by pulling on the unite downwards however not prescribed to push it upwards, so in the event of uncertainty it is smarter to begin arrangement somewhat higher and afterward correct by pulling down the gadget.

Proceed with sending till the marker of the door shows up. It ought to be over the aortic bifurcation and inverse to the contra parallel iliac. Stop sending now and don't proceed with arrangement of the ipsi parallel iliac. This aides the in join obsession and forestall scattering.

Pull out the contra parallel ponytail (over a wire) till the level of the iliac and afterward begin cannulating the contra sidelong door with floppy 0.035" wire. After cannulation affirm the situation inside the unite (not para-join) by advancing the braid through the door and turning its bended tip.

A short time later addition the contra horizontal iliac appendage and convey it with guaranteeing a cover with the principle body at any rate 1.5 stent-cells. Return to the ipsi sidelong side and proceed with organization of the ipsilateral iliac, at that point at long last send the proximal suprarenal obsession stent.

Iliac expansions are utilized if necessary (as a rule with the Zenith Flex an ipsi sidelong iliac augmentation is required). Guarantee a cover of at any rate 1.5 stent-cells to keep away from type III endoleak.

At last it is prescribed to utilize a trim agreeable inflatable to guarantee relation of the unite yet just inflatable at the fixing zones and locales of cover, and never outside the join.

2.5 Closure of the groin

After complete haemostasis closure was done

2.6 Postoperative care

All patients were transferred to ICU postoperatively for proper monitoring and controlled hydration. Post-operative Hemoglobin level was measured at day-1 and serum creatinine level was measured at day-2 postoperatively.

Each patients was transferred to the ward after being stabilized.

2.7 Follow up plan

Each patient was planned to be followed up after hospital discharge twice, the first after 2 weeks- and the second after one month. then regulary every 6 months . The patients were instructed to seek the follow up if any problem happens during the period in-between.

Each patient was followed-up for the vascular status based on the CT angiography, and also followed-up for the general health and existing or possible comorbidities and the wounds.

All the data and steps collected and done during the preoperative, operative, postoperative or during the follow-up intervals were recorded for interpretation of the results.

3. Results

The mean age of the study population was 66 years, with a standard deviation of 9 years. As regard gender, the majority (95%) were males, and 5% were females. 68.4% were smokers. Hypertensive & diabetic patients represented 80% & 35%, respectively. 50% of patients had coronary artery disease. No positive family history was reported

60% of patients were accidentally discovered. 55% had back or groin pain. Abdominal pain and pulsating mass represented 25% for each. 15% showed limb ischemia, and 10% showed other presenting symptoms

As regard size and thrombus load, the means were 6.4 and 44%, respectively. Mean neck diameter was 28 mm. The mean Aortic bifurcation diameter was 22 mm. Regardingthe distal landing zone, 65% were normal, and 30% were stenotic, and only 5% showed aneurysm.

The mean amount of contrast used was 163 ml. Mean blood loss volume was 248cc. Blood transfusion was needed in 5% of patients. Mean procedure time was 3.34 hours, and mean hospital stay was three days.

Iliac stenting was done in 30% of cases. IVUS was done in 25% of patients, and 5% of cases underwent femoro-femoral bypass.

The most frequent procedure complications were endoleak and groin wound hematoma (10% for each). While the least frequent complications were limb ischemia and graft limb thrombosis (5% for each).

Total aneurysm thrombosis was seen in all patients with endoleak at 1, 6, and 12 months.

At one month, 90% showed no change, and only 10% showed progression. 47.4% showed no change at six months, 36.8% showed progression, and 15.8% showed regression. At one year, 44.4% showed no change, 38.9% showed progression, and 16.7% showed regression.

75% of devices used were Cook device, and 25% were Medtronic device.

At one month and six months, all patients showed total aneurysm thrombosis and patent graft limb. No patients showed endoleak. At one year, all patients showed total aneurysm thrombosis, 94.4 showed patent graft limb, and no patients showed endoleak

At one month, no deaths were reported, either procedure or non-procedure related. At six months, one patient died due to a cardiovascular cause (non-procedure related). No deaths were reported due to our procedure. At one year, another patient died due to a non-procedural cause (myocardial infarction). No procedural deaths were reported.

At one month and six months, 100% of patients showed patent graft limb. At 12 months, 94.4% of patients showed patent graft limb after one patient had graft limb thrombosis.

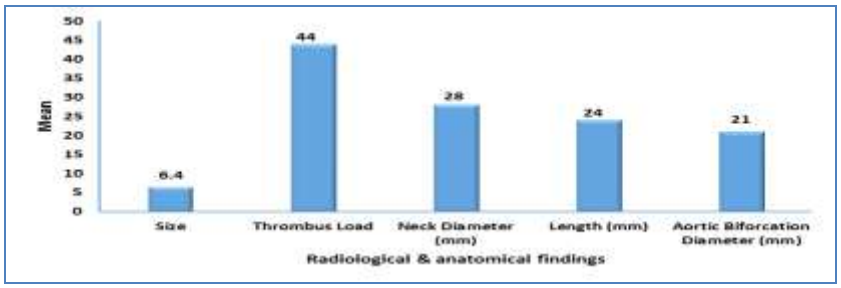

Fig (1) Radiological & anatomical findings in the whole study population.

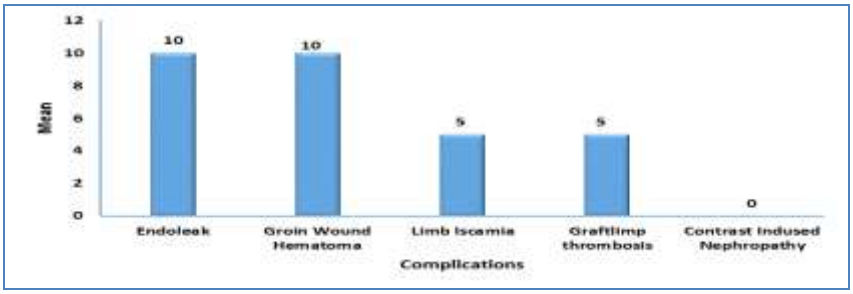

Fig (2) Complications in the whole study population.

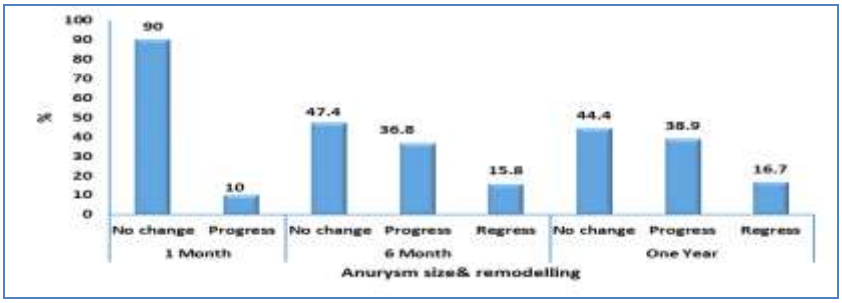

Fig (3) Aneurysm size and remodeling at different follow up times.

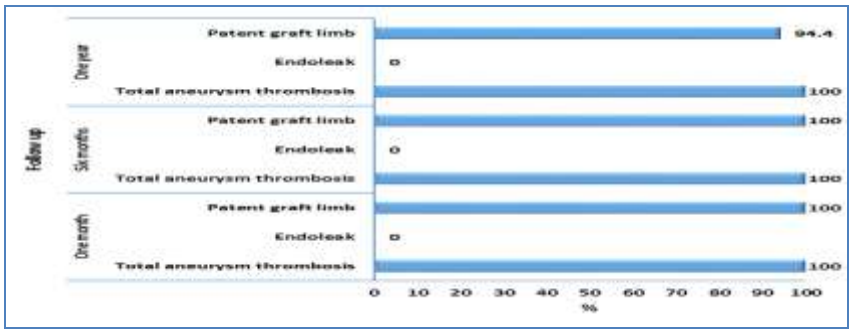

Fig (4) Procedure-related findings at different follow up times.

4. Discussion

The presentation of endovascular joining was an achievement in the therapy of patients with AAA in that it gave a therapy alternative to those patients with enormous aneurysms who had been inoperable due to the presence of huge clinical comorbidities. In the expansion of this innovation to all patients with aneurysmal sickness, clinical examinations have affirmed that contrasted and open a medical procedure, an early advantage in personal satisfaction can be accomplished, as it identifies with decreasing clinic stay and recuperation period [6].

Not all patients with AAAs with signs for mediation are contender for endovascular systems and, actually the satisfactory choice of patients is the main factor for achievement in treatment. The maincriterion of choice identifies with the life structures of the aortic ,iliac and femoral framework [7].

In our investigation we detailed 0 cases (0%) of type I endoleak. Endoleak type I happens due to inadequate fixing of the proximal (type Ia) or the distal (type Ib) end of the endograft with the aorta or iliac supply routes Hostile life systems, for example, short, cone shaped or angulated neck or iliac landing zones, are inclining factors for type I endoleaks. Type I endoleaks happen at a pace of 3-4 % more than 6 years follow up [8].

Type I endoleaks are related with critical danger for burst and ought to be overseen immediately

The stent unites utilized were cook (pinnacle) in 75% and Medtronic (endurant) in 25% of patients and of patients with endoleaks type 2 happening in 2 cases 20% of the aneurysms . 0ne case from apex and the other from endurant stent join.

Badrekhan Hassan, [8] showed that in the examination III, the vast majority of the kind II endoleaks could be recognized on the main postoperative CTA. During follow-up time were 3cases (1.4 %) in the okay versus 15 cases (13.2 %) in the high-hazard bunch created sac growth,while in Study IV,there were 78cases with type II endoleaks, incorporating 28 patients with type II with extension.

In our investigation we report 2 cases 10% of type 2 endoleak treated by snaking of the causative vessel while [8] announced 13 patient of 114 with apercentage of 11.4% in the high danger groupe patent of his examination.

Studies report that most reasons for crack were because of direct endoleaks and not sort II [9].

Earthy colored et al.[10], found that there are no reasonable benefits of one stent-join plan over another. The general presentation among the accessible gadgets is comparative and the accessible information affirm consistently low entanglement rates. The decision of a specific gadget configuration depends on different variables, including patient life structures, administrator inclination, and cost. An endograft framework that can deal with a wide range of AAA, incorporating those with angulated or convoluted life structures, still can't seem to be accomplished.

In our investigation Groin twisted hematoma as post employable complexity was noted in 2 cases (10 %) and were dealt with minimalistic ally by intermittent injury dressing and anti-infection agents.

Trinidad et al. [11] an investigation accomplished for assessment of twisted inconveniences after EVAR, there were 14,868 patients who went through EVAR for AAA between the years 2005 and 2014. Of those, 384

(2.6%) created twisted complexities after EVAR. Dominant part of wound entanglements (94%) were SSI. Among those with SSI, 68% had shallow SSI, 21% had profound incisional SSI, and 5% named organ space SSI. The excess non-SSI wound complexities were wound dehiscence (6%)

Trinidad et al. [11] additionally expressed that Patients with wound complexities were bound to be female (4.0 versus 2.2%) and strangely the just a single female patient remembered for our examination was convoluted with wound hematoma (5%)

In our examination there was just a single patient confounded with distal appendage ischemia as a post employable entanglement (5%)

In an investigation of Thomas et al., [12] that were performed more than 9 years on 311 patients with AAA went through EVAR, there were 28 patients with ischemic entanglement, 21 had lower extremity ischemia and 7 had pelvic ischemia and he expressed that it isn't phenomenal to create ischemic confusion after EVAR and it might surpass the rate with open careful fix.

In our investigation there is no patients convoluted with contrast instigated nephropathy (0 %). Albeit 25% of our patients experiencing ongoing renal disability showed by expanded serum creatinin level in the preoperative appraisal.

In our investigation, there were no optional reinterventions needed for any of the significant inconveniences aside from one patient showed distal appendage impediment in the development and was overseen by femoro femoral by pass. Significant entanglements, for example, unite relocation, underlying disappointment, join twisting, aortoenteric fistula, or aneurysm break were not experienced during the development. This might be ascribed to the progressions in join configuration just as administrator subordinate inclusion method.

Diary of vascular medical procedure (JVS) in an investigation done by Khanjan et al [13] see that the time from activity to release was 2.9 days. In our investigation the normal emergency clinic stay was 3 ±0.9 days.

EVAR 1 (English examination) Rajesh et al., [14], had exhibited an essentially lower death rate in patients who were submitted to the endovascular treatment than in patients who were submitted to the open a medical procedure and the DREAM multicentric Dutch preliminary Badrekhan Hassan, [8], which likewise showed atendency of less usable mortality (over the initial 30 postoperative days) with the endovascular strategy when contrasted and open a medical procedure.

In our arrangement, we didn't have mortality during the methodology however we have two mortalities during a half year and one year follow up because of different causes.

5. Conclusion

Endovascular fix of AAA has improved the perioperative bleakness and mortality of patients going through AAA fix contrasted with open careful fix, albeit further long haul follow-up is needed to decide the sturdiness of these fixes. The coming of spread and fenestrated join innovation will probably extend endovascular stent unions to every aortic section. Long haul achievement is best accomplished if the gadgets are utilized in appropriately chose patients and are developed of solid materials that can withstand the physiological milieu into which they are set. Cautious patient determination and careful observation postoperatively are fundamental for long haul achievement. With future advances in endograft innovation, growing administrator experience, and improved reconnaissance strategies, the latest thing of extending signs for EVAR systems is probably going to proceed.

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