Egyptian Journal of Surgery Vol 27, No 1, Jan., 2008

ORIGINAL ARTICLE

EARLY MORBIDITY AND MORTALITY AFTER RETROPERITONEAL REPAIR OF THE ABDOMINAL AORTA WITH MODIFICATION OF THE PATIENT'S POSITION

By
Sherif Reffat, Mohamed Shams, Mohamed Shaarawy, Mohamed Gamal, Omar Saleh, Mohamed Sherif, Mamdouh Almezaien
Department of General Surgery, Faculty of Medicine, Suez Canal University, Ismailia, Egypt

Correspondence to: Sherif Reffat, Email: shrefat@hotmail.com

Aim: Repair of the abdominal aorta is a major procedure that has a considerable morbidity and mortality. Efforts are exerted to reduce this operative risk, one of which is the surgical approach of the Aorta. This study was carried out to evaluate the retroperitoneal approach regarding morbidity and mortality during the operation and for 30 days afterward and to evaluate the accessibility of this approach while the patient in supine.
Methods: Nineteen patients with a mean age of 65.5 years were admitted for the repair of Abdominal Aorta between March 2004 and March 2006. To repair the Aorta of these patients it was approached retroperitonealy, using the standard technique with modification of the patient's position. Operative and post-operative data were measured and compared to the literature.
Results: Mean operative time, intra-operative fluid replacement and ICU stays were less compared to the transperitoneal approach. Normal intestinal sounds were regained after 2 days in most of the patients. Mean hospital stay was 6.7 days with no mortality.
Conclusion: This study supports that retroperitoneal approach has early morbidity and mortality that is comparable to the accepted rate of complications in literatures. This approach provides a convenient exposure to treat different anatomical lesion of the distal Aorta and iliac arteries, when we operate with the patient in the neutrally supine position.

Keywords: Aneurysm, Leriche syndrome, atherosclerosis.

INTRODUCTION

Abdominal Aortic Atherosclerotic diseases (Aneurysm and Occlusive) are common among elderly population, especially after the age of 50. These patients are usually smokers and have ischemic heart disease, hypertension, diabetes and Hyperlipidaemia.[1] Therefore, the treatment options are risky.

In treating these patients, surgeon has to choose the safest approach with the least morbidity and mortality. Therefore, Endovascular repair is the first choice if applicable, as it is considered to be the least invasive approach to such patients. However, still have its limitations and also controversies regarding the material of the graft and long term complications. This leaves a space for the standard open method to treat such conditions, which has always been considered a major surgical procedure.[2-4]

It is true that improvements in the preoperative patient assessment and preparation, anaesthetic management, operative techniques and postoperative care have all contributed to the results of open aortic surgery, however a wide space still exist for refinement of the different aspects to lower the currently accepted rates of morbidity and mortality.[5]

Open Abdominal Aortic surgery can be performed through Midline Transperitoneal incision, which still considered to be the standard method. On one hand, it allows exploration of the abdominal organs and good access of right and left renal and iliac arteries. On the other hand, the patient's cardio-respiratory function is much restricted with the long midline incision and his intestinal function is affected by the aggressive manipulations and exposure.[1]

The Transverse Transperitoneal incision is thought to decreases the respiratory splinting of the longitudinal incision. However, statistically it did not prove to decrease the morbidity or mortality.[1]

Hand assisted Laparoscopic approach is another option that uses relatively small incision. The operative time is very long in this approach and still has the disadvantages of accessing the Aorta transperitoneally.[4]

The Retroperitoneal approach is gaining popularity because of suggestions that pulmonary morbidity, ileus and intravenous fluid requirements are decreased.[6] However, because the semi-lateral position is the standard for this approach[1,7] (Fig. 1), this approach is claimed to be unsuitable when right iliac or femoral anastomosis is a part of the operation.[7]

The aim of this study was to evaluate early morbidity and mortality after retroperitoneal repair of the infrarenal aortic atherosclerotic or aneurismal diseases.

In addition, as a secondary objective, the study aimed to evaluate the accessibility of this approach, with the patient in supine position, for right side iliac or femoral anastomosis when it was a part of the operation.

Study design: This is a Prospective Descriptive case-series study. Target population includes patients with aortic occlusive or aneurismal diseases.

PATIENTS AND METHODS

Patients admitted to the hospital in the period between March 2004 and March 2006 with the following criteria were included in the study:

1. AAA more than 5 cm in diameter.
2. Rapidly growing AAA.
3. Symptomatic AAA.
4. Symptomatic Leriche syndrome.

Patients with the following criteria were excluded from the study:

1. Leaking AAA.
2. Acute Myocardial infarction within the last 6 months.
3. Unstable angina.
4. Complex cardiac arrhythmia.
5. Congestive heart failure.
6. Juxta-, para- and supra-renal abdominal Aortic Aneurysm.
7. Patients unfit for anesthesia.

Patients who fulfilled these criteria were nineteen patients, 16 males and 3 females. Their ages ranged between 58 and 72 years with a mean age of 65.5 years.

Regarding the risk factors, 79% of them were smokers, 74% were hypertensive, 53% were diabetics, 42% have ischemic heart disease and 54% have hyperlipidemia Table 1.

Table 1. Distribution of the risk factors.

Risk factor	Positive	%	Negative	%	Total
Smoking	15	78.9	4	21.1	19
Hypertension	14	73.6	5	26.4	19
Diabetes	10	52.6	9	47.4	19
IHD	8	42.1	11	57.9	19
COAD	4	21.1	15	78.9	19
Hyperlipidaeia	15	78.9	4	21.1	19

Operative procedure: After receiving combined epidural and laryngeal mask general anesthesia, the patient was positioned neutrally supine on the operative table, sterilized and covered with special care to hide the genitalia.

Acting on the left side, an oblique incision was made starting from the tip of the eleventh rib till the midline, mid way between the umbilicus and symphysis pupis (Figs. 2,3).

The incision was deepened through the muscle till the peritoneum was reached. The retroperitoneal space was entered and enlarged anterior to the left kidney.

The anterior surface of the Aorta was dissected up to the renal vein and the third part of the duodenum. When the occlusion / aneurismal dilatation involve the aortic bifurcation, both iliac arteries were explored and used for graft distal anastomosis. We were able to reach the proximal part of both external iliac arteries by this approach. Both groins were explored and the common femoral artery was used for graft outflow when the

occlusion/aneurismal dilatation involve the iliac arteries, (Figs. 2, 3).

The same team did all the nineteen operations.

All patients admitted routinely to the ICU after discharge from theater. They were discharged to the ward when stable depending on vital signs, urine out put, ECG, arterial blood gases, CVP, hemoglobin, bleeding profile, serum creatinine, liver functions and controlled blood sugar. Patient stability was the decision of the ICU team.

The following data were recorded:

1. Operative time (from skin incision to skin closure).
2. Injury to surrounding structures.
3. Intra-operative blood and fluid replacement.
4. ICU stay.
5. Return of intestinal sounds.
6. Hospital stay.
7. Cardio-respiratory events.
8. Mortality rate during the operation and for one month after.

Patients were reviewed weekly after discharge for one month.

RESULTS

The studied group of patients was mainly male gender (16/19) with a mean age of 65.5 years.

Regarding the presentation; 12 patients (63%) presented with Leriche syndrome, in one of these 12 patients the presentation was acute on top of chronic bilateral limb ischaemia. Aorto-bifemoral graft was used in 11 patients (58%) and Thrombo- endarterectomy in one patient (5%).

The remaining 7 patients (37%) admitted with infra renal AAA, repaired by Aorto-bi-iliac in 5 patients (26%) and tubal graft in 2 patients (11%) as in (Fig. 4).

Operative time ranged between 50 to 120 minutes with a mean of 98 minutes. During the operation fluid and blood replacement ranged between 500 and 1500 ml with a mean of 750 ml. None of the patients had injury to surrounding structures during surgery.

All patients were routinely admitted to ICU postoperatively. The admission period ranged from 1 to 3 days for most of the patients (95%) with a mean of 1.9 days. By the second postoperative day 84% of the patients were discharged from the ICU to the surgical ward Table 2.

Most of the patients (89%) regained their intestinal motility within two days after the operation with a mean of 1.8 days Table 2.

We had no operative deaths and all the nineteen patients discharged home maximally 8 days postoperatively with a mean hospital stay of 6.7 days Table 2.

During the post operative follow up only two patients had superficial wound infection, which recovered with antibiotics. None of the nineteen patients died during the 30 days follow up period.

Table 2. ICU and Hospital stay and Regain of intestinal sounds.

Post operative days	Discharged from the ICU		Regain of intestinal sounds		Discharged from the Hospital	
	Number of patients	%	Number of patients	%	Number of patients	%
1	6	31.6	5	26.3	-	0
2	10	52.6	12	63.1	-	0
3	2	10.5	2	10.5	-	0
4	-	0	-	0	-	0
5	1	5.3	-	0	2	10.5
6	-	0	-	0	4	21
7	-	0	-	0	10	52.6
8	-	0	-	0	3	15.8
Total	**19**	**100**	**19**	**100**	**19**	**100**

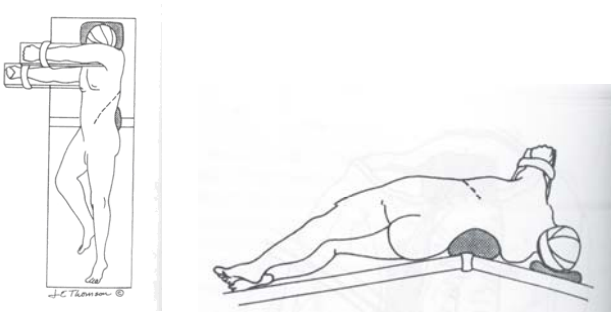

Fig 1. Abdominal and two groin skin incision.

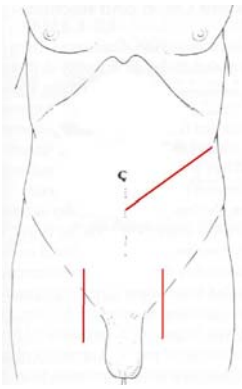

Fig 2. Abdominal and two groin incisions in neutral position.

Fig 3. Abdominal and two groin incisions in neutral position.

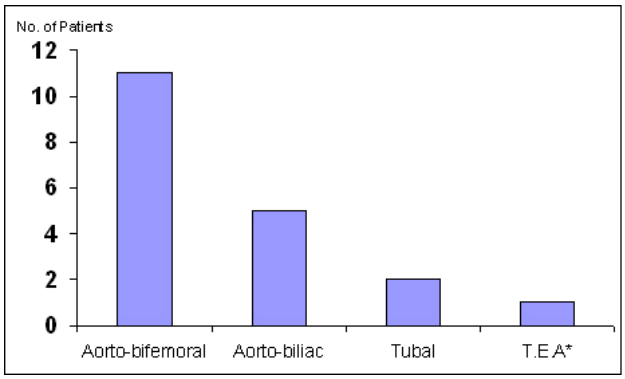

Fig 4. The different methods used to treat the aorta.

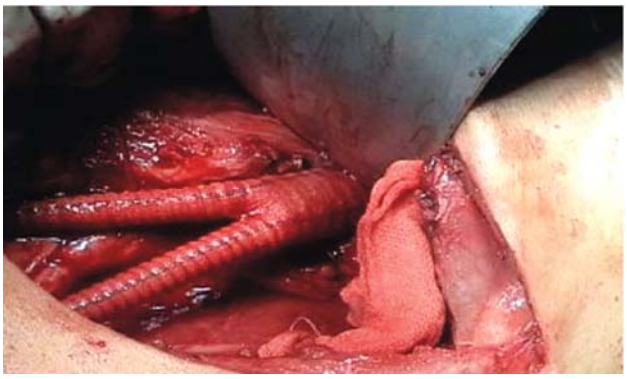

Fig 5. Easily accessible distal aorta and both iliac arteries.

DISCUSSION

Open repair of the Abdominal Aorta is still practiced widely.[8-10] In the presenting study the infrarenal abdominal aorta was approached retroperitoneally assuming that this approach will have a better outcome regarding early morbidity and mortality.

The operative procedure was done with the patient lying supine. This modification allows easily access to the right iliac artery and right groin when indicated (Figs. 3,5).

Therefore, the indications to do this approach were more extended than what is recommended in previous literature such as previous abdominal surgery, abdominal stoma, inflammatory aneurysm and high cardiac or respiratory risk for transperitoneal approach.[1,6,11] In our study, this approach used to treat patients with AAA or Aortic occlusive disease in whom the right limb of the Y graft was anastomosed easily to the right iliac artery or the right femoral artery, as the patient was lying neutrally supine.

Mean operative time was 98 minutes. This agrees with Laohapensang who found that operative time in the retroperitoneal approach is less than the transperitoneal one, which usually takes 180 minutes.[12] This also seems to be much less than the Hand Assisted Laparoscopic approach (257 +/- 70 minutes).[13] This may reflect good accessibility of the approach, although this needs all approaches to be done by the same operative team and for one selected indication to confidently compare the results.

Mean blood and fluid replacement was 750 ml; this is compared to 1136 ml in Transperitoneal approach,[14] which can be explained by the relatively bloodless field created and absence of peritoneal fluid evaporation as the peritoneum was not opened.

As we did not open the peritoneum and did not manipulate aggressively the bowel, intestinal sounds were regained after one day in 26% of the patients and by the second day 89% of the patients had audible intestinal sounds. This early return of intestinal function encouraged early restore of oral intake and early recovery.

Mean ICU stay was 1.9 days. This is quite accepted when compared to 1.3 days when endovascular repair (the least invasive approach) was used [15]. This may be due to less effect of the oblique wound on the cardio-respiratory functions.

Hospital stay ranged between 5 and 8 days with a mean of 6.7 days, this is quite satisfactory when compared to 4.2 days in endovascular repair, which is considered to be the least invasive approach.[15] This may be due to the early resuming of oral feeding and because the patient can adapt more easily to the less painful oblique wound that has less cardio-respiratory effect and allows early mobility.

We had no mortality in this study. This agrees with Shindo, et al who found low mortality when using the retroperitoneal approach.[16]

Superficial wound infection occurred in tow patients, which can be considered a minor complication in such aggressive operation.

On the other hand, few literatures suggested no benefits for the retroperitoneal approach over the transperitoneal one.[14,17] However, these results depend on data from patients underwent retroperitoneal repair because they were high-risk patients. For those the operation was done using retroperitoneal approach because they had cardiopulmonary risks, huge aneurysm >10 cm, redo aneurysm repair or inflammatory aneurysm. Therefore, their results were not superior to the transperitoneal one.

In conclusion: the current study confirms the impression that retroperitoneal approach may be a better choice to reduce the early postoperative Morbidity and Mortality following Abdominal Aortic surgery.

The study also confirms the accessibility of this approach, by placing the patient supine, in treating patients need right side anastomosis as well.

REFERENCES

1. David C. Direct Reconstruction for Aorotiliac Occlusive Disease. In: Robert B. Rutherford ed. Rutherford Vascular Surgery. Philadelphia. Elsevier Sanders. 2005;3:1106-36.

2. Hiramoto, Jade S, Reilly, Linda M, Schneider. Long-term outcome and reintervention after endovascular abdominal aortic aneurysm repair using the Zenith stent graft. Journal of Vascular Surgery. 2007;45:461-6.

3. Norwood, MGA, Lloyd, Bown, Fishwick. Endovascular abdominal aortic repair. Postgraduate Medical Journal. 2007;83:21-7.

4. Chahwan, Santiago, Cmerota, Comerta, Anthony J. Elective treatment of abdominal aortic aneurysm with endovascular or open repair: the first decade. J of Vascular Surgery. 2007;45:258-62.

5. Jonathan P. Gertler. Renal and Pulmonary Complications of Vascular Surgery. In: Allan D. Callow and Calvin B. Ernst eds. Vascular Surgery, theory and practice. Prentice-Hall International Inc. 2005;94:1397-1402.

6. Marc L. and Jack L. Abdominal Aortic and Iliac Aneurysms. In: Robert B. Rutherford ed. Rutherford Vascular Surgery. Philadelphia. Elsevier Sunders. 2005;3:1408-52.

7. Brewster DC. Vascular surgery in: Mastery of surgery, 4th ed. Philadelphia; Lippincott Williams & Wilkins. 2001;3:2097-108.

8. Cronenwett JL, krupski WC, Rutherford RB. Abdominal aortic and iliac aneurysms. In: Robert B Rutherford ed. Rutherford Vascular surgery. Philadelphia. W. B. Saunders. 2000;1246-55.

9. Lederle FA, Johnson GR, Wilsone S.E. The aneurysm detection and management study scoring program: Validation cohort and final results .Arch Internal medicine. 2000;160:1425–30.

10. Kirby LB. Comparison between the transabdorninal and retroperitoneal, approaches for aortic reconstruction in patients at high risk. Journal of Vascular Surgery. 1999;30:400-6.

11. AA Milne, CV Ruckley. Indications for elective surgery for abdominal aortic aneurysm. In: Jonathen J Earnshow and John A Murie eds. The evidence for vascular surgery. tFm publications. Gloucestershire. 200;16:95-100.

12. Laohapsensang k, Rerkasem k, Chotirosniramit N. Left retro peritoneal versus midline trans-peritoneal approach for A.A.A repair: Journal of Urology. 2006;175:1230–5.

13. Ferrari, Mauro, Adami, Daniele, Del Corso. Laparoscopy-assisted abdominal aortic aneurysm repair: Early and middle-term results of a consecutive series of 122 cases. Journal of Vascular Surgery. 2006;43:695-700.

14. Sieunarine, Lawrence Brown. Comparison of trans-peritoneal approaches for infra renal aortic surgery early and late results, cardio vas surgery. 1997;5:71-9.

15. Espinosa, Gaudencio, Marchiori, Marchiori, Edson. Initial results of Endovascular repair of Abdominal Aortic Aneurysms with a self-expanding stent-graft. Journal of Vascular & Interventional Radiology. 2002;13:1115-23.

16. Shindo S, Lcubota k, kojimah, Matsumoto M. A comparison of the inflammatory response and recovery of bowl function between trans and extra approaches of A.A.A repair: Journal of medical Association. 2005;5:601-6.

17. Calvin B Ernst, Steve H Tyndall. Infrarenal aortic aneurysm. In: Allan D. Callow and Calvin B. Ernst eds. Vascular Surgery, theory and practice. Prentice-Hall International Inc. 2005;94:921-32.