

COMPARISON OF RETROPERITONEAL AND TRANSPERITONEAL PROCEDURES IN AORTOILIAC OCCLUSIVE DISEASES

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ABSTRACT

Objective: Comparison of transperitoneal (TP) and retroperitoneal procedures at the surgical treatment of aortoiliac occlusive diseases (AIOD) was aimed in this study. Advantages and disadvantages of the procedures were also evaluated.

Methodology: From October 2003 to March 2009, 110 patients underwent aortic surgery. TP technique was performed to 50 patients and retroperitoneal (RP) technique was performed to 60 patients. Demographic data, risk factors, perioperative and postoperative medical data (24 parameters) were analyzed and compared between two groups. No statistically significant difference was observed in demographic data and risk factors. Five of eight operative parameters resulted in favor of RP procedure. Length of intensive care unit (ICU) stay ($p < 0.01$), length of hospital stay ($p < 0.01$), return of bowel functions ($p < 0.01$), time of beginning oral feeding ($p < 0.01$), effort pain score ($p < 0.01$) were significantly different in RP group and, results were better than TP group. Pulmonary complications were analyzed as lesser in RP group ($p = 0.02$). There was no statistically significant difference at the rest of complication data (wound complications $p = 0.09$, paralytic ileus $p = 0.14$, re-operation $p = 0.46$, 30 day mortality $p = 0.30$).

Conclusion: Comparison of medical data showed that RP procedure is more advantageous than TP procedure at the surgical treatment of AIOD.

KEY WORDS: Aortic surgery, Retroperitoneal approach, Transperitoneal approach.

Pak J Med Sci October - December 2009 (Part-I) Vol. 25 No. 5 723-727

How to cite this article:

Basel H, Ayidin U, Dostbil A, Manduz S, Kantarcioglu N, Hazar A. Comparison of retroperitoneal & transperitoneal procedures in aortoiliac occlusive diseases. Pak J Med Sci 2009;25(5):723-727.

INTRODUCTION

Aortoiliac occlusive disease (AIOD) is the result of atherosclerotic and obliterative plaques in the infrarenal aorta and iliac arteries. The natural history of this pathology is characterized by

increased mortality and morbidity, if not treated. Surgical treatment of AIOD has been well standardized for many years and the outcomes are quite good. The most widely used exposure of the infrarenal abdominal aorta is the transperitoneal (TP) approach, however there is an increasing popularity of the retroperitoneal (RP) approach too.¹⁻⁵ The studies comparing these two procedures report significantly lower percentages of pulmonary,⁶ cardiac^{5,7} and gastrointestinal complications⁵ when retroperitoneal approach was used. However there are various studies reporting no significant differences between RP and TP

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- * Received for Publication: June 4, 2009
- * Revision Received: September 5th 2009
- * Revision Accepted: September 7th 2009

approaches.⁸ This study aims to compare the RP and TP approaches in a patient population consisting of only AIOD, to find out the optimal surgical technique .

METHODOLOGY

One hundred ten patients who had undergone aortic surgery between October 2003 and March 2009, were studied retrospectively. Demographic datas and risk factors of the patients are listed in Table-I. All patients were operated for AIOD, abdominal aorta aneurysms, previous RP or TP operations, re-operations were excluded from the study. Sixty patients were operated with RP approach and 50 patients were operated with TP approach. Aortofemoral bypas was performed in 18 patients from RP group and 10 patients from TP group (Table-II).

Operations were performed under general anesthesia. The transperitoneal approach was performed through Standard midline laparotomy. Laparotomy incision varied 12-20 cm through midline. The retroperitoneal approach was performed with an oblique 10-12 cm incision from the left subcostal magrin to the rectus abdominis mýuscle margin. It was reached to the retroperitoneal cavity by dissecting the aponeurosis of abdominal muscles. The aorta was exposed from bifurcation to the renal artery level and aortotomy for anastomosis was performed. Aortoiliac occlusions were treated by bypassing the stenotic segments as end-to-side proximal anastomosis and end-to-side fashion to common femoral arteries in groins. The patients were transported to intensive care unit (ICU) after the operation.

Eight parameters were monitored in both groups (Table-III). Duration of operation, aortic cross clamp time, blood loss in 24 hours, legth of ICU stay (hours), length of hospital stay (days), return of bowel functions (hours), time of beginning oral feding (days), effort pain score. Effort pain score was achieved by asking the patient to cough strongly 6 hours after the extubation and attributing a score of between 1-10 for the pain patient felt. (0: no pain, 10: highest pain) Post oprative complications were also

compared in both groups. Complications compared are (Table-IV): pulmonary complications wound complications, paralytic ileus, re-operation, 30 day mortality rate.

When demographic datas and risk factors were evaluated, retroperitoneal and transperitoneal groups were similar to each other . Consequently procedures were performed according to surgeon's preference, familiarity and desire to use the method. All surgical procedures were peformed by three senior surgeons however every surgeon performed the technique which is familiar to himself.

All parameters were evaluated in both groups. Continuous variables were tested by Student t test and Mann Whitney U test. Variables in categorical forms were tested with Z test . Statistical significiance rate was assumed as 5 % and 1%. Statistical analyses were performed with SPSS.

RESULTS

Both groups were compared for demographics and risk factors (Table-I). A significant difference couldn't be determined in the groups. Aortofemoral [RP 18 (30%), TP 10(20%)] and aortobifemoral [RP 42(70%), TP 40(80%)] procedures were performed. (Table-II) Statistically significant difference wasn't established in operative procedures between groups ($p < 0.818$). Eight parameters containing operative and post-operative datas were compared in each group. In comparison, five of eight parameters were established statistically different. These parameters were length of intensive care unit stay, length of hospital stay, return of bowel functions, time of beginning oral feeding and effort pain score. There was no statistically significant difference in the rest of eight parameters. These were operation time, aortic cross clamp time and blood loss.

In the RP group the length of ICU stay (RP 7.93 hours vs TP 18.22 hours, $p < 0.01$) and length of hospital stay (RP 3.36 days vs TP 5.39 days, $p < 0.01$) were shorter than the TP group. In the comparison of return of bowel functions (RP 13.32 hours vs TP 23.78 hours, $p < 0.01$) and time

Table-I: Demographics and Risk factors of patients

	TP group n=50	RP group n=60	P value
Age (mean-/+SD)	58.7-/+5.5	56.6-/+4.9	0.71
Sex (M/F)	40(75%)/10(25%)	52(86%)/8(13%)	0.5
Smoking	48(96%)	54(90%)	0.37
Hypertension	36(72%)	38(63%)	0.49
ACAD	18(36%)	20 (33%)	0.83
DM	16(32%)	20(33%)	0.91
COPD	6(12%)	10(16%)	0.62
Stroke	0	2(3%)	0.30
Renal disease	4(8%)	6(1%)	0.79

ACAD: Atherosclerotic Coronary Artery Disease DM: Diabetes Mellitus

COPD: Chronic Obstructive Pulmonary Disease

of beginning oral feeding (RP 1.43 days vs TP 2.61 days, $p<0.01$) a significant difference was observed in RP group. Significant difference was also observed in the comparison of effort pain score. In RP group mean pain score was 4.14 however in TP group pain score was 5.61 and p value was <0.01 . In TP group coughing was more painful.

Operation complications were also compared in both groups. (Table-IV) There was no pulmonary complication in RP group but four were assessed in TP group ($p=0.02$). Wound complications (infection, bulging, incisional hernia, incisional pain) were observed in 10 (20%) patients in TP group but observed in four (8%) in RP group ($p=0.09$). In TP group paralytic ileus was observed in four (8%) patients however no paralytic ileus occurred in RP group ($p=0.14$). Patients undergoing re-operation were more in TP group (TP four (8%) vs RP two (3%), $p=0.46$). Two patient (TP n:1) underwent re-operation for graft thrombosis and four patients (RP n:2, TP n:2) for anastomotic bleeding The operative mortality was only two (1.53 %) in 30 day follow up period. Mortality occurred in TP group because of myocardial infarction. Statistical analyzes were performed for the comparison of complications. Only two parameters (pulmonary complications) were significantly lower

in RP group. Other complications were also lower in RP group nevertheless significant difference wasn't analyzed.

DISCUSSION

There are many studies criticizing the superiority of retroperitoneal versus transperitoneal approach at the surgical treatment of AIOD.⁹⁻¹² Several authors have reported that no difference was seen between the procedures.^{11, 13} However these studies were heterogenous, containing aortic aneurysms and AIOD. Surgical treatment of aortic aneurysms is completely different procedure therefore outcomes are also different from AIOD. In our series aneurysms were excluded to form unique groups. Siennaurine compared with aneurysm an AIOD separately.¹⁰ This study reported no significant difference between two procedures. However Darling concluded in his study that RP approach provided advantages associated with minimal effects on the gastrointestinal and respiratory functions and reduced ICU and hospital stay.¹² The results of our study is consistent with the conclusions of Darling. Because return of bowel functions ($p<0.01$), time of beginning oral feeding ($p<0.01$), effort pain score ($p<0.01$) were better and length of hospital ($p<0.01$) and ICU ($p<0.01$) stays were shorter in RP group. The outcomes

Table-II: Operations performed

	RP approach	TP approach	Total	P value
Aortofemoral bypass	18 (30%)	10(20%)	28(25%)	0.818
Aortobifemoral bypass	42(70%)	40(80%)	82(75%)	
	60	50	110	

Table-III: Parameters compared

		<i>n</i>	<i>Mean</i>	<i>Median</i>	<i>Std.Deviation</i>	<i>Min.</i>	<i>Max.</i>	<i>p</i>
Operation Time (minute)	TP	50	131.65	132	13.670	105	152	0.426
	RP	60	135.39	139	11.413	112	150	
Aortic Cross Clamp Time(minute)	TP	50	36.91	37	3.976	30	43	0.322
	RP	60	38.11	38	3.725	30	44	
Blood Loss in 24 hours(ml)	TP	50	334.57	335	26.454	280	400	0.197
	RP	60	325.71	320	29.209	280	400	
Lengh ICU stay (hour)	TP	50	18.22	18	3.450	12	24	<0.01
	RP	60	7.93	8	1.824	5	12	
Length of Hospital stay (day)	TP	50	5.39	5	1.270	3	8	<0.01
	RP	60	3.36	3	0.989	2	6	
Return of Bowel Functions(hour)	TP	50	23.78	24	4.880	16	32	<0.01
	RP	60	13.32	14	2.554	9	18	
Time of Beginning OralFeeding (day)	TP	50	2.61	2	0.839	2	5	<0.01
	RP	60	1.43	1	0.690	1	4	
Effort Pain. Score (0-10)	TP	25	5.61	5	1.118	4	8	<0.01
	RP	30	4.14	4	0.970	3	7	

of RP procedure were more physiological in gastrointestinal and pulmonary functions.

Peroperative findings of our study didn't show a significant difference between procedures. Operation time and aortic cross clamp time was a little longer in RP group On the other hand blood loss in 24 hours was slightly higher in TP group. The medical datas were consistent with previous studies.^{10,14}

Complications that have occurred in both procedures showed that pulmonary complications were significantly less in RP group. (p=0.02) This outcome is supported with the reports of Darling and Buckley.^{12,15} Paralytic ileus was not recorded in RP group however four

patients with paralytic ileus were observed in TP group. (p=0.14) A statistical significant difference wasn't analyzed nevertheless studies proving less gastrointestinal complication had been reported.^{1,12} Four patients from TP group and two patient from RP group underwent re-operation(p=0.46) No certain difference was analyzed.

Thirty day mortality was 4%. Mortality occurred in TP group (n:2) originating from myocardial infarction. Wound complications were regarded as infection, incisional hernia, incisional pain, bulging. In our study wound complications were more common in TP group (p=0.09) but p value didn't reach statistical

Table-IV: Complications compared

	<i>TP group</i>	<i>RP group</i>	<i>P value</i>
Pulmonary complications	8(16%)	0	0.02
Wound complications	10(20%)	4(8%)	0.09
Paralytic ileus	4(8%)	0	0.14
Re-operation	4(8%)	2(3%)	0.46
30 day mortality rate	2(4%)	0	0.30

significance. However Siensaurine et al. reported higher incidence of wound complications with RP procedure.¹⁰ We prefer a short left flank incision 10-12cm and muscle dissecting instead of muscle incision for reaching to the retroperitoneal area. These surgical preferences might cause the post operative outcomes.

In our study we didn't evaluate the economic proceeds of RP procedure. However RP approach resulting in less operative complication and shorter ICU and hospital stay, reduces hospital costs and increases the profitability of aortic surgery.¹⁵

CONCLUSION

At the surgical treatment of AIOD better surgical outcomes were achieved with RP approach. Better gastrointestinal and pulmonary functions, lesser pain and shorter hospital stay were obtained with RP technique. Consequently RP procedure increases operative success and provides better recovery course.

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