

## A comparison between minilaparotomy and conventional approach for the surgical therapy of Aortailiac Occlusive disease

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### ABSTRACT

**Objective:** To search for less traumatizing measures for Aortic Occlusive Disease (AOD) surgeries to improve the recovery from surgery. Another objective was comparison of retroperitoneal minilaparotomy (RML) with conventional transperitoneal classic median laparotomy (TCML) with respect to per-operative and post-operative outcome and complications.

**Methodology:** It was a retrospective comparative study. All patients undergoing AOD surgery were enrolled. Our comparative data of 20 patients who had AOD surgery by TCML (TCML group) performed from January 2003 to December 2006 and 20 cases of patients who had AOD surgery by RML (RLM group) performed from January 2006 to December 2009 is presented. Chi-square and Fischer test with significance of p value being taken at 0.05 were used for categorical data, while student's t test was used for continuous data.

**Results:** Mean age, gender, the operation and aortic occlusion time was similar between the TCML and RLM groups. The length of stay in the intensive care unit (ICU) and total hospital stay in the RLM group was statistically shorter compared to the TCML group ( $p < 0.05$ ). Major complications were rare in both the groups.

**Conclusion:** During AOD surgery, RLM appears to be an attractive alternative to traditional TCML with fewer complications.

**KEY WORDS:** Aorta, Arterial Occlusive Diseases, Minilaparotomy, Vascular Surgical Procedures.

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### INTRODUCTION

Nowadays minimally invasive surgical procedures are applied more often in vascular surgery like the other surgical disciplines. The distinctions of the minimally invasive approaches compared to classical methods are appreciated to become widespread.<sup>1-4</sup> The advantages of this method are early mobilization, less postoperative pain, the early return of the bowel functions, less hospital stay and the cosmetic reasons. Because of its long-term results, the aortofemoral bypass procedure remains the gold standard for the correction of AOD. Endovascular treatment has begun to reveal its limitations, particularly with regard to the management of severe and

extensive aorto-occlusive disease and abdominal aneurysms.<sup>5-7</sup>

Third alternative, laparoscopic vascular surgery is a technically challenging procedure that requires a special suturing technique and specialized instrumentation.<sup>8-10</sup> This retrospective study was undertaken to establish the feasibility of retroperitoneal minilaparotomy for the management of AOD and to determine its effects on intra operative and postoperative variables. Minilaparotomy, which has been used to reduce surgical trauma, provides good exposure of the operating field, similar to that afforded by the conventional procedure. We are presenting our comparative data of patients who had AOD surgery by TCML (TCML group) and AOD surgery by RML (RLM group).

### METHODOLOGY

From the beginning of January 2003 through the end of December 2006, 20 patients with AOD were treated by aortobifemoral by-pass (ABFBP) with conventional TCML approach (TCML group). From the beginning of January 2006 through the end of December 2009, 20 patients with aorto-iliac occlusive disease were treated by aortobifemoral by-pass with RML approach (RLM group). The operation was performed under general anesthesia with endotracheal intubations. In the TCML group, an approximately 30 cm median incision was made at the level of the umbilicus, and two infrainguinal incisions were made for access to the femoral arteries. The bowel was retracted by means of an abdominal retractor and abdominal compresses, and an incision was

made in the retro peritoneum above the aorta using standard open-surgery instruments. In the RLM group, at supine position with left side elevated to 25 degrees a 6-8 cm oblique incision at the level of umbilicus curving up to the 11th rib was made and external, internal muscles and transversal muscle were split bluntly. The retroperitoneal space entered with finger and blunt dissections (Figure-1). After the administration of 5,000 units of heparin, the aorta was cross-clamped proximally (immediately below the renal arteries) and distally (immediately above the bifurcation). The aorta was opened for end-to-side anastomosis, and the distal aorta was never sewn. Patients received a 16- to 18-mm Vascutec® bifurcated graft (Sulzer Vascutek Ltd.; Renfrewshire, Scotland, UK). Proximal anastomosis of the Dacron bifurcated graft was performed with continuous 3-0 Prolene suture (Figure-2). Both limbs of the graft were pulled retroperitoneally to the femoral arteries and affixed with sutures (Figure-3). We used a curved, 8¼3 (210-mm) Aesculap® BF-27 dressing forceps to tunnel the graft. The retro peritoneum was closed with a continuous silk suture. The wounds were closed in layers (Figure-4).

### RESULTS

In the TCML and RLM groups, ABFBP operation was carried out. In the TCML group, the mean age was  $64.7 \pm 8.3$  (range 45 to 78), the percentage of the male patient was 85% (n=17), the mean operation time was  $76.9 \pm 10.7$  min (range 57 to 98 min), the mean aortic occlusion time was  $25.5 \pm 3.1$  min (range 22 to 33 min). The percentage of total mortality was



Figure-1: 8 cm incision was made at the left hypocondrium obliquely and after blunt dissections the retroperitoneal space was passed and reached to retroperitoneum above the aorta.



Figure-2: Proximal anastomosis of the Dacron bifurcated graft was performed with continuous 3-0 Prolene suture.

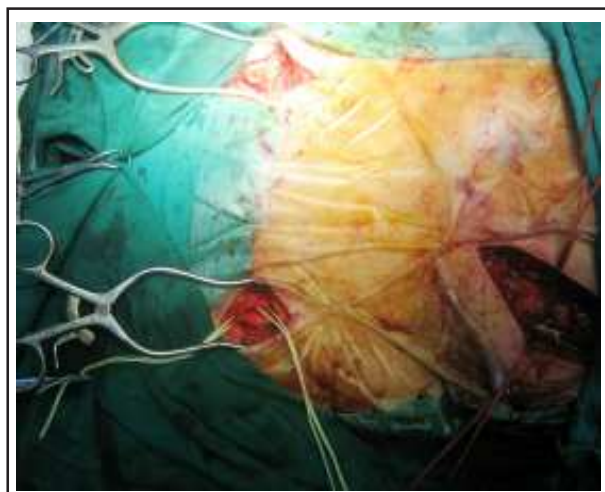


Figure-3: Both limbs of the graft were pulled retroperitoneally to the femoral arteries and affixed with sutures.

10% (N=2). Other detailed data is shown in Table-I. In group II(RML) the mean age was  $65,7 \pm 7,7$ (SD) (range 45 to 77), the percentage of the male patient was 80%(n=15). The percentage of total mortality was

Table-I: Data of the Group I(TCML) patients.

Age (years)	64.65 ± 8,34
Gender	Male = 85% (N=17), Female = 15% (N=3)
Operation	Aortobifemoral by-pass= 100% (N=20)
Comorbidities	DM= 15% (N=3) CRF= 15% (N=3) CAH= 5% (N=1)
Total Op. Time(min)	76.9 ± 10.72
ACC Time(min)	25.45 ± 3.06
Mean Blood Transfusion (Unit)	1.35 ± 0.58
Mean Entubation(h)	11.25 ± 2.14
Mean. Lentgh of I.C.U Stay(h)	46.05 ±4.32
Mean Bleeding(ml)	261.5 ± 65.71
Mean Starting Time to Oral Feeding after Extubation(h)	19.0 ± 2.73
Ileuses	10% (N=2)
Mobilization(h)	20.80 ± 2.48
Length of Stay in Hospital(d)	10.45 ± 3.51
Mean Early Mortality	5% (N=1)
The Cause of Early Mortality	MI= 5% (N=1)
Mean Late Mortality	5% (N=1)
The Cause of Late Mortality	Stroke = 5% (N=1)
The Mean Early Graft Closure	5% (N=1)
The Mean Late Graft Closure	5% (N=1)
The Mean Reoperation	10% (N=3)
Mortality	10% (N=2)

Abb: h: Hours; ml: Milliliter; d: Day; ACC: Aortic Cross Clamp; I.C.U: Intensive Care Unit



Figure-4: The wounds were closed in layers.

10% (N=1). The instructive data about the Group II (RML) is shown in Table-II while the comparison and p value of both the groups are given in Table-III.

Table-II: Data of the Group II(RML) patients.

Age (years)	65.7 ± 7,70
Gender	Male = 80% (N=15), Female = 20% (N=5)
Operation	Aortobifemoral by-pass = 100% (N=20)
Comorbidities	DM= 10% (N=2) CRF= 10% (N=2) CAH= 5% (N=1)
Total Op. Time(min)	80.0 ± 6.85
ACC Time(min)	25.0 ± 3.89
Mean Blood Transfusion (Unit)	1.40 ± 0.50
Mean Entubation(h)	6.90 ± 1.29
Mean Lentgh of I.C.U. Stay	20.10 ±2.63
Mean Bleeding(ml)	236.0 ± 58.34
Mean Starting Time to Oral Feeding after Extubation(h)	8.55 ± 1.35
Ileuses	0% (N=0)
Mobilization	15.65 ± 2.41
Length of Stay in Hospital	5.60 ± 2.94
Mean Early Mortality	0% (N=0)
The Cause of Early Mortality	-
Mean Late Mortality	5% (N=1)
The Cause of Late Mortality	Stroke = 5% (N=1)
The Mean Early Graft Closure	5% (N=1)
The Mean Late Graft Closure	5% (N=1)
The Mean Reoperation	10% (N=2)
Mortality	5% (N=1)

Abb: h: Hours; ml: Milliliter; d: Day; ACC: Aortic Cross Clamp; I.C.U: Intensive Care Unit

## DISCUSSION

The standard therapy for AOD since 1960s is ABFBP.<sup>11</sup> Reconstructive surgery for treatment of AOD has generated long-term potency.<sup>12</sup> Just like other fields of surgery especially in infrarenal aortic surgery to lower the surgical stress minilaparotomy procedures were developed and applied.<sup>1-4,12,13</sup> The conventional TCML, which consists of an incision of the abdominal wall approximately 30 cm long, causes significant trauma and is associated with pain and prolonged postoperative recovery, especially in older patients. Furthermore, the long incision in the abdominal wall increases the risk of wound infection. A majority of patients develop postoperative a dynamic ileuses as a result of intra operative extra cavity small-bowel retraction. Therefore, the conventional median laparotomy prolongs the hospital stay and increases the cost of treatment.<sup>14</sup> In our study there was no statistically significant difference between total operation time, ACC time, bleeding and blood transfusion but there was statistically significant difference between mean intubation's time (In the group I 11, 25 ± 2,14 h, in the group II 6,90 ± 1, 29 h and the Student's T test is ,000) length of ICU (In the Group I: 46,05 ± 4,32 h, in the group II 20,10 ±

2,63 h and the Student's T test is ,000) and total hospital stay (In the group I 10,55 ± 3,44 d, in the group II 5,60 ± 2,94 d and the Student's T test is ,000).

Laparoscopic vascular surgery remains a technically challenging procedure with a steep learning curve. It requires a new suturing technique and specialized instruments.<sup>15-17</sup> The operative time is longer than that of conventional laparotomy.<sup>18</sup> The minimally invasive RML approach provides better results than those of conventional median laparotomy. It provides good visualization of the surgical field, but affords the surgeon slightly less maneuvering room. The small abdominal incision and subtle postoperative scar yields an aesthetically gratifying result that gives the appearance of a much less extensive surgical procedure. The minilaparotomy is technically feasible for aortobifemoral bypass, with an acceptable cross-clamp time, lower blood loss, and less morbidity. We believe that our approach shortened the rehabilitation time of our patients. They began to take fluids orally on the day of the operation, and light foods on the 1st day after surgery. Ileuses occurred much less often than after conventional repair, because the intestine stays inside the abdominal cavity. In our study in the Group II starting time to oral

Table-III: The comparison and the P values of the two groups.

Variations	Group I (TCML)	Group II (RML)	P Value
Age (years)	64.65 ± 8.34	65.7 ± 7.70	NS
Gender	Male = 85% (N=17), Female = 15% (N=3)	Male = 80% (N=15), Female = 20% (N=5)	NS
Operation	Aortobifemoral bypass = 100% (N=20)	Aortobifemoral bypass = 100% (N=20)	NS
Comorbidities	DM= 15% (N=3) CRF= 15% (N=3) CAH= 5% (N=1)	DM= 10% (N=2) CRF= 10% (N=2) CAH= 5% (N=1)	NS
Total Op. Time(min)	76.9 ± 10.72	80.0 ± 6.85	NS
ACC Time(min)	25.45 ± 3.06	25.0 ± 3.89	NS
Mean Blood Transfusion (Unit)	1.35 ± 0.58	1.40 ± 0.50	NS
Mean Entubation(h)	11.25 ± 2.14	6.90 ± 1.29	,000
Mean. Lentgh Of I.C.U Stay(h)	46.05 ±4.32	20.10 ±2.63	,000
Mean Bleeding(ml)	261.5 ± 65.71	236.0 ± 58.34	NS
Mean Starting Time to Oral Feeding after Extubation(h)	19.0 ± 2.73	8.55 ± 1.35	,000
Ileuses	10% (N=2)	0% (N=0)	,000
Mobilization(h)	20.80 ± 2.48	15.65 ± 2.41	,000
Length of Stay in Hospital(d)	10.45 ± 3.51	5.60 ± 2.94	,000
Mean Early Mortality	5% (N=1)	0% (N=0)	,000
The Cause of Early Mortality	MI= 5% (N=1)	-	,000
Mean Late Mortality	5% (N=1)	5% (N=1)	NS
The Cause of Late Mortality	Stroke = 5% (N=1)	Stroke = 5% (N=1)	NS
The Mean Early Graft Closure	5% (N=1)	5% (N=1)	NS
The Mean Late Graft Closure	5% (N=1)	5% (N=1)	NS
The Mean Reoperation	10% (N=3)	10% (N=2)	NS
Mortality	10% (N=2)	5% (N=1)	,000

feeding (In the group I  $19,0 \pm 2,73$  h, in the group II  $8,55 \pm 1,35$  d and the Student's T test is ,000) and mobilization time (In the group I  $20,8 \pm 2,48$  h, in the group II  $15,65 \pm 2,41$  h and the Student's T test is ,000) was statistically shorter than the Group II. The minimally invasive approach can be used for vascular surgical procedures other than aortobifemoral bypass, such as abdominal aortic aneurysm repair.<sup>19</sup> We report our small series of patients to highlight the use of this new minimally invasive surgical approach for AOD. However, prospective randomized trials with large number of patients are needed to determine whether minilaparotomy is the superior technique for treatment of AOD.

### CONCLUSION

There was no statistically significant difference between two groups in the operation time, the ACC time, bleeding amounts, blood transfusion. In contrast in group II(RML) length of stay in ICU and total hospital stay, oral feeding time and mobilization time was statically shorter than group I(TCML). In our opinion AOD surgery managed with retroperitoneal minilaparotomy technique basically has the postoperative advantages.

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