



COMPLICATIONS OF RETROPERITONEAL AORTIC APPROACH

H. Abrashev, T. Kavarakov

Clinic of Vascular Surgery, University Hospital, Trakia University, Stara Zagora, Bulgaria

ABSTRACT

The retroperitoneal approach to the abdominal aorta and its branches can be used for all types of aortic reconstructions and aortoiliac occlusive diseases. We retrospectively analyzed the post-operative outcome of 51 patients that underwent vascular reconstructive surgeries using retroperitoneal aortic approach between 2004 and 2014. The group of patients consisted of 35 men and 16 women with median age of 65,9 years and rate of postoperative complications 27%. This study was carried out to define the complications and applicability of this technique in the treatment of aortoiliac occlusive disease (AIOD) and abdominal aortic aneurysms (AAAs).

Key words: Vascular surgery, surgical techniques, abdominal aorta, aneurysms

INTRODUCTION

The retroperitoneal approach to the abdominal aorta and its branches can be used for all types of aortic reconstructions (Elective AAA, Ruptured AAA, A-I occlusive disease, Iliofemoral disease, Infected aortic graft etc). Over the last 30 years a number of surgeons have championed the retroperitoneal approach for repair of abdominal aortic aneurysms and aortoiliac occlusive disease using a variety of incisions. Several studies attest to the clinical superiority of this approach over the transabdominal route and recent evidence demonstrates reduced physiological disturbance with this technique [1].

When executed properly, the extended left posterolateral retroperitoneal approach can provide excellent exposure of the entire infradiaphragmatic aorta. This exposure facilitates infrarenal, juxtarenal, and suprarenal aortic repairs, as well as concomitant reconstruction of the visceral, renal, and iliac arteries. In addition, the left retroperitoneal approach allows for easy access to the series of lumbar arteries feeding the abdominal aortic aneurysm. These lumbar vessels can be clipped or ligated before opening the sac if an open endoaneurysmorrhaphy is performed, thus reducing blood loss and provides more meticulous control of the aneurysm. Technically, this would be very difficult to accomplish transabdominally, as

access to the lumbar vessels is more troublesome from an anterior approach [2]. The retroperitoneal approach offers certain physiologic advantages associated with minimal disturbance of gastrointestinal and respiratory function, thereby reducing the length of intensive care unit and hospital stay. The retroperitoneal approach is connected with less postoperative complications – peritoneal adhesions, presence of stomas, fistulas, blood loss, ileus and et. Furthermore, retroperitoneal exposure is associated with decreased evaporative loss, less hypothermia, less postoperative ileus, earlier resumption of diet and less pain. Reoperative aortic surgery is simplified by the retroperitoneal approach, which avoids intra-abdominal adhesions and facilitates exposure of the perirenal aorta [3]. The retroperitoneal approach offers advantages in patients with hostile abdomen and horseshoe kidney but has disadvantages if aneurysmal disease of the iliac arteries is present [4]. Clinical cases involving both gastrointestinal (cholecystitis) and vascular pathology, the retroperitoneal approach is favored for simultaneous gastrointestinal procedures(cholecystectomy) and prosthetic graft implantations[5]. It is also excellent approach for patients undergoing peritoneal dialysis or who have ascites or massive obesity.

Apart from this, it should be realized that the retroperitoneal approach has also several disadvantages. When compared to the transperitoneal approach it is quite time consuming, which makes it less attractive in emergency situations. Exploration of the abdominal cavity is difficult if not impossible. Redo-operations might present a problem. Reimplantation of the inferior mesenteric artery is made more difficult. Access to the right common iliac artery and its bifurcation is cumbersome. The same goes on the right renal artery. Retroperitoneal approach might be contra indicated in the presence of venous anomalies such as doubled or left caval vein [6].

Surgical technique

The surgical approach is described by several authors through the years. However the most thorough and detailed description is given by R. Clement Darliing, Philip S. K. Paty , Stephanie Saltzberg. [7] After induction of general anesthesia, the patient is placed on a suction bean bag in a modified right lateral decubitus position. The patient is positioned with the table break 5-10 cm cephalad to the left iliac crest. The patient's torso is shifted toward the left and rotated until the left shoulder is elevated 45 to 65 degrees from the horizontal position, while the pelvis is rotated 15 to 30 degrees to allow access to both groins. The left upper extremity is brought across the chest and supported by blankets, a sling, or a stand. The left thigh is elevated above horizontal plane to relax the ipsilateral iliopsoas muscle. This maneuver improves access to the distal aorta and the left iliac arteries. To open the space between the iliac crest and the costal margin, the table is flexed at the table break. The incision is extended from the lateral edge of the rectus muscle between the umbilicus and pubis symphysis in a oblique fashion posteriorly and superiorly through the 10th or 11th interspace to the mid to posterior axillary line. The 10th interspace is employed if access to the pararenal or visceral aorta is required. The 11th interspace is adequate for infrarenal aortic reconstruction as it provides access to the infrarenal aorta, proximal right common iliac artery, and left iliac arteries. The muscle layers of the abdominal wall are divided to the lateral border of the rectus abdominis. This includes the external oblique, internal oblique, transversus abdominis, and transversalis fascia, respectively. The transversus abdominis is initially divided laterally and then medially to separate the peritoneum, which is usually thicker

and more discrete laterally, from the underlying muscle. The intercostals muscles are divided on the superior margin of the underlying rib. The retroperitoneal space is entered posterolaterally to avoid tearing the parietal peritoneum. The posterior peritoneum, posterior layers of Gerota's fascia, and the left kidney are retracted anteriomedially and cephalad to expose the left psoas muscle and periaortic tissue. The fascia remains intact on the psoas, which minimizes dissection-related bleeding from the iliopsoas and cutaneous and genitofemoral nerve injury. Exposure is maintained with a self-retaining retractor. Care must be taken to avoid vigorous retraction of the anterior and cephalad margin of the incision as this can result in splenic or renal injury. Distal arterial control is obtained first to prevent embolization. If there is significant involvement of the right iliac arteries, then a small suprainguinal counterincision can be performed on the right to obtain extraperitoneal exposure of these vessels.

The right retroperitoneal approach is performed when abdominal conditions preclude the use of a left retroperitoneal approach. The right retroperitoneal approach is used when specific abdominal problems, such as a stoma, preclude the left-sided approach. For instance, it might be used to avoid prior surgery or inflammation in the left retroperitoneal space. It might also be indicated for more extensive pathology involving the right renal or right common iliac arteries. The exposure requires the same preparation as the contralateral approach with the exception of only 30 and 15 degrees elevation of the right torso and pelvis, respectively. When the retroperitoneal space is entered, the plane between the peritoneum and Gerota's fascia is developed. Either a posterolateral approach as described above or an anterolateral dissection, in which the right kidney and ureter remain in their anatomic position and the peritoneum is mobilized medially, might be used. The left renal vein can be mobilized or divided if necessary for more cephalad exposure. The vena cava is gently retracted laterally and small branches are suture ligated. If a posterolateral exposure is used, the gonadal vein should be divided so as to avoid traction injury from more cephalad traction during exposure. This approach should be avoided in symptomatic or ruptured aneurysm because proximal control is limited to the base of the superior mesenteric artery by fixed structures such as the liver.

Complications

Between 2004 and 2014 in the clinic of vascular surgery at Trakia University, Stara Zagora, we performed 51 vascular reconstructive operations with retroperitoneal aortic approach. The group of patients consists of 35 men and 16 women with average age – 65,9. We retrospectively analyzed all data that was obtained from the

operative protocols and the concomitant medical documents. Most common complications that occurred in these 51 patients were: lymphorrhea, postoperative bleeding, limphocele, incisional hernias, wound complications-wound edge necrosis. There are 14 patients of all with postoperative complications after retroperitoneal aortic surgery **Figure 1.**

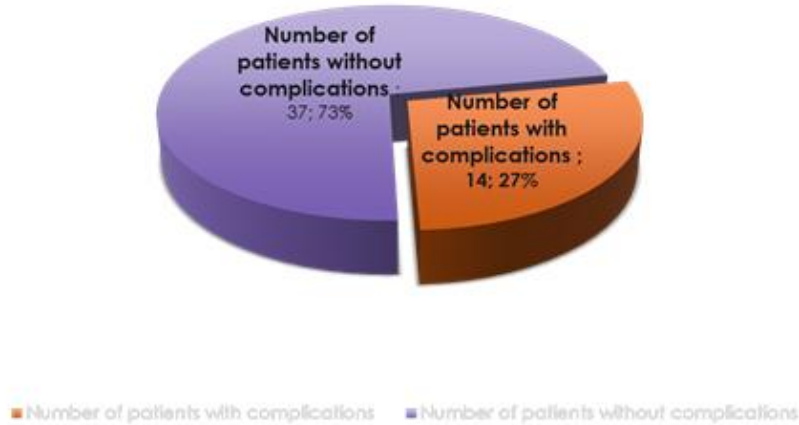


Figure 1.

Five patients had postoperative bleeding. One of them had to be reoperated due to retroperitoneal hematoma. Lymphocele had one patient. Postoperative lymphorrhea was observed in 4

patients. Wound edge necrosis appeared in 3 patients. There was one patient that postoperatively had incisional hernia, who was reoperated with good outcome **Figure 2.**

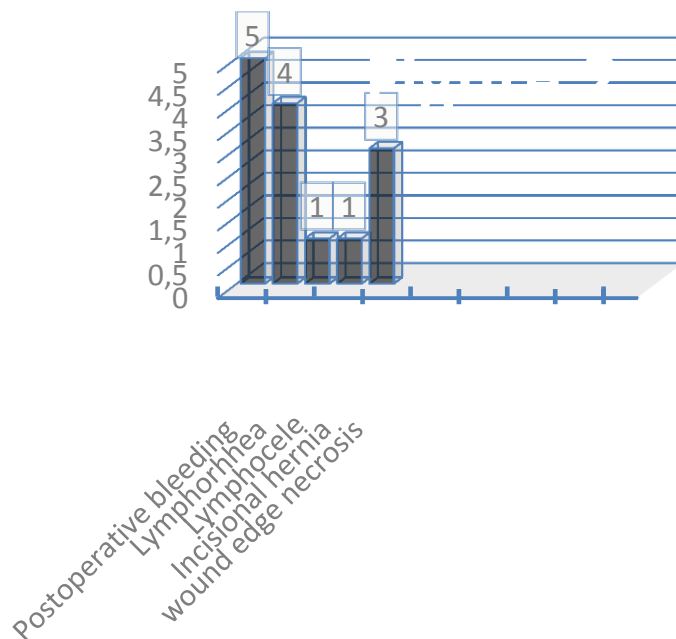


Figure 2.

Management of the postoperative complications was carried out timely. We followed postoperative protocols and all patients were 24 hour monitored by the hospital staff. Postoperative bleeding was ceased with conservative treatment including correction of the hemostasis and hemodynamics, sterile

dressings. One patient was reoperated for retroperitoneal hematoma with good outcome. Lymphorrhea was treated conservatively including drainages, sterile dressings, non lymphokinetic drugs and bed rest. The patient with the postoperative lymphocele underwent retroperitoneal puncture and the lymph

collection was evacuated. Drainages and sterile dressings were set. Patients with incisional wound edge necrosis underwent operative treatment including incision and secondary suture. One patient had incisional hernia who underwent surgical repair with excellent outcome.

DISCUSSION

Insignificant lymphorrhea, confined incisional wound edge necrosis and postoperative subcutaneous suffusions are not classified as complications of the retroperitoneal aortic approach in the present literature sources. Therefore, the percentages of the postoperative complications of the retroperitoneal aortic approach in our study are relatively higher than the percentages from other studies on this topic. Actually, we encountered none life-threatening complications that needed emergency reoperations or urgent intensive care.

CONCLUSION

Since the first successful retroperitoneal aortic reconstruction was reported by Oudot in 1950, controversy has surrounded its use in elective abdominal aortic operations. Retroperitoneal aortic approach simplifies the exposure of infradiaphragmatic aorta and when executed properly is associated with considerably less postoperative complications and less physiological disturbances which results in less hospital stay and speedy recovery and faster return to patient's everyday life. We retrospectively analyzed the data of 51 cases of vascular reconstructive operations using retroperitoneal aortic approach. We strictly followed postoperative treatment protocols and in result all patients had no life-threatening complications and they responded well to the timely postoperative treatment. In summary,

the retroperitoneal approach can justifiably be considered the approach of choice for technically demanding aortic reconstructions connected with lower rate and incidence of postoperative complications.

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