Minilaparotomy for Abdominal Aortic Aneurysm Repair
Preliminary Results

A median laparotomy is the standard approach for endoaneurysmorrhaphy of abdominal aortic aneurysms. The so-called minilaparotomy, which has come into use in recent years to reduce surgical trauma, provides good exposure of the operating field, similar to that afforded by the conventional procedure.

From the beginning of June 1999 through the end of October 2000, we used a minilaparotomy for abdominal aortic endoaneurysmorrhaphy in 26 patients. Endoaneurysmorrhaphy was performed without difficulty through an 8- to 10-cm paraumbilical transperitoneal incision. Aneurysms greater than 10 cm in diameter, prior abdominal surgery, and obesity were considered contraindications to the operation. Two of the 26 patients required conversion to full laparotomy because of intraoperative bleeding. There was 1 wound infection and no fatality. The technique proved to be safe, effective, and aesthetically acceptable to the patient.

The laparoscopic approach to vascular surgery is still in its experimental phase. Although the minilaparotomy appears to be of great potential benefit, further study is needed to compare its postoperative results with those of standard median laparotomy.

In recent years, there have arisen a number of alternatives to conventional median laparotomy for the repair of abdominal aortic aneurysms (AAAs). Certainly endoluminal grafting for this purpose is the most exciting topic in vascular surgery today. Numerous studies have shown that endovascular treatment of AAAs is a safe procedure that results in lower morbidity rates and in mortality rates equal to or lower than those reported for open surgical repair.1,3 There is also the laparoscopic approach to vascular surgery, still in its experimental phase. This is a technically challenging procedure that requires specialized instrumentation and sophisticated laparoscopic suturing capability.4,6

A 3rd alternative, the minilaparotomy, requires no additional surgical training and is performed with standard equipment and instruments. It too has potential benefits that go beyond the smaller surgical wound and cosmetically more acceptable postoperative scar. There is, in theory, the probability of reduced risk of infection, a shorter intubation period, less postoperative pain, earlier discharge, and—in the event of reoperation—less risk, because the peritoneum was never completely dissected.

We report our use of the minilaparotomy in 26 patients who underwent endoaneurysmorrhaphy for abdominal aortic aneurysms.

Patients and Methods

Patients
From the beginning of June 1999 through the end of October 2000, 26 patients with infrarenal AAAs were treated by endoaneurysmorrhaphy through minilaparotomies. In 19 patients, we used a tubular graft; the remaining 7 patients received bifurcated aortic grafts because their aneurysms extended to the iliac arteries. Nine other patients were excluded from the procedure because of obesity, prior abdominal surgery, or aneurysms greater than 10 cm in diameter. The 26 patients in the study ranged in age from 48 to 76 years (mean, 66 years).
Preoperatively, all patients were evaluated for abdominal pain by angiography and by ultrasonic examination of the abdomen and retroperitoneum.

**Methods**

The operation was performed with the patient under general anesthesia induced by endotracheal intubation. Access to the abdominal cavity was gained through an 8- to 10-cm paraumbilical incision (Fig. 1). With the aid of an abdominal retractor and abdominal compresses, we retracted the small and large bowels, then incised the retroperitoneum above the aneurysm. There followed exposure of the neck of the infrarenal aneurysmal sac. Both iliac arteries were exposed. Two Cosgrove flex clamps were placed percutaneously through the left-upper and right-lower quadrants (Fig. 2). After the administration of 5,000 units of heparin, the aneurysm was occluded by application of a flexible clamp to the aneurysmal neck. Another Cosgrove clamp was placed to occlude the right iliac artery, and a standard vascular clamp was introduced through a minilaparotomy to occlude the left iliac artery. A parietal clot was removed through a longitudinal incision in the aneurysmal sac, and the lumbar arteries were secured with interrupted single 2-0 Ticron sutures. Patients received either a 16- to 24-mm Vascutek® tubular graft (Sulzer Vascutek Ltd.; Renfrewshire, Scotland, UK) or a bifurcated aortic graft if the aneurysm extended to the iliac arteries. Both types of graft were secured in position with continuous 2-0 Prolene sutures (Fig. 3). After blood flow was instituted through the graft, the aneurysmal sac was sutured with a continuous 2-0 Prolene suture. The retroperitoneum was closed with a continuous silk suture. No drainage tube was inserted into the wound. The wounds were closed in layers.

**Results**

Two of the 26 patients who underwent endoaneurysmorrhaphy via minilaparotomy required intraoperative conversion to full median laparotomy because of bleeding. In our series, there was 1 wound infection. The minimally invasive approach for infrarenal endoaneurysmorrhaphy was accomplished without difficulty. The mean occlusion time was 38 ± 11 minutes (range, 27 to 49 min); the mean stay in the intensive care unit was 39 ± 15 hours. Twenty of the 26 patients required no blood transfusion. The mean length of hospital stay was 6 ± 1 days (range, 5 to 7 days). Nine of the 26 patients developed mild ileus. Eighteen of 26 patients resumed a normal diet 3 to 4 days after surgery. At the 30-day postoperative follow-up, there was no morbidity or mortality, and the patients were satisfied with the aesthetic results of their surgery.

**Discussion**

The conventional median laparotomy, which consists of an incision in the skin and fascia approximately 30 cm long, causes significant trauma and is associated with pain and prolonged postoperative recovery—especially in elderly patients. The long incision in the skin and abdominal wall increases the risk of
wound infection. Because of the intraoperative extracavitary small-bowel retraction, most patients develop postoperative adynamic ileus. This sequela markedly prolongs the hospital stay and increases the cost of treatment. The minimally invasive approach can achieve the same beneficial result as conventional median laparotomy. It provides good visualization of the surgical field, but affords slightly less maneuvering room to the operating surgeon. If necessary, a minilaparotomy can easily be extended to a median laparotomy. In addition, as a consequence of a small abdominal incision and a subtle postoperative scar, the result is aesthetically gratifying and gives the appearance that a much less extensive surgical procedure has been performed (Fig. 4).

In addition to AAA surgery, a minilaparotomy can be used for other operations, such as an aortobifemoral bypass procedure, with use of a Dacron graft for the management of aortoiliac occlusion. By reporting on our small series of patients, we wish to highlight the use of this new minimally invasive surgical approach for AAA operations. To our knowledge, no study comparing a median laparotomy and a minimally invasive alternative for the surgical treatment of AAAs has been published to date. A greater number of studies will be needed to confirm the value of the minimally invasive approach for AAA operations.

References