

An overview of laparoscopic techniques in abdominal aortic aneurysm repair

Konstantinos P. Economopoulos, MD,^{a,b,c} Eirini Martinou, MD,^{c,d} Shahrhad Hakimian, BS,^{a,e} Dimitrios Schizas, MD,^c Sotirios Georgopoulos, MD,^b Christos Tsigris, MD,^b and Chris N. Bakoyiannis, MD,^b *Boston, Mass; Athens, Greece; and London, United Kingdom*

Background: Since 1993, various laparoscopic techniques have been developed to make laparoscopic treatment of abdominal aortic aneurysms (AAAs) a possible therapeutic alternative. We aim to review all published clinical studies on laparoscopic surgery of AAAs and juxtarenal abdominal aortic aneurysms (JAAAs).

Methods: A thorough search of English-language literature published between January 1966 and December 2012 was performed. Studies that reported the results of laparoscopic surgical procedures as the intended repair strategy in patients with AAAs and JAAAs were selected using specific inclusion criteria. Only case series containing more than five patients were included. Outcome measures of eligible studies were extracted, tabulated, and then analyzed cumulatively, using a purely descriptive approach.

Results: Fourteen studies were included in the analysis encompassing 933 patients with AAAs (mean age, 68.5 years; age range, 46-88) averaging 55.8 mm in diameter and 96 patients with JAAAs (mean age, 71 years; age range, 50-81) averaging 57 mm in diameter. The mean follow-up was 15.3 months for the AAA cases and 32.8 months for the JAAA cases. Hand-assisted laparoscopy, in particular, had a low 30-day mortality rate, short cross-clamping and operative times, few perioperative and postoperative complications, high graft patency rates, and short length of both hospital and intensive care unit stay.

Conclusions: Laparoscopic surgical procedures are a safe, feasible, and worthwhile alternative for patients with AAAs and JAAAs. Hand-assisted laparoscopy, in particular, was associated with low morbidity and mortality and short hospital and intensive care unit stay. However, the final decision regarding the best laparoscopic treatment should be left to the surgeon because of the limits of the data. (*J Vasc Surg* 2013;58:512-20.)

Introduced in 1966, conventional open surgical repair as described by Creech was the standard of care for the treatment of infrarenal abdominal aortic aneurysms (AAAs) for over 40 years.¹ However, in this technique, exposure of the abdominal aorta during conventional open repair resulted in significant morbidity. The long midline incision and the retroperitoneal dissection, for example, contributed to large fluid shifts, prolonged postoperative ileus, significant postoperative pain, and increased risk for postoperative infections.^{2,3} Furthermore, open aortic surgery required 2 to 3 days in the intensive care unit (ICU) and subsequently 4 to 7 days of hospitalization.⁴

In the late 1980s, endovascular AAA repair was developed⁵ in an attempt to establish an alternative minimally invasive treatment option and was popularized by Parodi

et al⁶ in the early 1990s. Since then, thousands of patients have been treated with this innovative technique, and nationwide inpatient sample data from 2001 to 2006 show that endovascular repair has substituted open aneurysm repair as the most popular treatment modality.⁷ However, despite satisfying short-term results, uncertainties remain concerning the risk of graft rupture, endoleak, thrombosis, and migration of the endovascular stent graft.^{8,9} Nine percent to 18% of patients require additional secondary procedures, and late survival is similar after open surgery and endovascular repair.^{8,10} Reintervention and reoperation rates are higher with endovascular repair compared with open surgery. In addition, endovascular AAA is not suitable for certain groups of patients.¹¹ Aneurysm neck angulation greater than 60° and the presence of accessory renal arteries make proximal fixation challenging. Furthermore, aneurysmal iliac disease can complicate distal fixation and pelvic ischemia, and iliac occlusive disease makes vascular access problematic.^{12,13} These anatomic constraints often disqualify patients from consideration of endovascular stent grafting as a treatment option. Therefore, surgical repair of AAAs remains a viable option.

In 1993, laparoscopic surgical techniques entered the field of aortic surgery.¹⁴ Laparoscopy aims to perform the endoaneurysmorrhaphy described by Creech while taking full advantage of the reduced operative trauma. Since then, various techniques have been developed to make laparoscopic treatment of AAAs a possible solution. Laparoscopic techniques for the treatment of AAAs include (1) the

From the Department of Surgery, Massachusetts General Hospital, Harvard Medical School, Boston^a; the First Department of Surgery, Vascular Department, University of Athens, "Laiko" General Hospital,^b and the Society of Junior Doctors,^c Athens; St Georges Hospital Healthcare NHS Trust, London^d; and Tufts University, School of Medicine, Boston.^e

Author conflict of interest: none.

Reprint requests: Konstantinos P. Economopoulos, MD, Department of Surgery, Massachusetts General Hospital, 65 Martha Rd, Apt 10C, Boston, MA 02114 (e-mail: economopoulos@snl.gr).

The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

0741-5214/\$36.00

Copyright © 2013 by the Society for Vascular Surgery.

<http://dx.doi.org/10.1016/j.jvs.2013.04.059>

Table I. Demographic characteristics of eligible studies

Trial identification	Country	Years of enrollment	Number of patients (%)	Mean age (range), years	Sex		Mean size (range), mm
					Male	Female	
Total laparoscopic surgery of AAA							
Edoga 1998 ¹⁵	USA	February 1997-November 1997	22 (8.3)	72.2 (62-88)	16	6	60 (40-80)
Ludemann 1999 ¹⁶	USA	NR	6 (2.3)	NR	NR	NR	NR
Coggia 2005 ^{a,17}	France/Italy	February 2002-September 2004	49	73 ^c (46-85)	45	4	52 ^c (30-95)
Cau 2006 ¹⁸	France	September 2002-May 2005	23 (8.7)	68 (51-79)	21	2	53 (34-75)
Javerliat 2006 ^{a,19}	France	November 2000-August 2005	82 (31.1)	NR	NR	NR	NR
Kolvenbach 2006 ²⁰	Germany	2000-2005	131 (49.6)	NR	NR	NR	NR
Total			264	70.1 (46-88) ^b	82 ^b	12 ^b	60 (30-95) ^b
Laparoscopic-assisted surgery of AAA							
Kline 1998 ²¹	USA	NR	20 (9.3)	70.9 (60.9-79.1)	NR	NR	53 (40-70)
Castronuovo 2000 ²²	USA	February 1997-May 1999	60 (27.8)	70.6 (53-87)	51	9	57 (44-80)
De Donato 2003 ²³	Italy	November 1999-December 2002	80 (37)	69 (56-83)	69	11	NR
Alimi 2003 ²⁴	France	January 1998-January 2002	24 (11.1)	68.2 (57-82)	22	2	51.1 (32-68)
Cardon 2005 ²⁵	France	March 2001-September 2001	32 (14.8)	NR	NR	NR	NR
Total			216	69.6 (53-87)	142	22	54.9 (32-80)
Hand-assisted laparoscopic surgery of AAA							
Kolvenbach 2006 ²⁰	Germany	1996-2000	215 (47.5)	NR	NR	NR	NR
Ferrari 2009 ²⁶	Italy	October 2000-October 2008	188 (41.5)	69 (NR)	182	6	55 (NR)
Veroux 2010 ²⁷	Italy	May 2006-May 2008	50 (11)	61.2 (NR)	50	0	59 (NR)
Total			453	67.4 (-)	232	6	55.8 (-)
Total laparoscopic surgery of JAAA							
Coggia 2008 ²⁸	France/Italy	February 2002-October 2007	13	70 ^c (50-81)	12	1	55 ^c (50-80)
Laparoscopic-assisted surgery of JAAA							
Ferrari 2009 ²⁶	Italy	October 2000-October 2008	83	71 (NR)	81	2	57 (NR)

AAA, Abdominal aortic aneurysm; JAAA, juxtarenal abdominal aortic aneurysm; NR, not reported.

^aThese two articles were conducted on overlapping populations.

^bThe Coggia 2005 study was used instead of Javerliat 2006.

^cMedian.

totally laparoscopic approach (both dissection and anastomosis conducted laparoscopically), (2) the laparoscopic-assisted surgical approach (laparoscopic dissection with endoaneurysmorrhaphy via minilaparotomy), (3) the hand-assisted laparoscopic approach (laparoscopic dissection and anastomosis assisted by the surgeon's hand), and (4) the robot-assisted laparoscopic approach (laparoscopic dissection and anastomosis assisted by a robot). Because of the very limited data in the published literature, only the first three of these techniques will be discussed herein.

The aim of this article is to review the current literature on laparoscopic AAA repair and to summarize and discuss the results of published reports.

METHODS

Search strategy. Eligible articles were identified by a thorough search of PubMed bibliographical database extending from January 1966 to December 2012 (last search: December 25, 2012). Three investigators (K.E., E.M., and S.H.) working independently executed the search using the following keywords in all the possible combinations: laparoscopy, laparoscopic, endoscopy, vascular surgery, abdominal aortic aneurysm, aortic disease, aortic surgery, and minimally invasive. In addition, we checked all the references of relevant reviews and eligible articles that our search retrieved.

Search of the literature was restricted to those articles published in English and retrieved 310 articles (349 including non-English articles), which were reviewed by three authors (K.E., E.M., and S.H.) working independently for study eligibility based on the following criteria: (1) original clinical series describe laparoscopic surgery of infrarenal AAAs or juxtarenal abdominal aortic aneurysms (JAAs); (2) the intended repair strategy was a laparoscopic repair by using the totally laparoscopic approach or the laparoscopic-assisted surgical approach or the hand-assisted laparoscopic approach; and (3) more than five patients were reported to be treated with these laparoscopic techniques. Discrepancies were discussed until complete agreement was reached among the reviewers, and the list of the articles that best matched the inclusion criteria was finalized.

The selection process excluded: (1) case reports or case series including less than six cases of AAA repair with laparoscopic surgical techniques; (2) studies reporting on suprarenal aneurysm repair or aortoiliac occlusive disease (patients with AAAs and concomitant aortoiliac occlusive disease were included when it was not possible to extract the data separately); (3) studies that specialize in conventional open surgical repair, or other minimally invasive techniques like endovascular AAA repair and robotic-assisted procedures; and (4) studies that do not contain the main outcomes of interest as described below.

Download English Version:

<https://daneshyari.com/en/article/5995744>

Download Persian Version:

<https://daneshyari.com/article/5995744>

[Daneshyari.com](https://daneshyari.com)