LAPAROSCOPIC APPENDECTOMY AS AN ALTERNATIVE TO CONVENTIONAL PROCEDURE – RESULTS IN OUR OWN MATERIAL

MARcin MEREnda1, ANDrzej LIvArsk1, PIOTR KABZiŃSKI1, DARiUSz JANczAK1,2
Department of Surgery of 4th Military Clinical Hospital in Wrocław1
Department of Clinical Procedures, Medical University in Wrocław2

Appendectomies are the most common surgical procedures performed in the emergency surgery setting. Since more than one decade laparoscopic appendectomy appeared as an alternative procedure to commonly used conventional appendectomy as a recognized method of treatment of acute appendicitis. Despite multiple papers and studies comparing these techniques, still no clear indications and eligibility criteria exist for either of them.

The aim of the study was to evaluate results of treatment of acute appendicitis using the laparoscopic method versus the conventional appendectomy, basing on parameters affecting treatment results and costs, such as duration of hospitalization, complications, use of medications.

Material and methods. The analysis included patients who underwent surgical treatment for acute appendicitis at the Department of Surgery of 4th Military Clinical Hospital in Wrocław between 2006 and 2012. Since 2006, 128 laparoscopic appendectomies (group 1) were performed, while 189 patients underwent conventional procedure during this time (including 11 who underwent a diagnostic laparoscopy – group 2). The study was based on retrospective analysis of medical records of patients. Treatment results were evaluated basing on the following parameters: duration of hospitalization, amount of used analgesics, duration and type of antibiotic therapy, peri- and postoperative complications.

Results and conclusions. Results obtained at our Clinic, similar to results obtained at other sites, warrant use of laparoscopic appendectomy. Use of minimally invasive techniques provides better treatment results, mainly with regard to shorter duration of hospitalization, lower use of antibiotics and analgesics, which also contributes to lower overall treatment costs.

Key words: laparoscopic appendectomy, minimally invasive surgery

First attempts to use a laparoscopic technique in the treatment of acute appendicitis (AA) were undertaken in the 1970’s, when De Kok used laparoscopic access to dissect the vermiform appendix and protect its remnant following its exposure through mini laparotomy, without using purse string sutures and “Z” sutures that are used in the conventional technique. We could call such procedure an appendectomy with laparoscopic assistance. First fully laparoscopic appendectomy was performed in 1981 by a German gynecologist Kurt Semm (1), but first report was published in 1983 since initially report by K. Semm was rejected since his procedure was deemed unethical. The technique of laparoscopic appendectomy was perfected and popularized by Gőetz (2).

1990’s and first decade of the 21st century brought immense interest in this new technique, which resulted in large number of papers from all over the world (3, 4, 5). Most of the publications indicates benefits of laparoscopic appendectomy versus conventional technique with regard to duration of hospitalization, time to restoration of peristalsis, number of local complications related to wound healing. In 1995 Consensus statements of the European Association for Endoscopic Surgery was published (Consensus statements – Sep-
In September 1994, the Educational Committee of the European Association for Endoscopic Surgery (6) dealt with laparoscopic cholecystectomy, appendectomy, and hernia operations. In this context, laparoscopic cholecystectomy was branded “gold standard,” while laparoscopic appendectomy, despite encouraging results, was not considered as standard management, because most of the papers came from sites that specialized in endoscopic surgery.

After an initial period in which enthusiasm related to this new method dominated, papers critical to laparoscopic appendectomy (LA) started to appear. In some of them, advantage of AL over the conventional technique, with regard to duration of hospitalization, number of complications or use of analgesics, was insignificant, while possibility of occurrence of serious complications, such as intestinal injury or intraabdominal abscess after LA, was pointed out (7).

In 2006 a recommendation concerning laparoscopic procedures in acute abdominal disorders by the European Association for Endoscopic Surgery was published. Laparoscopic appendectomy was considered in this document as an alternative method of treatment of appendicitis.

Currently, the vast majority of departments of surgery in Poland is equipped with laparoscopic equipment, and laparoscopic cholecystectomy is considered as a recognized standard management. Requirements for laparoscopic procedures are listed, e.g., by the National Consultant for General Surgery in the specialization curriculum that requires for the doctor who specializes in surgery to perform at least 40 laparoscopic cholecystectomy procedures. However, emergency laparoscopic procedures, including for the treatment of acute appendicitis, are still performed only by few centers in Poland. Conventional appendectomy is commonly one of the first surgical procedures performed by young surgeons on their own who usually have little experience in laparoscopic techniques. All these aspects dictate that number of appendectomy procedures performed using laparoscopic techniques versus conventional procedures remains relatively small in our country.

Therefore, further observations of outcomes of minimally invasive procedures used in the treatment of AA seem warranted to demonstrate if benefits obtained by patients warrant widespread use of laparoscopic techniques in any case.

MATERIAL AND METHODS

Retrospective analysis of medical records of patients treated at the Department of Surgery of the 4th Military Clinical Hospital in Wrocław between 2006 and 2012 due to acute appendicitis was performed. During this time, 128 laparoscopic appendectomies (group 1) were performed and 189 patients underwent conventional procedure (including 11 following diagnostic procedure (including 11 following diagnostic laparoscopy – conversion).

The conventional procedures utilized traditional access to the peritoneal cavity from the pararectus incision or alternating incision using purse string sutures and “Z” sutures. Laparoscopic technique provided access to the peritoneal cavity by creating pneumoperitoneum following insertion of a trocar 10/12 mm from an incision below the umbilicus, and subsequently a trocar 5 mm was inserted in the midline over the pubic symphysis and a trocar 10/12 mm in the left iliac fossa or in the right subcostal region (according to operator’s preferences) (fig. 1).

Harmonic knife was used for the dissection of the mesentery (fig. 2), while the remnant of the vermiform appendix was closed, depending on operator’s preferences, with endostaplers Endo-GIA, polymer clips Hem-o-lok and Endo-Loop or an ordinary ligature (fig. 3) (8-12).

When the vermiform appendix was removed from the peritoneal cavity, the protection against abdominal wall infection, Endo-Pauch, was used (fig. 4).

The following parameters were assessed in individual groups: duration of hospitalization, use of analgesics and antibiotics, complications and overall costs of performer procedures.

RESULTS

Clear advantage in the group of patients treated with laparoscopic procedures was found for the duration of hospitalization. It was on average 2.6 days (from 2 to 6 days) in the first group and on average 5.3 days (from 4 to 16 days) in the conventional appendectomy group (fig. 5).
No significant differences were found for the duration of the surgical procedures. It was on average 67 minutes (from 25 to 115 minutes) in the laparoscopic group and on average 58 minutes (from 25 to 105 minutes) in the second group.

Infection of postoperative wound is the most common complication of AA treatment. It sometimes requires long term treatment, markedly affecting quality of life of patients and duration of hospitalization. Only 3 cases (2.3%) of suppuration of postoperative wounds were found in the group of laparoscopic appendectomy versus 16 cases (8.4%) in the conventional appendectomy group (fig. 6).

Use of analgesics and antibiotics, expressed as number of doses per one hospitalized patient, was lower in the group of patients who underwent a laparoscopic procedure. Amount of utilized analgesics in the first group was on average 3.6 (from 1 to 9) versus 6.2 (from 3 to
16) in the “conventional” group. Number of utilized antibiotic doses was also significantly lower in the “laparoscopic” group: on average 3.3 (from 1 to 15) versus 8.1 (from 1 to 33) in the second group (fig. 7).

Despite higher material costs related to the laparoscopic procedure itself (it is approximately 1000 PLN versus approximately 250 PLN for the conventional procedure at our center), considering shorter hospitalization (daily cost of patient hospitalization at our center is approximately 600 PLN), overall treatment costs are lower in the group of patients who underwent laparoscopic procedure (fig. 8).

In the prolonged follow-up, symptoms suggesting pericecal abscess, reported in the literature as a serious complication of laparoscopic appendectomy (13), were found in two cases (1.56%). Performed CT imaging of abdominal cavity demonstrated fluid collections around the cecum, without any evidence of an abscess. Therefore medical treatment was given that resulted in resolution of symptoms.

**DISCUSSION**

Acute appendicitis is a common acute surgical disorder. Despite more than one hundred years of history of enormous experience with appendectomies (14) and continuous progress in the surgical technique, still surgical treatment of AA carries a risk of dangerous complications, including death. Nowadays demands placed by patients on a surgeon keep on increasing and cannot be compared to those from the days of first pioneer surgical procedures. Majority of patients attending surgical emergency room due to AA are young, active professionally and socially subjects who expect not only cure and resolution of pain, but also as quick as possible return to full
Laparoscopic appendectomy as an alternative to conventional procedure – results in our own material

 activity. Knowledge of obvious achievements of medical sciences, including minimally invasive techniques is common among patients. Therefore, in the 21st century, patients are clearly dissatisfied with any delay in recovery following “routine” as some patients think, appendectomy procedure, caused by e.g. infection of a postoperative wound. In extreme cases this may result even in legal complaints.

Treatment outcomes obtained at our Clinic support data presented in majority of publications related to use of laparoscopy in the treatment of AA, indicating benefits of using minimally invasive procedures (duration of hospitalization, number of infectious complications, use of analgesics and antibiotics) (15, 16). Lower operative injury and consequently shorter hospitalization is the greatest benefit of laparoscopy. Some authors raise their concerns over the use of laparoscopy in the treatment of AA due to high procedure costs (17). According to our assessment, this concern is not justified, since indeed higher material costs of the procedure are compensated by other costs related to patient hospitalization and use of drugs, resulting in lower overall costs of laparoscopic treatment of AA. Lower number of infectious complications and better cosmetic effects markedly affect quality of life and level of satisfaction of patients.

Despite very good treatment results, one has to emphasize possibility of dangerous complications related to use of minimally invasive technique. These may include intraoperative intestinal perforation or a pericecal abscess. Obviously, despite advances in minimally invasive techniques, in some cases the safest solution is conversion to the conventional technique. Such conversion is not a failure, but merely a change of surgical technique.

One must remember to avoid potential exposure to dangerous complications, such as intestinal perforation, related to dissection of a vermiform appendix which is hardly accessible, trying to obtain benefits related to minimally invasive techniques. In our material, conversion to an open procedure was required only in 11 cases (7.9%).

In our opinion laparoscopic appendectomy is a reliable surgical technique for the treatment of acute appendicitis. It is an alternative to the conventional procedure in the era of development and progress of minimally invasive surgery. When performed by an experienced team of surgeons, it meets all high expectations of modern patients.

CONCLUSIONS

1. Shorter hospitalization of patients and better cosmetics effects are clear benefits related to laparoscopic treatment of acute appendicitis versus the conventional method.
2. Laparoscopic access in the treatment of AA results in lower number of infectious complications of the postoperative wound.
3. Use of laparoscopic techniques is related to lower utilization of analgesics and antibiotics.
4. Treatment of AA using laparoscopic versus conventional procedures is cheaper despite higher material costs of the procedure itself.
REFERENCES


Received: 20.03.2013 r.
Adress correspondence: 50-981 Wrocław, ul. Weigła 5
e-mail: marcinmerenda@op.pl