

PROFESSIONAL PAPER

Laparoscopic appendectomy in obese patients - experience from small, general hospital

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ABSTRACT

Background: Acute appendicitis (AA) is the most common cause of acute abdominal pain in the general population. In the past 30 years, obesity has become twice as common. Emergency surgery services are more often faced with obese patients with acute abdominal pain whose origin is AA. That is why we wanted to compare our results with data from the literature on laparoscopic surgery of obese patients with AA.

Materials and methods: This is a retrospective study, which includes the population of obese patients who underwent surgery at our facility during the period from 1.1.2018. to 31.12.2022. Data were taken from our patients' electronic records. Patients were included in the study who had body mass index (BMI) 30 and more, without any serious comorbidity. Exclusion criteria were: younger than 20 years, previous laparotomy, periappendicular infiltration, unregulated hypertension and diabetes mellitus, and morbidity obesity (BMI 40 and above). We analyzed demographic data, the length of surgery, PH findings of appendicitis, consumption of analgesics, beginning of peristalsis, length of stay and postoperative complications.

Results: In the period in question the laparoscopic approach was used in surgery on 190 patients in the treatment of AA. 20 obese patients (10.52%) were included in our study. There were 11 male and 9 female patients, whose average age was 42 years. The duration of the operation was 55 minutes, the most frequent PH finding was phlegmonous inflammation of the appendix in 12 patients. The appearance of peristalsis was on the first postoperative day, consumption of analgesics was two ampullas of metamizole on the day of the operation. The length of stay was 3 days, and there were two abscesses as postoperative complications.

Conclusion: The laparoscopic approach has many advantages that are even greater in the obese population in relation to those of normal weight. The operation takes less time, postoperative pain is reduced, recovery after laparoscopic appendectomy is faster, and there are fewer postoperative complications. This approach should be used more often.

Keywords: laparoscopy, appendicitis and obesity

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Introduction

Acute appendicitis (AA) is the most common cause of acute abdominal pain requiring surgery. It is the most frequent surgical disease with an incidence between 150 and 228/100 000, more often in males but without a significant difference¹. It occurs most often in the second and third decade of life. AA is a rare disease in the older population (sixth, seventh, eight decades). About 8% of the general population has AA during their life according to many epidemiological studies². Hernia repair is the most common operation in the world, while appendectomy is in second place in general surgery in the world. Laparoscopic appendectomy (LA) in the era of the minimal invasive approach has become dominant in relation to open appendectomy (OA), through a McBurney incision, in the past 10-15 years². OA has become rare and is used in cases with gangrenous appendix bases (when the application of Hem-o-lok clips is not secure), the retrocecal position of the appendix, a hostile abdomen (numerous previous abdominal operations), in cases of conversion from LA when there is unclear cecal pathology, suspicion of a neoplastic process, periappendicular infiltration, and also in cases of an old perforation of the appendix with diffuse peritonitis. In the presence of signs of diffuse peritonitis in our hospital, we perform a medial infraumbilical laparotomy, not a Mc Burney incision. We hope to achieve better visualisation, lavage and a better position of the drain in these cases.

The frequency of obesity (body mass index (BMI) 30 and more) has doubled in the last 30 years, especially in the Western world³. Obese patients with acute abdominal pain whose origin is AA are increasingly encountered by the emergency surgery services. It is difficult to establish a diagnosis in these patients. The diagnostic accuracy is lower in obese patients with AA than in the population with normal body weight with the same disease. Physical examination is difficult because the depth of the abdominal wall decreases signs of peritoneal tenderness. Echosonography is not accurate enough because meteorismus and intraabdominal fat may causes difficulties. A CT scan remains the diagnostic choice in obese patients with AA. Of course,

laboratory tests such as the parameters of the acute phase of inflammation (LKC, CRP, procalcitonin) can indicate an acute abdominal surgical process. At our hospital we perform about 250 appendectomies per year. In November 2017 we started performing LA. Every year after that, the number of LA surgeries has increased. Last year, about 60% of all appendectomies were LA at our facility. The proportion of obese patients in the population who undergo surgery for appendicitis acuta is about 10%. Also, the frequency of obesity in the general population in our region is between 10 and 11%. The advantages of the laparoscopic approach mentioned in literature are numerous: less trauma to the tissue of the abdominal wall, faster recovery, fewer complications, local, systemic and surgical site infections (SSI), less deep vein thrombosis (TDV)), shorter length of stay, better outcome and better cosmetic effect^{3,4,5}. These advantages of the minimal invasive approach are even greater and more important in the obese population with AA, and there is a significant difference in some of these variables when comparing LA and OA in the population with normal weight. Obese patients obviously have more benefits from LA than patients with normal BMI⁶.

The purpose of this study was to compare our results with data from the literature in laparoscopic surgery on obese patients with AA, to check the benefits of laparoscopic appendectomy in obese patients in small, general hospitals.

Material and methods

This was a retrospective study which encompassed the population of obese patients who underwent laparoscopic appendectomy in the period from 1.1.2018 to 31.12.2022 at Doboj General Hospital. Data were obtained from the patients' electronic records. The data we analyzed were demographic data, surgical record, the duration of surgery, PH findings, postoperative course, consumption of analgesics, and length of stay (LOS). Also we gathered information during clinical monitoring, such as the occurrence of peristalsis and complications. We compared the results obtained

with data from the literature. The study included obese patients with BMI 30 and higher, older than 20 years, without significant comorbidities. The exclusion criteria were: patients younger than 20 years, previous laparotomy, periappendicular infiltration, an unregulated chronic disease such as hypertension, diabetes mellitus, chronic obstructive pulmonary disease (COPD), and, finally morbid obesity (BMI 40 and above).

In the five year period in question 20 obese patients were included of the 190 who underwent LA. In total 1170 patients underwent laparoscopic and open appendectomy. There were 10.52% obese patients in the LA group. In most of the obese patients who underwent OA we used a medial laparotomy. We used the McBurney incision sporadically. All LAs in obese patients were performed after short preoperative preparation, in the left lateral and mild Trendelenburg position, which we used to achieve better visualization and an easier approach to the ileocecal region.

We used three ports: umbilical, 10 mm, suprapubic, 5 mm and left lateral, 10 mm. After creating a pneumoperitoneum using a Veres needle, we inserted the camera and two ports. Using a Harmonic scalpel (Ethicon, Endosurgery, Cincinnati, OH) we dissected the mesoappendix and approached the appendiceal

base, which we closed using Hem-o-lok clips size L or XL (Hem-o-lock, Weck Closure Systems, Research Triangle Park, NC, USA). In some cases we used titanium clips (Braun, Germany). Usually we placed two clips on the base and one above it, then removed the appendix.

We measured the duration of the operation from the first incision of the skin to completing the final suture on the skin. We monitored postoperative complications for 30 days after operation, by check ups in the surgical out-patients' clinic and by telephone.

Results

In the period from 1.1.2018 to 31.12.2022 at Doboj General Hospital we admitted 20 obese patients with symptoms of acute appendicitis. There were eleven males and nine females. The average age of the patients was 42 years (+/- 15.8). The phlegmonous type of inflammation was predominant (Table 1). The average duration of the operation was 55 minutes (from 20 to 135 minutes).

During the postoperative period after LA, there was minimal use of analgetics, early appearance of peristalsis, short LOS and rare complications (Table 2).

Table 1. Patho-histological results in obese patients

Patho-histological tests	
Appendicitis catarrhalis (non-complicated)	5
Appendicitis phlegmonosa (non-complicated)	12
Appendicitis gangraenosa perforativa (complicated)	3

Table 2. Postoperative follow up

Application of analgetics	Appearance of peristalsis	Length of stay (LOS)	Complications	SSI (surgical site infection)	Ileus
Two ampullas of metamizole i.v. or neodolpasse	First postop. day in 80% of patients	3 days (two to five days)	2 cases of abscess	0	0

Discussion

According to most studies, the male population suffers from AA more often than women, but the difference is not significant, at about one to two percent more than female¹. The average age of our patients was somewhat higher than in the literature, because two patients were older than 60 years, and the sample was small. In our population, most patients were in the second and third decades of life, which is the same as in the literature². The duration of surgery is an interesting variable, because it depends on the patients (depth of the abdominal wall, a large amount of fatty tissue) and also the experience of the surgeon. Some studies showed that the duration of surgery (LA) in obese patients is shorter than OA^{2,8}. Clarke et al. showed the opposite results in their article, the prolonged time of LA in obese patients in relation to OA in the same population³. Meta analyses have given the advantage to LA in obese patients in this category (duration of operation), but in line with the experience of the surgical staff^{9,10}. Our result (the average duration of the operation was 55 minutes) is very good compared to the literature. PH findings are as expected, most show phlegmonous inflammation. We emphasize the difficulty of establishing a diagnosis of AA in obese patients. In addition to the physical examination, laboratory findings (leukocytes, C reactive protein, procalcitonin) and echosonography, we increasingly use CT scans when we suspect AA. Physical examination is less sensitive because peritoneal tenderness is not as strong. As a result there is a somewhat higher number of mild, catarrhal inflammations, while the number of complicated AA is expected. Use of analgesics was significantly lower than in the population with normal weight. Most often two ampoules of metamizole or two infusions of neodolpasse were sufficient on the day of the operation and the first postoperative day. On the second postoperative day analgesics were administered at the patients' request. This is in accordance with the literature data^{4,5}. We are especially proud of the appearance of peristalsis on the first postoperative day in 80% of patients. This means the early peroral intake of food, the early mobilization of patients and a shorter

length of stay. Peristalsis occurred a few days later in complicated cases with generalized peritonitis, but that was expected. This result is somewhat better than in the literature where peristalsis is described on the second postoperative day in 80-90% of all cases of obese patients⁷. A shorter length of stay and similar frequency of complications are described in the literature in the obese population who underwent LA in relation to those who underwent OA (McBurney), and in relation to the population of normal weight who treated using LA⁵⁻⁷. Complications are rare in this population (obese patients with LA)¹⁰⁻¹². Ozozan et al. cite similar LOS but better outcomes of LA in obese patients. An American study from 2012 showed that LOS was 1-2 days shorter and summary morbidity was lower by 57% in obese patients treated by LA in relation to those treated by OA⁷. These results are reasonable when we consider the 4-6 cm operative wound from a McBurney incision, or a medial infraumbilical laparotomy in comparison to 2.5 cm (total length of three ports - 10 mm, 10 mm and 5 mm) during LA. In our data, LOS was similar, and the number of complications was smaller. We had two abscesses which were resolved using a conservative approach with antibiotics, and there was no need for reintervention. Both of those abscesses appeared after complicated appendicitis, in one case we did not insert a drain, in the other we did, but the outcome was the same. There were no surgical site infections, nor postoperative ileus during 30 day follow up. This is the same as in the literature, and the good result is the consequence of ensuring closure of the appendiceal stump with plastic clips (Hemo-o-lok). They are inert and cause the least possible reaction in tissue¹².

In the literature (systematic reviews and meta analyses) LA was first compared with OA in a population with normal BMI. After that there were publications which compared LA and OA in obese patients. The differences between these two approaches were greater in the group of obese patients because there is less trauma to the tissue of a thicker abdominal wall, a smaller possibility of wound infection, faster mobilization of patients, and therefore less danger of postoperative ileus and deep vein thrombosis^{9,11,13}.

Limitations of the study: The small sample, impossibility of comparison with an obese group who underwent OA because many of them underwent medial laparotomy under the clinical conditions of acute abdomen.

Conclusion: Laparoscopic appendectomy has advantages in relation to open appendectomy which especially benefit the population of obese patients, such as the shorter duration of surgery, shorter LOS, less consumption of analgesics and rare postoperative complications. Generally, LA give a better outcome and should be applied in future as much as possible.

Conflict of interests

The authors have no relevant financial or non-financial interests to disclose.

Patient Consent Form: All participants were informed about subject of the study.

Author's Contribution: Zoran Matković: Data curation, Visualization, Investigation, Writing-Reviewing. Nataša Đekić Matković: Conceptualization, Methodology, Writing- Original draft preparation, Supervision. Jovica Mišić: Investigation, Writing-Reviewing. Miloš Milićević: Visualization, Investigation, Supervision.

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