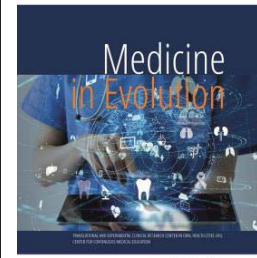


Laparoscopic incidence in acute appendicitis related to its degree of severity



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Abstract

The exact cause of acute appendicitis remains unknown, being probably multifactorial, but the inflammation of the vermiform appendix, due to luminal obstruction or dietary factors, is a major diagnostic criterion in acute appendicitis. This pathology typically presents acutely within the first 24 hours of onset, but can also present as a more chronic condition. It is currently considered that the pathological process begins after prolonged spasm of the smooth muscles and arterial vessels of the appendix. Muscle contraction leads to stasis in the appendix, spasm of the arterial vessels, ischaemia of the mucosa and, as a consequence, the primary Aschoff complex develops. Acute appendicitis is the most common surgical emergency which required the development of a predictor, represented in many studies by the disease severity score (DSS). This score can be associated with the results on the incidence of in-hospital and after hospital discharge complications, with the evaluation of the duration of hospitalization, in order to apply the most effective therapeutic methods.

Once the diagnosis of acute appendicitis has been made, the appendicectomy should be performed urgently within the first hours after hospitalization. To date, the indications for laparoscopic appendicectomy are debatable and its advantages are related to the severity of the disease.

Keywords: acute appendicitis, laparoscopic surgery, degree of severity

INTRODUCTION

Acute appendicitis is a condition often of unknown cause, but the inflammation of the appendix due to obstruction may be caused by lymphoid hyperplasia, parasitic infections, faecal matter or benign or malignant tumours. Once significant inflammation and necrosis occur, the appendix is exposed to the risk of perforation, leading to a localized abscess and sometimes open peritonitis, with a high degree of severity and risk to life [1]. The risk of rupture is variable, but is about 2% at 36 hours and increases by about 5% every 12 hours thereafter.

Appendectomy is the standard treatment for acute appendicitis. Laparoscopic approach to appendectomy is preferred over the open approach. Most uncomplicated appendectomies are performed laparoscopically.

Kumar et al., 2016, in the study on laparoscopic appendectomy versus classical appendectomy that evaluates the advantages and disadvantages of the two techniques, showed a lower incidence of incision infection, a low level of need for postoperative analgesics and a shorter postoperative hospital stay in laparoscopic therapy. The main disadvantage of laparoscopic appendectomy is the longer operative time, but it offers less pain, faster recovery and the ability to explore most of the abdomen through small incisions. Cases where there is an abscess or advanced infection may require an open approach [3].

Many large studies show that simple appendicitis associated with a low degree of severity, treated either by open surgical therapy or by laparoscopy, has excellent results [4]. Determining and reporting disease severity in emergency appendectomy is not standardized, but a severity grading system that strongly correlates with laparoscopy of acute appendicitis is needed [5].

Aim and objectives

The aim of this study is to evaluate the laparoscopic incidence in acute appendicitis in relation to disease severity. The optimal laparoscopic approach of acute appendicitis involves precise identification of risk factors, clinical and pathological features based on laboratory examination, the most accurate diagnosis rate and the treatment administered. Any factor that leads to a complicated pathological picture induces a higher degree of severity. This fact will effect the incidence of laparoscopy in the therapeutic management of acute appendicitis, aiming at reducing pre- and postoperative complications among the studied population.

Objectives: Laparoscopic incidence and its benefits in acute appendicitis (AA) according to severity score related to gender; Laparoscopic incidence and its benefits in acute appendicitis (AA) according to severity score related to age; Laparoscopic incidence and its benefits in acute appendicitis (AA) according to severity score related to age and gender.

MATERIAL AND METHODS

A retrospective study was used to achieve the proposed objectives. In this regard, a group of 171 patients diagnosed with acute appendicitis was created.

The material basis of the study included the patients' medical records from the hospital archives, respectively the computerized data of the two units, the County Emergency Clinical Hospital from Oradea and the Pelican Hospital from Oradea.

The data obtained were statistically interpreted based on the determination and calculation of a series of specific analysis indices.

RESULTS

Almost 30% (29.24%) of the total number of patients included in the study group suffered from acute appendicitis in 2017. In 2020, approximately 20% (19.88%) of the total. In 2018 and 2019, the number of patients with acute appendicitis decreased by half compared to 2017, reaching values of 16.95%, respectively 15.78% (Table 1).

Table 1. Percentage of operated AA out of total AA/year by severity score

Year	Mild AA		Severe AA		Total	
	No.	%	No.	%	No.	%
2017	26	25.74	24	34.28	50	29.24
2018	16	15.84	13	18.57	29	16.95
2019	16	15.84	11	15.71	27	15.78
2020	30	29.70	4	5.71	34	19.88
2021	13	12.87	18	25.71	31	18.13
2017-2021	101	100	70	100	171	100

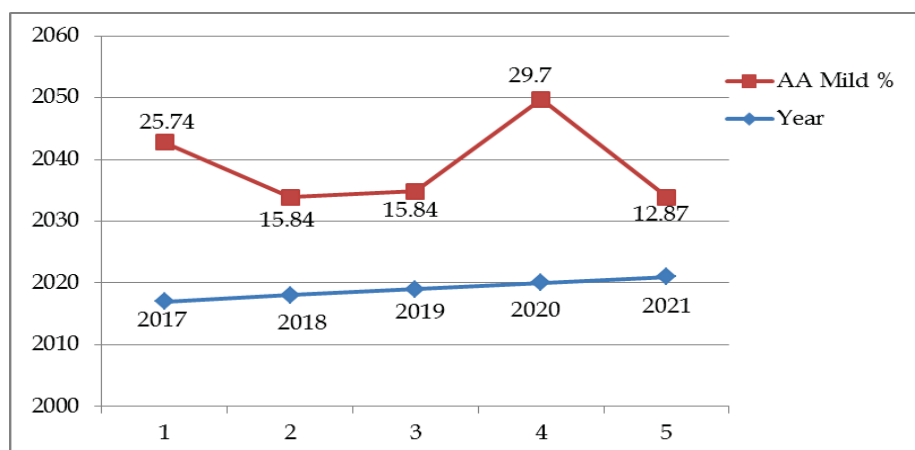


Figure 1. The percentage of acute appendicitis with mild severity score

The percentage of acute appendicitis (Fig. 1) with mild severity score was of 29.70% in 2020, a percentage that in 2017 decreased to 25.74%. In the analysed period, the lowest percentage of 12.87% was registered in 2021.

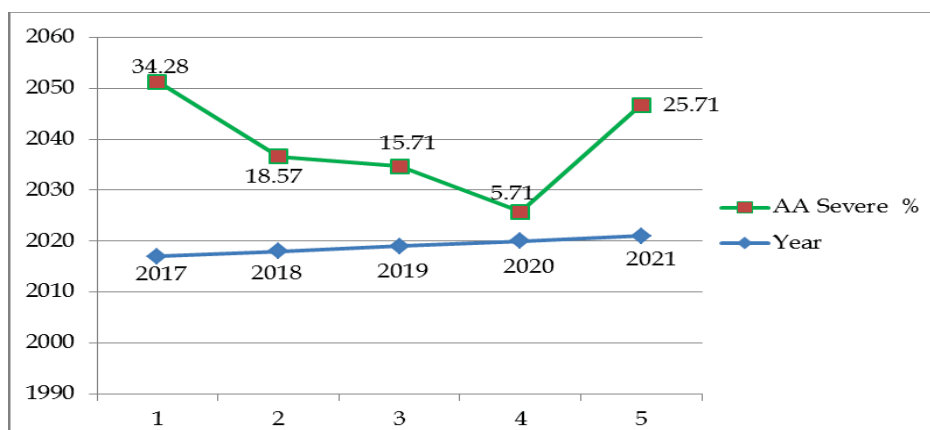


Figure 2. The percentage of acute appendicitis with severe severity score

In acute appendicitis with increased severity, the highest percentage was recorded in 2017 (34.28%) and the lowest in 2020 (5.71%) (Fig. 2).

Table 2. The percentage of operated AA by severity score in relation to gender

Year	Gender	Mild AA		Severe AA		Total	
		No.	%	No.	%	No.	%
2017-2021	F	55	54.45	34	48.57	89	52.04
	M	46	45.54	36	51.42	82	47.95
	TOTAL	101	100.00	70	100.00	171	100.00

Mild acute appendicitis showed increased incidence in female patients, 54.45% compared to male patients. In the case of severe acute appendicitis, the percentage was higher among male patients, 51.42%. The highest percentage of acute appendicitis related to gender was recorded in female patients, 52.04% (Table 2).

The percentage of mild acute appendicitis was the highest in patients under 20 years of age, 28.71%. The same ascending trend was observed in the case of patients aged 21-30 years, 22.77% (Table 3).

Table 3. The percentage of operated AA by severity score in relation to age

Year	Age group	Mild AA		Severe AA		Total	
		No.	%	No.	%	No.	%
2017 - 2021	<20 years	29	28.71	11	15.71	40	23.39
	21-30 years	23	22.77	14	20.00	37	21.63
	31-40 years	16	15.84	17	24.28	33	19.29
	41-50 years	17	16.83	10	14.28	27	15.78
	51-60 years	9	8.91	10	14.28	19	11.11
	61-70 years	5	4.95	6	8.57	11	6.43
	>70 years	2	1.98	2	2.85	4	2.34
TOTAL		101	100.00	70	100.00	171	100.00

Severe acute appendicitis had the highest percentage in patients aged 31-40 years, 24.28%. This percentage was also high in patients aged 21-30 years, 20% (Table 3).

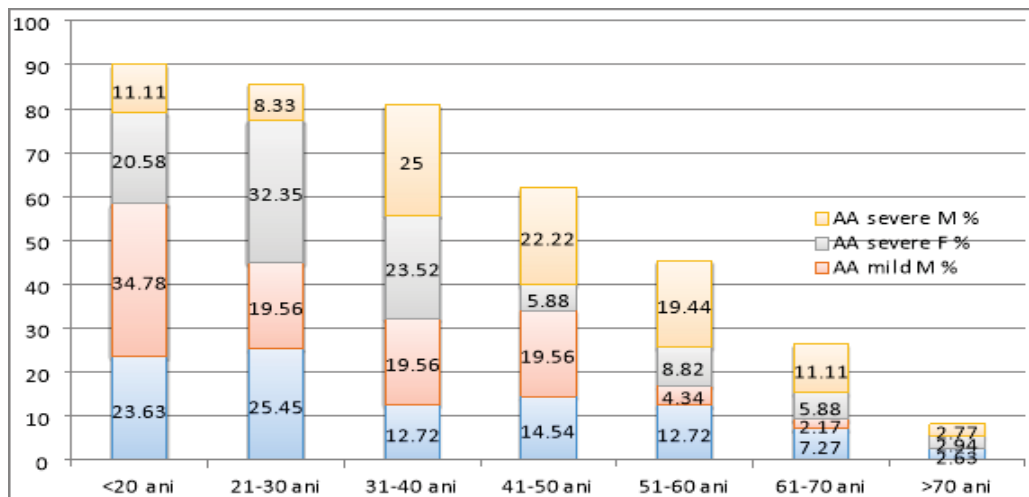


Figure 3. The percentage of acute appendicitis by severity score in relation to age and gender

The majority of the patients with mild appendicitis from both groups, women's group and men's group, was under 20 years of age and between 21-30 years, 49.08% and 54.34%, respectively (Fig. 3).

Most female patients with severe appendicitis were aged between 21-40 years, 55.87% and most male patients with severe appendicitis were aged between 31-50 years, 47.22%.

DISCUSSIONS

Several studies in the literature suggest that the laparoscopic approach for performing appendectomy (LA) presents many advantages such as faster recovery, fewer postoperative complications, better aesthetic impact, less postoperative pain and shorter hospital stay [6, 7].

Acute appendicitis with higher severity score is more common in patients aged 21-40 years regardless of gender. Compared to conventional surgery, postoperative recovery is faster in the case of laparoscopic procedure.

The number of patients from the laparoscopic study group, diagnosed with severe acute appendicitis, converted to the conventional procedure was insignificant.

The retrospective cohort study on whether the laparoscopic approach should be proposed as the gold standard in acute appendicitis conducted by Guercio et al., 2016 concluded that the most relevant factor studied was the reduction in the conversion rate for laparoscopic approach. No significant differences were found concerning the length of the procedure and the length of the hospital stay between the two groups. The rate of complications was very low in both groups.

This study also looked at the frequency with which experienced surgeons can apply such a procedure to obtain all the advantages of this technique in order to highlight whether laparoscopy of acute appendicitis can become the gold standard in treating this surgical emergency [8].

A very important result observed in the study "Risk Factors for Future Repeated Abdominal Surgery" to be highlighted is the significant reduction in the conversion rate for laparoscopic approach, which allows the safe performance of even "difficult" appendectomies such as retrocaecal or infrahepatic appendicitis. Possible complications due to abdominal incisions, especially in case of large incisions and contaminated surgical field, are very well-known [9].

At first, these advantages were confirmed for uncomplicated appendicitis [10]. Current evidence has shown several advantages of LA even for complicated appendicitis. These advantages are should be considered as the minimum incision is associated with a significantly lower rate of surgical infection [11]. Consequently, although appendectomy is considered a simple and safe procedure, diagnostic certainty and safe and correct surgical procedure are needed [12].

Other studies have reported that laparoscopic appendectomy is associated with a higher rate of complications and higher costs than the conventional procedure [12], although the advantages of the laparoscopic approach (optimal abdominal cavity exploration, fast recovery) are highlighted in cohort studies [7]. Both techniques proposed in the specialized studies may change results in terms of patient comfort, complications and costs [13].

Conventional surgical technique is commonly adopted in many cases [14]. The three-port laparoscopic procedure is frequently used for cholecystectomy, but also for appendectomy and other abdominal procedures presented in the study on the laparoscopic treatment of a large pedunculated hemangioma of the liver [15].

Laparoscopic appendectomy can be adopted in all stages of severity of acute appendicitis, including diffuse peritonitis.

CONCLUSIONS

The incidence of laparoscopic appendectomy in severe acute appendicitis in the study group was higher in the 21-40 age group.

The incidence of laparoscopic appendectomy in mild acute appendicitis in the study group was higher in patients younger than 20 years of age.

Severe acute appendicitis, treated laparoscopically, had a higher incidence in female patients, reaching the percentage of 55.87%.

In both the female and the male group, the incidence of mild appendicitis was higher in patients under 20 years of age and in patients between 21-30 years of age, being of 49.08% and 54.34%, respectively.

The incidence of laparoscopic appendectomy in acute appendicitis by severity score in relation to age and gender in the study group was higher in the case of female patients as opposed to male patients.

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