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Post-Operative Presentation and Evolution of Acute Appendicitis in Patients Over 50 Years

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Abstract

Acute Appendicitis (AA) is the major cause of emergency abdominal surgery. It mainly affects young individuals, but its incidence has increased in the elderly. The retardment of the diagnosis and treatment of AA in the elderly can lead to more associated complications. This study aims to evaluate the differences in the presentation and postoperative evolution of AA in patients over 50 years old, based on a retrospective observational clinical study with data collected from the medical records of patients over 18 years old who underwent emergency appendectomy between the years of 2014 and 2015. Significant statistical differences were identified between the groups in terms of age, presence of comorbidities, severity of appendicitis, need for a postoperative drain and length of hospital stay. It is concluded that the patient with AA above 50 years old presents a more severe condition.

Keywords: Appendicitis; Elderly; Appendectomy; Appendicitis complications

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Background

Acute Appendicitis (AA) is the most frequently abdominal surgical emergency; thus, appendectomy is the non-elective most performed surgery by general surgeons [1]. The lifetime risk of AA is about 7% [2,3]. It is a disease that mainly affects young individuals, while it represents only 10% of cases of emergency abdominal surgery in the elderly [4]. However, the incidence in this age group has increased, probably related to the rise of life expectancy and improved methods diagnostics [1,5]. Elderly patients diagnosed with AA already have a higher rate of morbidity and mortality, when compared to the young patients, because they present comorbidities and physiological changes typical of senility [6]. Furthermore, the elderly may also have atypical symptoms of AA, initially suggestive of intestinal obstruction or diverticulitis, delaying the proper diagnosis. The delay in the diagnosis and treatment of AA in the elderly leads to an increase in the incidence of perforation of the cecal appendix, which can reach 70% in this age group, worsening of the patient's clinical condition, higher number of perioperative complications and increased morbidity and mortality [3-9].

Since the diagnosis of AA has grown in the elderly population for several reasons, including superior accuracy in the diagnosis, it becomes pertinent to carry out more studies on the subject. The purpose of this paper is to evaluate the differences in the postoperative presentation and evolution of acute appendicitis in patients over 50 years old.

Methods

Type of study

This retrospective observational clinical study refers to patients with a diagnosis of AA, who underwent a laparoscopic appendectomy in our center from January 1st, 2014 to December 31st, 2015. Data were collected from medical records and surgical maps. Only patients older than 18 years, from both genders, were included.

Sample

Initially, 315 medical records of patients were submitted to urgent laparoscopic appendectomy due to clinical and/or radiological diagnosis of AA.

After the preliminary analysis of these records, the following were excluded:

- Patients without diagnosis confirmed of AA by anatomopathological examination.

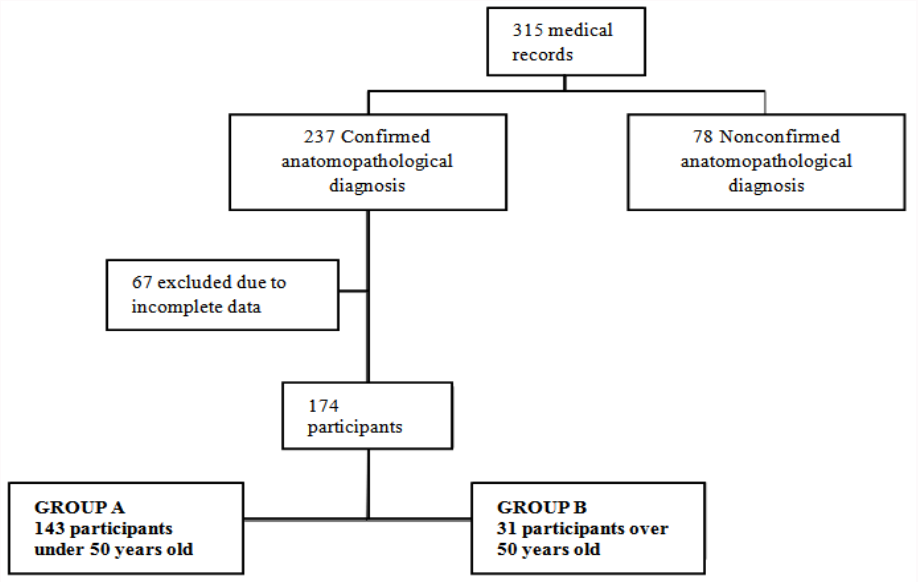


Figure 1: Distribution of participants in groups.

- Patients with incomplete data in the medical record.

After the exclusions, the final sample was composed of 174 participants (55.54% males with an average age of 37.2 ± 13.16 years).

These participants were divided into two groups according to age:

- Group A: 143 participants (58% male) under 50 years old (32.5 ± 8.1 years).
- Group B: 31 participants (51.6% male) aged 50 or over (58.6 ± 9.5 years).

The distribution of the groups is shown in the diagram in Figure 1.

Types of variables

The following variables were analyzed: demographic (gender and age), presence of previous comorbidities (systemic arterial hypertension, hypothyroidism, diabetes mellitus, fibromyalgia, dyslipidemia, smoking and hepatitis C), time between onset of symptoms and seeking medical attention, levels of C-Reactive Protein (CRP) and presence of leukocytosis at admission, time between admission to the surgical procedure, postoperative complications (nausea/vomiting, diarrhea, intracavitary abscess, abdominal pain, fever, bradycardia, thrombophlebitis, urinary retention, abdominal focus sepsis, atelectasis and hypotension), AA severity according to the anatomopathological aspect of the cecal appendix (phase I: catarrhal; phase II: edematous; phase III: gangrenous; phase IV: perforative) 10, use of abdominal drain, admission to an Intensive Care Unit (ICU) and length of hospital stay.

Statistics

Data compilation and calculations (means and standard deviations) were performed in an Excel® spreadsheet. Statistical analysis was performed using the statistical calculator Social Science Statistics Calculator.

- The normality test applied was the Shappiro-Willk. All variables showed normal distribution.
- The comparison of numerical variables between the 2 groups was performed using the student's t test for independent variables.
- The comparison of categorical variables between the 2 groups was performed using the Chi-square test.
- Correlations between numerical variables were obtained using Pearson's p test.
- Values of $p<0.05$ were considered significant.

Ethics

The project was approved by the Research Ethics Committee of Edmundo Vasconcelos Hospital. The informed consent term was dismissed by the ethics committee since it refers to a retrospective study and data was collected from medical records. There are no conflicts of interest between the study authors.

Results

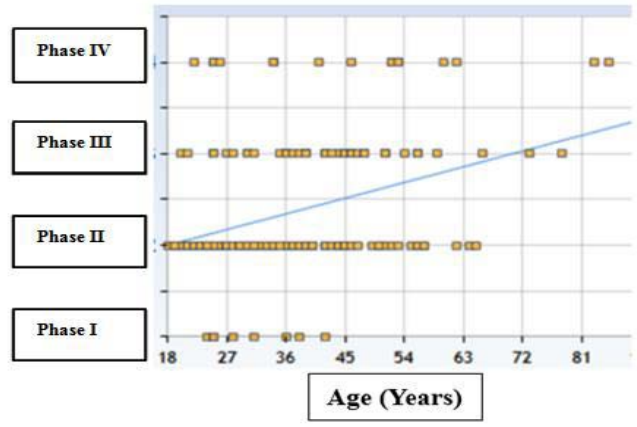
We found 143 patients under the age of 50 years (82%) and 31 participants over 50 years old (18%). The summary table (Table 1) below presents the data found in the comparison between the groups. Numerical variables are expressed as mean ± standard deviation and categorical variables in percentage. The comparisons that showed statistical significance ($p<0.05$) are expressed in red. It was observed a statistically significant difference between the groups regarding age, presence of comorbidities, severity of appendicitis, need for a postoperative drain and length of hospital stay. The univariate analysis correlating the age variable (all participants) with the other numerical variables is summarized in Table 2. The correlations that presented statistical significance ($p<0.05$) are expressed in red.

Discussion

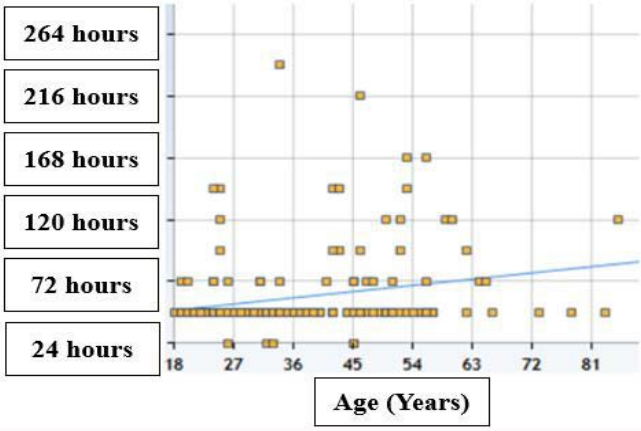
Our results showed that patients with AA and older than 50 years: (1) had more severe AA from the histopathological point of view, (2) more need for abdominal drain and (3) a longer period of hospitalization than the younger patients. AA is one of the most common causes of abdominal pain and urgent abdominal surgery. Previous studies show that appendicitis in the elderly tends to be associated with a higher risk of perforation and complications, due to the higher number of comorbidities, longer time of the onset of

Table 1: Summary table with the main findings in the comparison between groups A and B.

	Group A	*Group B*	*Test*	*p*
Age (years)	32.5 ± 8.10	58.6 ± 9.50	t- Student	*0.0001*
Gender (% male)	58.10	51.60	Chi-square	*0.5*
Presence of previous comorbidities (%)	23.60	56.25	Chi-square	*0.04*
Symptom-care time (hours)	45.52 ± 40.26	47.6 ± 33.60	t- Student	*0.25*
Admission-surgery time (hours)	21.02 ± 12.90	19.1 ± 7.60	t- Student	*0.25*
Leukocytosis (%)	77.41	76.23	Chi-square	*0.981*
C-reactive protein (CRP) (mg/dl)	63.97 ± 69.03	74.6 ± 87.45	t- Student	*0.22*
Severity of appendicitis (% phase IV)	5%	25%	Chi-square	*0.0001*
Postoperative complications (%)	13.38	21.87	Chi-square	*0.054*
Need for drain (%)	2	14,8	Chi-square	*0.0232*
Need for ICU (%)	1.5%	6.4%	Chi-square	*0.0881*
Length of hospital stay	56.5 ± 28.84	75.75 ± 35.31	t- Student	*0.0001*



Graph 1: Correlation between age and severity of acute appendicitis.



Graph 2: Correlation between age and length of hospital stay.

symptoms, communication difficulties and a wide range of possible differential diagnoses, that reasons are related to senility and cause a greater challenge for accurate diagnosis [11,12]. That is why the present study aimed to identify the main vulnerabilities regarding the treatment of AA in patients over 50 years old in our service. In our series, there was a prevalence of 18% of cases submitted to laparoscopic appendectomy in patients aged 50 years or over, a number that

Table 2: Correlation between the age of the participants and the other numerical variables.

	R	*p*
Symptom-care time (hours)	0.0919	*0.2277*
Admission-surgery time (hours)	-0.0230	*0.7632*
C-reactive protein (CRP) (mg/dl)	0.0671	*0.3797*
Severity of appendicitis (% phase IV)	0.3501	*0.0001*
Length of hospital stay	0.223	*0.0031*

is in line with the literature [5]. In the present study, we found no differences between the groups, neither in the onset of symptoms to surgical treatment time, nor in relation to the level of the CRP or the presence of leukocytosis. Likewise, age was not statistically correlated with these variables. What we observed from the results found and in other studies, is that laboratory tests of inflammatory markers have low sensitivity to determine exclusion of AA in the elderly individual, despite that, it is useful in the diagnosis of this disease [2,13]. Dhillon NK et al. observed that despite the elderly patient seeking medical attention later, the serum leukocyte count was similar between elderly and young patients [13]. Our results indicated that from the onset of symptoms, through laboratory analysis, to surgery, the patient over 50 behaves in the same way as the younger patient. We identified those patients in group B presented with more severe phases in the anatomopathological analysis of the cecal appendix. Dhillon et al. [12] demonstrated that the histopathological complicated diagnosis confirmation of AA, with perforation of the cecal appendix in the elderly, was five times higher when compared to younger individuals. Another study did not find a difference on the duration of the disease and the surgical treatment of AA between the elderly and the young. However, a higher rate of complicated appendicitis was observed in the elderly group. According to the same study, the elderly arrives at the hospital in more advanced stages of AA and with a 90% perforation rate [14]. Although this fact can be explained by the delay in diagnosis, we observed 25% of AA in phase IV in older patients, even though they had a symptom onset to surgical treatment time like younger patients. In our analysis, the length of hospital stay was longer for patients aged 50 years or older (average of 75 h of hospitalization). In other studies, the same was observed, whether due to the need for intravenous antibiotic therapy for longer periods due to the severity of the cases or due to the need for surgical conversion [14]. In our study, there was no need to convert laparoscopic surgery to laparotomy in

any of the analyzed patients. Omari et al. [6] presented the same trend regarding the length of hospital stay, with an average length of stay of 7.4 days for complicated appendicitis and 4.2 days for uncomplicated appendicitis. There was no difference regarding the rate of operative complications between the groups, but there was a higher rate of an abdominal drain in group B. This fact may be related to a higher incidence of complicated appendicitis in older patients [14]. Segev et al. [15] on the other hand, presented in their studies a greater number of complications in the group of elderly patients (40.3%). Due to that discrepancy between the studies, the relevance of carrying out new and further studies is perceived.

Final Considerations

AA in the elderly is a disease that has been increasing in incidence due to the rise of life expectancy of the general population and more advanced diagnostic methods, thus more studies on this subject are necessary. In our study, some limitations were found, among them the fact that it was a single health institution analyzed, moreover medical records with the absence of relevant data, such as the presence of postoperative paralytic ileus that has not been described. In addition, in the literature, most studies show a reduced number of elderly patients in the groups analyzed retrospectively.

Conclusion

The patient above 50 years old has more severe AA, higher need for an abdominal drain and longer hospital stays than the younger patients.

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All named authors meet the International Committee of Medical Journal Editors (ICMJE) criteria for authorship for this article, take responsibility for the integrity of the work as a whole, and have given their approval for this version to be published.

References

1. Baird DLH, Simillis C, Kontovounisios C, Salvi PF, Rasheed S, Tekkis PP. Clinical updates: Acute Appendicitis. BMJ. 2017;357:j1703.
2. Dayawansa NH, Segan JDS, Yao HHI, Chong HI, Sitzler PJ. Incidence of normal white cell count and C-reactive protein in adults with acute appendicitis. ANZ J Surg. 2016;88(6):539-43.
3. Kaya C, Altin Ö, Altuntas YE, Şeker A, Kaptanoğlu L, Bildik N, et al. The alvarado score and computed tomography for predicting acute appendicitis in elderly patients. South. Clin Ist Euras. 2018;29(3):157-60.
4. Storm-Dickerson TL, Horattas MC. What have we learned over the past 20 years about appendicitis in the elderly? Am J Surg. 2003;185(3):198-01.
5. Cohen-Arazi O, Dabour K, Bala M, Haran A, Almogy G. Management, treatment and outcomes of acute appendicitis in a elderly population: A single-center experience. Eur J Trauma Emerg Surg. 2017;43(5):723-7.
6. Omari AH, Khammash MR, Qasaimeh GR, Shammari AK, Yaseen MKB, Hammori SK, et al. Acute appendicitis in the elderly: Risk factors for perforation. World J Emerg Surg. 2014;9(1):6.
7. Guibentif L, Ris F, Scheffler M, Reny J-L, Prendki V. Acute appendicitis in elderly adults: A difficult diagnosis. J Am Geriatr Soc. 2016;64(6):1377-9.
8. Rondelli F, De Rosa M, Stella P, Boni M, Ceccarelli G, Balzarotti R, et al. Perforated *vs.* nonperforated acute appendicitis: Evaluation of short-term surgical outcomes in an elderly population. Minerva Chir. 2019;74(5):374-8.
9. Coursey CA, Nelson RC, Patel MB, Cochran C, Dodd LG, Delong DM, et al. Making the diagnosis of acute appendicitis: Do more preoperative CT scans mean fewer negative appendectomies? A ten-year Study. Radiology. 2010;254(2):460-8.
10. Goldblum J, Lumps L, McKenney J, Myers J. Rosai and Ackerman's Surgical Pathology. 11th Ed. Elsevier, 2017.
11. Wang D, Dong T, Shao Y, Gu T, Xu Y, Jiang Y, et al. Laparoscopy versus open appendectomy for elderly patients, a meta-analysis and systematic review. BMC Surg. 2019;28;19(1):54.
12. Calis H. Morbidity and mortality in apendicitis in the eldrely. J Coll Physicians Surg Pak. 2018;28(11):875-8.
13. Dhillon NK, Barmparas G, Lin TL, Alban RF, Melo N, Yang AR, et al. Unexpected complicated appendicitis in the elderly diagnosed with acute appendicitis. Am J Surg. 2019;218(6):1219-22.
14. Kirshtein B, Perry ZH, Mizrahi S, Lantsberg L. Value of laparoscopic appendicectomy in the elderly patient. World J Surg. 2009;33(5):918-22.
15. Segev L, Keidar A, Schrier H, Rayman S, Wasserberg N, Sadot E, et al. Acute appendicitis in the elderly in the twenty century. J Gastroinst Surg. 2015;19(4):730-5.