



In Acute Appendicitis, Neutrophil/Lymphocyte Rate and C-Reactive Protein's Radiological Relation with Appendix Diameter and Investigation of Its Impact on The Diagnosis

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Author Details
Ethem Bilgiç and Özden Yıldırım Akan
Authors Affiliations
Bozyaka Education and Research Hospital, Izmir, Turkey
Corresponding Author*
Ethem Bilgiç
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Abstract: Acute appendicitis is one of the most common causes of acute abdomen in general surgery clinic. Delayed intervention results in perforation and because of the delay morbidity and mortality increase. In general surgery clinics, common tendency is carrying out a surgery on the patients before symptoms become fully manifested. Today, there is a marked decrease in mortality related to acute appendicitis thanks to increase on diagnosis methods and advances in screening technology but there is no decrease in negative laparotomy. In our study, we investigated the radiological relation of NLO, CRP, leucocyte values in the patients diagnosed with acute appendicitis with appendix diameter and the contribution of their co-use on the diagnosis.

Keywords: NLO, CRP, general surgery clinic, C-Reactive Protein's.

INTRODUCTION

Acute appendicitis is one of the most common causes of acute abdomen in general surgery clinic. Delayed intervention results in perforation and because of the delay morbidity and mortality increase. In general surgery clinics, common tendency is carrying out a surgery on the patients before symptoms become fully manifested. For this reason in some patients on whom the surgery is decided to carry out, we see appendicitis symptoms with usual course (Hoffmann, J., & Rasmussen, O. Ø. 1989). For this reason, a correct diagnosis of acute appendicitis decreases negative laparotomy rate (Ishizuka, M. *et al.*, 2013). Today, there is a marked decrease in mortality related to acute appendicitis thanks to increase in diagnosis methods and advances in screening technology but there is no decrease in negative laparotomy (Tehrani, H. Y. *et al.*, 1999). Using assistant methods in diagnosing can decrease unnecessary surgeries and complication rates (Binnebösel, M. *et al.*, 2009). Studies put special focus on screening and

laboratory tests (Goodman, D. A. *et al.*, 1995). In our study, we investigated the radiological relation of neutrophil/lymphocyte rate (NLO), C-reactive protein (CRP), leucocyte values in the patients diagnosed with acute appendicitis with appendix diameter and the contribution of their co-use in the diagnosis.

MATERIAL METHOD

In this study, patients who presented to Bozyaka Education and Research Hospital Emergency. Department between the dates January 2018 - December 2018 and diagnosed with acute appendicitis were included. File evaluations of the patients were done retrospectively. Age, gender, the values of Leucocyte, Neutrophil, CRP and Neutrophil/Lymphocyte ratio of the patients the moment they presented to Emergency Department (obtained full blood count) and radiologically measured appendix diameter data were recorded and evaluated. They were compared statistically. No acute appendicitis case was excluded from the study.

Statistical analysis

In the evaluation of the datas, SPSS 25 pocket program was used. Variables were expressed using average±standard deviation, percentage and frequency values. Variables were evaluated after checking with normality, pre-condition of homogeneity of variances (ShapiroWilk and Levene test). When analyzing the datas, for the comparison of two groups independent 2 group t test was used, when pre-conditions were not met Mann Whitney-U test was used. The relation between two constant variances was evaluated with Pearson Correlation Coefficient and in cases where parametric test pre-conditions were not met, Spearman Correlation Coefficient was used. For the significance level of the tests $p < 0,05$ and $p < 0,01$ were taken.

FINDINGS

In total, 372 patients were included in the study; 249 of them were males and 123 of them were females. Average age of male patients was $33,61 \pm 13,05$, average age of female patients was $43 \pm 16,75$. While N/L value of male patients was $6,37 \pm 3,73$, N/L value of female patients was $7,03 \pm 4,12$ ($p=0,370$). Radiologically, appendix diameter

in males was measured as $9,79 \pm 2,28$ cm and in females $9,98 \pm 2,45$ ($p=0,680$). CRP values in male group average was $26,56 \pm 37,25$ and in female group, it was $31,98 \pm 53,19$ ($p=0,510$). Radiologically, there was a positive statistically significant relation of %23,7 between appendix diameter and CRP (Table 1), but there was no positive statistically significant relation between N/L and age (Table 2).

Table. 1
Radiological Appendix Diameter

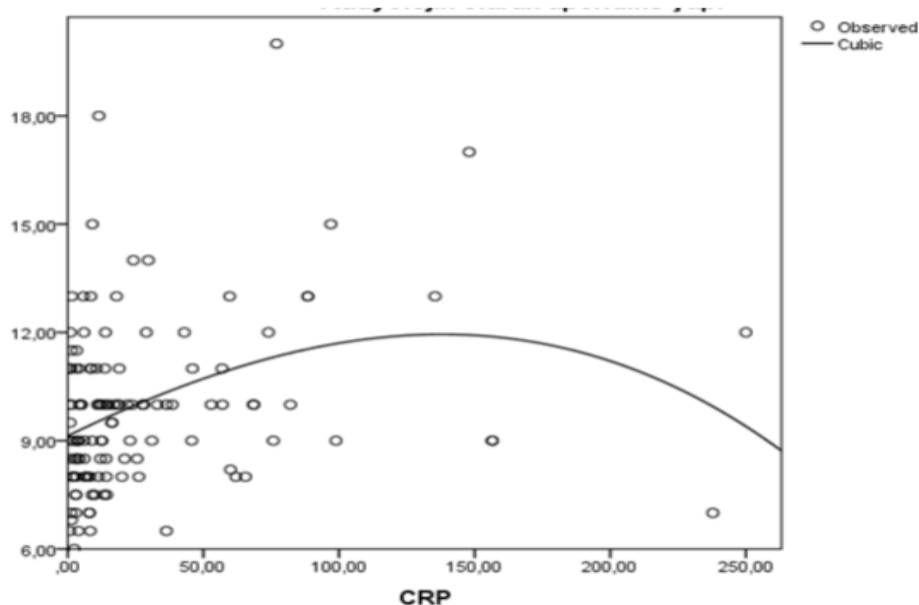


Table: 1

Table 2: Relationships between variables in all patients.

	Leucocyte	Neutrophil	Lymphocyte	N/L rate	Age	Radiologically measured appendix diameter
Neutrophil	r ,967**					
	p 0,000					
	n 372					
Lymphocyte	r ,248**	0,001				
	p 0,005	0,993				
	n 372	372				
N/L rate	r ,486**	,659**	-,578**			
	p 0,000	0,000	0,000			
	n 372	372	372			
Age	r -0,097	-0,052	-,200*	,206*		
	p 0,283	0,564	0,026	0,022		
	n 372	372	372	372		
Radiologically measured appendix diameter	r 0,097	0,117	-0,059	0,129	0,107	
	p 0,284	0,197	0,512	0,154	0,237	
	n 372	372	372	372	372	
CRP	r 0,001	0,022	-0,107	0,167	0,126	,237**
	p 0,992	0,808	0,238	0,064	0,165	0,008
	n 372	372	372	372	372	372

* $p < 0,05$

** $p < 0,01$

DISCUSSION

Even though acute appendicitis treatment has not changed for years, methods of diagnosis have increased. Even though methods such as Scoring systems, ultrasonography, computed tomography are used, there are still difficulties diagnosing acute appendicitis (Noh, H. *et al.*, 2012). Physical examination, medical history, laboratory tests and radiological tests are core things a surgeon considers (Benjamin, I. S., & Patel, A. G. 2002).

In numerous studies related to acute appendicitis, leucocyte value was found to be statistically significant (Saaiq, M. *et al.*, 2014). In some recent studies, it was shown that N/L value can be a better indicator than CRP, leucocyte and neutrophil (Markar, S. R. *et al.*, 2010). As these indicators are low-error and objective, they can be of important help in the diagnosis (Chung, C. H. *et al.*, 2000). In a study Bialas *et al.*, conducted with 469 patients reported that N/L ratio had high sensitivity and specificity in acute appendicitis cases (Bialas, M. *et al.*, 2006). Eren *et al.*, conducted with 162 patients, N/L value was not found to be related to appendix diameter but it can be very useful in detecting gangrenous and perforated appendicitis (Eren, T. *et al.*, 2016). While in our study there was a positive correlation between age and N/L value, however we could not correlate with the diameter of the appendix.

Eugene *et al.*, investigated the specificity and sensitivity of CRP values and negative and positive prediction rates in acute appendicitis patients. In patients, CRP value was taken to be positive if it was over 2.5 mg/dl. In this study, positive prediction rate of CRP was found to be %86,6, negative prediction rate %100, specificity %84.6 and sensitivity %100 (Albu, E. *et al.*, 1994). In a study conducted by Guler and his friends, even though they said that CRP value is an important marker in predicting both perforation and the height of diameter, they claimed that it is not a specific marker on its own (Güler, K. *et al.*, 2016). Also in our study there was a positive, statistically significant relation of %23,7 between appendix diameter and CRP, and we also think that it is an assistant marker in terms of perforation. Consequently, acute appendicitis is one of the most common diagnosis in general surgery in emergency departments and there are lots of scoring and diagnosis marker for the diagnosis. We think that N/L value and CRP value are also important in inflammation and they increase correlated to diameter.

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