APPENDICITIS OR EPIPLOIC APPENDICITIS? IS DIFFERENTIAL DIAGNOSIS POSSIBLE WITH LABORATORY PARAMETERS?
APPENDICITIS OR EPIPLOIC APPENDICITIS

APANDİSİT Mİ, EPİPLOİK APANDİSİT Mİ? LABORATUVAR PARAMETRELERİ İLE AYIRICI TANI MÜMKÜN MÜ?
APANDİSİT Mİ, EPİPLOİK APANDİSİT Mİ?

Tutku DUMAN SAHAN[1*], Mehmet Goktug EFGAN[2], Suleyman KIRIK[3], Zeynep KARAKAYA[4], Simge TOPCU TABAKCI[5]

[1] Department of Emergency Medicine, Çesme Alper Çizgenakat State Hospital, Izmir, Türkiye. e-mail: tutkuduman75@gmail.com
[2] Department of Emergency Medicine, Izmir Katip Celebi University, Faculty of Medicine, Izmir, Türkiye. e-mail: goktugefgan@gmail.com
[3] Department of Emergency Medicine, Izmir Katip Celebi University, Faculty of Medicine, Izmir, Türkiye. e-mail: kiriksuleyman2107@outlook.com
[4] Department of Emergency Medicine, Izmir Katip Celebi University, Faculty of Medicine, Izmir, Türkiye. e-mail: zeynepkarakaya76@hotmail.com
[5] Department of Emergency Medicine, Izmir Katip Celebi University, Faculty of Medicine, Izmir, Türkiye. e-mail: simget97@hotmail.com

ORCID ID: TDS: 0000-0001-9641-4176 **MGE:** 0000-0002-0794-1239 **SK:** 0000-0003-1477-6363
ZK: 0000-0003-0562-8297 **STT:** 0009-0004-1860-3704

DOI: 10.52818/cjmr.1757994 **E-ISSN:** 2791-7061

ARTICLE INFO

Article Information

Article Type:
Research Article
Received: 04.08.2025
Accepted: 21.12.2025
Published: 30.04.2026

Keywords:
Acute appendicitis,
Epiploic appendicitis,
Inflammatory markers

ABSTRACT

Objective: Acute abdomen is a common emergency department presentation requiring rapid diagnosis. Although acute appendicitis is the leading cause, rare conditions such as epiploic appendicitis, which present with similar symptoms, should be considered in the differential diagnosis. While acute appendicitis often requires surgery, epiploic appendicitis typically resolves with conservative treatment. Therefore, accurate differentiation is essential to avoid unnecessary surgeries. This study aimed to compare laboratory parameters between acute appendicitis and epiploic appendicitis and to assess their diagnostic utility.

Materials and Methods: This retrospective, cross-sectional study included patients aged ≥18 years who presented with acute right lower quadrant pain between January 1, 2022, and March 31, 2025. Diagnoses were confirmed via CT or surgery. Demographic data, complete blood count, CRP, and inflammatory markers (neutrophil-to-lymphocyte ratio [NLR], platelet-to-lymphocyte ratio [PLR], hemoglobin-albumin-lymphocyte-platelet index [HALP], systemic immune-inflammation index [SII], BUN-to-albumin ratio [BAR], and CRP-to-albumin ratio [CAR]) were compared between the groups.

Results: The study included 203 patients: 152 with acute appendicitis and 51 with epiploic appendicitis. The acute appendicitis group had significantly higher leukocyte ($p=0.004$), neutrophil ($p<0.001$), hemoglobin ($p=0.009$), and CRP ($p<0.001$) levels. Significant differences were also observed in NLR, PLR, SII, HALP, and BAR (all $p<0.001$).

Conclusion: Laboratory parameters can aid in differentiating acute appendicitis from epiploic appendicitis. In particular, inflammatory indices such as PLR and SII may support clinical decision-making and help reduce the rate of unnecessary surgeries.

MAKALE BİLGİLERİ

Makale Bilgisi

Makale Türü:
Araştırma Makalesi
Geliş Tarihi: 04.08.2025
Kabul Tarihi: 21.12.2025
Yayım Tarihi : 30.04.2026

Anahtar Kelimeler:
Akut apandisit,
Epiploik apandisit,
Enflamatuar belirteçler

ÖZET

Amaç: Akut karın, acil servislerde sıklıkla karşılaşılan ve hızlı tanı gerektiren klinik durumlardan biridir. Akut apandisit en sık görülen neden olmakla birlikte, benzer semptomlara sahip epiploik apandisit gibi nadir hastalıklar da ayırıcı tanıda göz önünde bulundurulmalıdır. Akut apandisit genellikle cerrahi müdahale gerektirirken, epiploik apandisit tipik olarak konservatif tedavi ile düzelir. Bu nedenle, gereksiz ameliyatları önlemek için doğru ayırıcı tanı çok önemlidir. Bu çalışma, akut apandisit ile epiploik apandisit arasında laboratuvar parametreleri açısından farklar olup olmadığını değerlendirmek ve bu parametrelerin ayırıcı tanıda tanısal değerini belirlemek amacıyla yapılmıştır.

Gereç ve Yöntemler: Bu retrospektif, gözlemsel, kesitsel çalışmada, 01.01.2022 ile 31.03.2025 tarihleri arasında acil servise akut sağ alt kadran ağrısı ile başvuran ve tanısı BT veya cerrahi operasyonla doğrulanan 18 yaş ve üzeri hastalar değerlendirilmiştir. Demografik veriler, tam kan sayımı, CRP ve inflamatuar belirteçler (NLR, PLR, HALP, SII, BAR, CAR) iki grup arasında karşılaştırıldı.

Bulgular: Toplam 203 hastanın 152'sine akut apandisit, 51'ine epiploik apandisit tanısı konuldu. Akut apandisit grubunda lökosit ($p=0.004$), nötrofil ($p<0.001$), haemoglobin ($p=0,009$) ve CRP ($p<0.001$) düzeyleri, epiploik apandisit grubuna göre anlamlı olarak daha yüksekti. Ek olarak, NLR, PLR, SII, HALP ve BAR gibi inflamatuar belirteçlerde istatistiksel olarak anlamlı farklılıklar gözlendi (tümü $p<0.001$).

Sonuç: Laboratuvar parametreleri, akut apandisit ile epiploik apandisiti ayırt etmede yardımcı olabilir. Özellikle PLR ve SII gibi inflamatuar indeksler klinik karar verme sürecine katkıda bulunabilir.

Duman Sahan T., Kirik S., Efgan MG., Karakaya T., Topcu Tabakci S. Appendicitis or Epiploic Appendicitis? Is Differential Diagnosis Possible with Laboratory Parameters? CJMR 2026; 6(1): 1-6

Corresponding Author: Tutku DUMAN SAHAN, tutkuduman75@gmail.com

Authorship Contributions: Conception and design: Kirik S, Efgan MG, Sahan TD, Karakaya Z; the definition of intellectual content: Efgan MG, Kirik S, Sahan TD; literature search, clinical studies, experimental studies, data acquisition, data analysis: Efgan MG, Kirik S, Tabakci ST , Sahan TD; manuscript preparation, manuscript editing, and manuscript review: Efgan MG, Sahan TD, Tabakci ST, Karakaya Z, Kirik S; final approval of the version to be published: Sahan TD, Kirik S, Karakaya Z; for all aspects of the work in ensuring that questions related to the accuracy and integrity appropriately investigated and resolved: Efgan MG, Tabakci ST, Sahan TD, Kirik S, Karakaya Z.
Conflict of Interest: We ensure that there is no conflict of interest of the authors.
Financial Support: Not available
Ethics Approval: The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and was initiated after obtaining approval from the local ethics committee on April 8, 2025 (Decision No: 0207).

Introduction

Acute abdomen is a frequent clinical condition encountered in emergency departments, requiring rapid diagnosis and intervention. Acute appendicitis, one of the most common causes, can lead to serious complications such as perforation, peritonitis, and sepsis if diagnosis and treatment are delayed (1). However, rare inflammatory conditions such as epiploic appendicitis can present with similar clinical findings and are often confused with acute appendicitis (2). While epiploic appendicitis typically resolves with conservative treatment, acute appendicitis requires surgical intervention. Therefore, accurate differential diagnosis of these two conditions is crucial for both patient safety and the effective use of healthcare resources.

Although imaging methods are considered the gold standard for confirming the diagnosis, 24-hour access may not be available in every center. This highlights the importance of laboratory data, which is fast, cost-effective, and widely available. In recent years, studies investigating the diagnostic value of certain inflammatory indices based on complete blood counts have increased. The neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), systemic immune-inflammation index (SII), hemoglobin-albumin-lymphocyte-platelet (HALP) score, and similar markers have emerged as potential diagnostic tools for distinguishing between different causes of acute abdomen (3,4).

In this study, we evaluated the diagnostic power of laboratory parameters in patients presenting with right lower quadrant pain who were diagnosed with either acute appendicitis or epiploic appendicitis. In particular, we investigated the potential contribution of inflammatory indices to the surgical decision-making process.

Materials and Methods

Study design

This study was designed as a retrospective, observational, cross-sectional study. It is based on a review of the medical records of patients who presented to the emergency department of a tertiary university hospital with sudden-onset abdominal pain and were diagnosed with acute appendicitis or epiploic appendicitis via advanced imaging methods or surgical intervention. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and was initiated after obtaining approval from the local ethics committee on April 8, 2025 (Decision No: 0207). All data were anonymized and analyzed in compliance with patient privacy and data security principles.

Study population

The study population consisted of adults aged 18 years and older who presented to the hospital's emergency department between January 1, 2022, and March 31, 2025. Inclusion criteria were the presence of acute appendicitis or epiploic appendicitis confirmed by computed tomography (CT) or surgical intervention. Patients with concomitant intra-abdominal pathologies (e.g., diverticulitis, acute cholecystitis), missing baseline laboratory data at presentation, pregnant or breastfeeding women, and patients with active malignancy or those undergoing immunosuppressive therapy were excluded from the study. These exclusion criteria were applied to increase the homogeneity of the patient population and strengthen the internal validity of the comparative analyses.

Data collection

Demographic data (age, gender), laboratory parameters, and hospital admission status were obtained retrospectively from the hospital information system. In addition, BAR, CAR,

NLR, PLR, the HALP score, and SII were calculated using laboratory test results obtained at the time of admission. These data were compared between patients diagnosed with acute appendicitis and those diagnosed with epiploic appendicitis. The variables were calculated using the following formulas: BAR (BUN/Albumin), CAR (CRP/Albumin), NLR (Neutrophil/Lymphocyte), PLR (Platelet/Lymphocyte), SII (Neutrophil × Platelet / Lymphocyte), and HALP ([Haemoglobin × Albumin × Lymphocyte] / Platelet).

Statistical analysis

Data analysis was performed using IBM SPSS Statistics version 27 (IBM Corp., Armonk, NY, USA). Descriptive statistics were reported as the number of units (n), mean ± standard deviation, median (M), minimum and maximum values, depending on the distribution of the variables. The distribution characteristics of numerical variables were evaluated using the Shapiro-Wilk normality test. For comparisons between two dependent groups, the Paired Samples t-test was applied when the assumptions of parametric tests were met, and the Wilcoxon signed-rank test was applied when the assumptions were not met. The relationships between continuous variables were analysed using the Pearson correlation coefficient when the distribution was normal and the Spearman correlation coefficient when the normal distribution was not met. The statistical significance level was set at $p<0.05$ for all tests.

Results

A total of 203 patients were included in the study, 102 (50.2%) of whom were female. Fifty-one (25.1%) patients were diagnosed with epiploic appendicitis, while 152 (74.9%) were in the acute appendicitis group. The mean age of the entire cohort was 39.47 ± 17.87 years. The mean length of hospital stay was 2.65 ± 3.17 days. Two (1.0%) patients died in the hospital due to postoperative complications. Descriptive statistics for the patients are presented in **Table 1.**

Table 1: Descriptive Statistics (n=203)

	Statistics
Group, *n* (%) Epiploic Appendicitis Acute Appendicitis	51 (25.1) 152 (74.9)
Gender *n* (%) Female Male	102 (50.2) 101 (49.8)
Age*	39.47±17.87
BUN*	13.78±9.00
Creatinine*	0.96±0.71
AST*	23.32±16.35
ALT*	22.69±18.46
Albumin*	41.91±5.26
CRP*	53.51±79.35
INR*	1.23±1.05
Leukocyte*	13.58±5.22
Neutrophil*	10.1±4.46
Lymphocyte*	2.33±2.80
Hmg*	13.59±1.72
Haematocrit*	40.05±4.52
Platelet*	273.89±71.16
BAR*	0.35±0.36
CAR*	1.58±2.45
HALP*	58.54±156.54
NLR*	6.51±6.07
PLR*	160.40±104.44
SII*	1785.61±1673.51
Number of days spent in hospital*	2.65±3.17
Mortality, *n* (%) Yes No	2 (1.00) 201 (99.0)

Values; n: Number of patients, %: Column percentage*: Average ± standard deviation and median (min-max) are given.

Laboratory data and calculated parameters were compared between the two groups. Statistically significant differences were observed in CRP, leukocyte, neutrophil, lymphocyte, haemoglobin, and haematocrit levels, as well as in CAR, HALP, NLR, PLR, and SII indices. CRP, leukocyte, neutrophil, CAR, NLR, PLR, and SII levels were significantly higher in the acute appendicitis group compared to the epiploic appendicitis group. Conversely, lymphocyte, haemoglobin, haematocrit, and HALP values were significantly higher in the epiploic appendicitis group. All comparison results are detailed in Table 2.

Table 2: Comparison of laboratory data between epiploic appendicitis and acute appendicitis groups

	GROUP		p
	Epiploic Appendicitis	Acute Appendicitis	
Age	42.96±17.62	38.30±17.86	0.051
BUN	13.00±4.22	14.04±10.11	0.740
Creatinine	0.86±0.17	0.99±0.81	0.107
AST	20.92±7.20	24.12±18.38	0.924
ALT	26.58±23.02	21.38±16.54	0.062
Albumin	43.21±2.92	41.67±5.56	0.271
CRP	15.98±26.91	66.11±86.88	**0.001**
INR	1.53±2.14	1.14±0.23	0.090
Leukocyte	10.78±4.17	14.51±5.21	**0.001**
Neutrophil	7.27±4.08	11.18±4.16	**0.001**
Lymphocyte	2.57±0.85	2.25±3.20	**0.001**
Hmg	14.18±1.83	13.39±1.64	**0.004**
Haematocrit	41.70±4.95	39.50±4.24	**0.002**
Platelet	266.94±54.03	276.22±76.07	0.499
BAR	0.31±0.12	0.36±0.39	0.640
CAR	0.34±0.48	1.79±2.60	**0.001**
HALP	62.17±22.97	57.87±170.15	**0.001**
NLR	4.12±6.67	7.31±5.65	**0.001**
PLR	128.89±109.16	170.98±100.98	**0.001**
SII	1047.74±1455.90	2033.18±1673.05	**0.001**
Number of days spent in hospital	1.15±1.73	3.16±3.39	**0.001**

Values; %: Column percentage*: Average ± standard deviation and median (min-max) are given.

Discussion

The main objective of this study was to evaluate laboratory markers that may contribute to the differential diagnosis between two abdominal pathologies—acute appendicitis and epiploic appendicitis—that have clinically similar symptoms but significantly different treatment approaches. Our findings revealed that inflammatory indices based on complete blood count, particularly parameters such as PLR and SII, provide meaningful contributions to this differential diagnosis.

Epiploic appendicitis is a rare inflammatory disease that often presents with clinically non-specific symptoms. This characteristic complicates the diagnosis and frequently creates diagnostic difficulties in patients presenting to the emergency department with acute abdominal complaints. The symptomatic presentation of epiploic appendicitis is generally limited to acute, localised abdominal pain; however, due to the low specificity of accompanying findings, it can easily be confused with more serious diseases requiring surgical intervention (5). In particular, the symptomatic similarity to common intra-abdominal inflammatory diseases, such as acute appendicitis and diverticulitis, can lead to misdiagnosis and inappropriate treatment. Literature supports this observation; for instance, in a study involving 660 patients with a preliminary diagnosis of acute appendicitis or diverticulitis, 11 (2%) were diagnosed with epiploic appendicitis (6). Another study reported that epiploic appendicitis was detected radiologically in 2.3% to 7.1% of cases initially suspected of having diverticulitis (7). These rates clearly demonstrate the potential for epiploic appendicitis to be overlooked and highlight the decisive role of imaging methods. Other pathologies to consider in the differential diagnosis include acute cholecystitis, haemorrhagic ovarian cysts, ovarian torsion, ectopic pregnancy, colorectal malignancies, and mesenteric lymphadenitis. While excluding gynaecological causes is crucial in young female patients, diagnoses such as gastrointestinal neoplasms or mesenteric ischaemia should be considered in elderly individuals. A rapid, accurate, and comprehensive approach is critical for reducing morbidity and ensuring effective resource use. If epiploic appendicitis is missed or confused with another pathology, unnecessary antibiotic treatments, surgical explorations, or prolonged hospital stays may occur. Therefore, physicians must be familiar with imaging findings and consider epiploic appendicitis among the possible causes of acute abdominal pain.

Acute appendicitis is characterised by a systemic inflammatory response resulting from bacterial invasion and inflammation secondary to luminal obstruction. Epiploic appendicitis, on the other hand, is often limited to a localised peritoneal reaction associated with venous obstruction and has minimal systemic effects (2). This pathophysiological difference was reflected in the laboratory parameters observed in our study. In the acute appendicitis group, CRP, leukocyte, neutrophil, NLR, PLR, and SII levels were significantly higher. These findings are consistent with literature indicating that these markers reach higher values in diseases causing sepsis or a systemic inflammatory response (3,8).

SII is a complex parameter derived from neutrophil and platelet values normalised by lymphocyte counts. In recent years, it has been shown to have prognostic value in many clinical conditions, from cancer to sepsis (4). In this context, our study corroborates the utility of SII in the differential diagnosis of heterogeneous inflammatory conditions such as acute abdomen.

Conversely, the HALP score was found to be higher in the epiploic appendicitis group. This can be explained by the better general nutritional status and lower systemic inflammation in these patients. Previous studies have shown that the HALP score is associated with immuno-nutritional status and systemic inflammation (9). Therefore, lower HALP scores are expected in pathologies with high inflammation, such as acute appendicitis.

The moderate discriminatory power of composite parameters such as BAR and CAR suggests that these indicators may be more useful in prognostic assessment than in diagnosis. Indeed, CAR has been used as a mortality predictor in studies, particularly in severe systemic inflammatory conditions such as sepsis (10).

In conclusion, this study demonstrates that it is possible to distinguish between serious intra-abdominal surgical pathologies and less invasive diseases using inexpensive, accessible tests that provide rapid results. Especially in emergency departments where 24-hour imaging access is limited, the integration of such laboratory parameters into diagnostic algorithms is vital for preventing unnecessary surgeries and improving patient safety.

Limitation

This study has several limitations. First, the retrospective design limited the evaluation of patient data, and dynamic changes in parameters over time could not be observed. Furthermore, the single-centre nature of the study may limit the generalisability of the findings. Nevertheless, the study contributes significantly to the literature through its comprehensive parameter analysis and ROC evaluations.

In the future, prospective, multicentre studies with larger sample sizes should be conducted to determine optimal cut-off values for inflammatory markers and to integrate them into diagnostic algorithms.

Conclusion

This study demonstrates the value of laboratory-based inflammatory parameters in distinguishing between acute appendicitis and epiploic appendicitis. Specifically, PLR and SII are potential biomarkers that can be integrated into clinical decision support systems due to their strong diagnostic performance. Other indices, such as the HALP score and CAR, may also be useful in assessing the severity of systemic inflammation. These parameters, which are rapid, cost-effective, and widely accessible, are expected to guide physicians in clinical scenarios where imaging findings are inconclusive, thereby contributing to the prevention of unnecessary surgical interventions. In this context, we recommend that laboratory markers be considered as a complementary diagnostic tool in the approach to acute abdomen.

References

1. Di Saverio S., Birindelli A., Kelly MD., et al. Jerusalem guidelines for diagnosis and treatment of acute appendicitis. World J Emerg Surg 2016; 11(1):34. Doi:10.1186/s13017-016-0090-5.
2. Singh AK., Gervais DA., Hahn PF., Sagar P., Mueller PR., Novelline RA. Acute epiploic appendagitis and its mimics. Radiographics 2005; 25(6):1521-34. Doi:10.1148/rg.256055030
3. Forget P., Khalifa C., Defour JP., Latinne D., Van Pel MC., De Kock M. What is the normal value of the neutrophil-to-lymphocyte ratio? BMC Res Notes 2017; 10(1):12. Doi:10.1186/s13104-016-2335-5.
4. Qi Q., Zhuang L., Shen Y., et al. A novel systemic inflammation response index (SIRI) for predicting the survival of patients with pancreatic cancer after chemotherapy. Cancer 2016; 122(14):2158-67. Doi:10.1002/cncr.30057.
5. Acevedo-Castillo C., Macias-Cruz H., Ramirez-Cisneros A., Bautista-Coronado U., Moran-Guerrero J., Guzman E. Epiploic appendagitis: Systematic review of a distinctive pathology. Am Surg 2024; 90:3074-81.Doi:10.1177/00031348241256062.
6. Rao P., Rhea J., Wittenberg J., Warshaw A. Misdiagnosis of primary epiploic appendagitis. Am J Surg 1998; 176(1):81-5. Doi:10.1016/S0002-9610(98)00103-2.
7. Hwang J., Kim S., Song H., et al. Differential diagnosis of left-sided abdominal pain: Primary epiploic appendagitis vs colonic diverticulitis. World J Gastroenterol 2013; 19(40):6842-8. Doi:10.3748/wjg.v19.i40.6842.
8. Sahan TD., Karakaya Z,. Bora ES., Efgan MG., Topal FE. Inflammatory indexes in emergency patients with hypertensive pulmonary oedema: A critical insight. Am J Emerg Med 2025; 91:93-9. Doi:10.1016/j.ajem.2025.02.025.
9. Chen X., Yang Y., Wang Y.,et al. HALP score predicts prognosis of patients with advanced gastric cancer receiving first-line chemotherapy. Front Oncol 2020; 10:1073. Doi:10.3389/fonc.2020.01073.
10. Ranzani OT., Zampieri FG., Forte DN., Azevedo LC., Park M. C-reactive protein/albumin ratio predicts 90-day mortality of septic patients. PLoS One 2013; 8(3):e59321. Doi:10.1371/journal.pone.0059321.