SCIE
DOI: 10.14744/scie.2018.37029
South. Clin. Ist. Euras. 2018;29(4):268-275

Original Article

The Role of the C-Reactive Protein and Procalcitonin in the Early Diagnosis of Intraabdominal Infection in Critical Patients With a History of Gastrointestinal Surgery

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Submitted: 10.10.2018
Accepted: 17.10.2018

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Keywords: C-reactive protein, gastrointestinal surgery; intraabdominal infection; procalcitonin.

ABSTRACT

Objective: The purpose of this study is to determine the roles of c-reactive protein (CRP) and procalcitonin (PCT) in the intraabdominal infective complications of patients undergoing gastrointestinal surgery.

Methods: This study is a prospective, single-blinded study. The subjects were critical patients undergoing gastrointestinal system surgery who had been transferred to the intensive care unit. The patients' serum CRP and PCT levels were measured during the 1st, 24th, 48th, and 72nd hours after surgery. Patients with intraabdominal infections were recorded.

Results: The study included 49 patients. Of these patients, 38% developed intraabdominal infections, and the mortality rate was 4%. It was observed that the PCT levels in particular were statistically very significant at the 48th and 72nd hours. The sensitivity and specificity of the CRP level at the postoperative 48th and 72nd hours were 78.9% and 70%, respectively. The sensitivity and specificity of the PCT level were 73.7% and 96.7%, respectively, at the postoperative 48th hour, and 84.2% and 90%, respectively, at the 72nd hour.

Conclusion: The elevated serum PCT and CRP concentrations at the 48- and 72-hour markers are critical for the early diagnosis of the intraabdominal infections. The predictivity of postoperative PCT concentrations at the 48th and 72nd hours is higher regarding infective complications compared to CRP.

INTRODUCTION

The most frequently encountered complications in the postoperative period are infections, bleeding, thromboembolism, irregular wound healing, atelectasis, and urinary retention.[1] Infections have the highest mortality rate among these complications, followed by bleeding and thromboembolism.[1] For many types of surgery, infective complications are limited to wound infection. However, high-mortality complications such as intraabdominal abscess and anastomotic leakages can be observed after gastrointestinal surgery. The risk of developing these complications is higher among co-morbid patients.[2] Therefore, patients with high co-morbidity, or those who have a history of major vascular or abdominal surgeries, are postoperatively monitored in the intensive care unit (ICU), and the physicians focus on the early diagnosis and treatment of surgical complications. However, it is not easy to determine which patients have a high risk of developing complications. The diagnosis of postoperative complications in the early phase can be delayed when the physician relies only on clinical observation and biomarkers (such as leukocytes).[3,4] Some biomarkers (such as c-reactive protein [CRP], lactate, procalcitonin [PCT]) have started being used for the early diagnosis of these complications in the past few years.

One of the most commonly used biomarkers is CRP. The CRP is an acute-phase reactant synthesized by the liver, and it has a high sensitivity and low specificity. The CRP levels rise in response to systemic inflammation. It is one of the routine measurement parameters for postoperative ICU patients. An increase in the CRP levels in the first 4 postoperative hours is not an important finding.[5] A 2011 study indicates that the CRP measurements in the first 48 postoperative hours are a poor predictor of patient survival, but the measurements after the 48th hour can be used to determine the risk of complications.[6] Elevated CRP levels lasting for more than 48 hours are an important predictor of infective complications.[5,7] PCT, a new biomarker, has become prominent in the past few years.

PCT is synthesized from the thyroid C cells under physiological conditions. However, the extrathyroidal synthesis can be observed in the case of sepsis. Maximum CRP levels are observed between 36 and 50 hours after the endotoxin secretion. PCT is secreted at the 3rd or 4th hour, and it reaches maximum levels at between the 8th and 12th hour.[8] High initial PCT levels in trauma patients being monitored in the ICU are associated with more complications and a worse prognosis.[9]

The diagnostic value of biochemical parameters and the related evidence concerning complications in postoperative ICU patients are still controversial. However, most ICU physicians still tend to use biochemical parameters for the diagnosis of most complications. This can result in the unnecessary use of diagnostic and treatment methods. The purpose of this study is to determine the roles of CRP and PCT in the diagnosis of the intraabdominal infective complications in patients undergoing gastrointestinal surgery (according to the American Society of Anesthesiologists [ASA], the scores were II, III, and IV) being monitored in the ICU.

MATERIAL AND METHODS

This study was conducted in the Anesthesiology and Reanimation Department, Adult Intensive Care Unit, between January and May 2017, as a prospective, controlled, single-blinded, observational study. This study was approved by the Ethical Committee (1582-13/06/2017).

The subjects of the study are adult patients (18 or older) who were operated on (urgent or elective) in the general surgery clinic for upper gastrointestinal (stomach cancer, sleeve gastrectomy, pancreas cancer) or colorectal (ileus, incarcerated hernia, cancer, ischemia) pathologies and who were transferred to the adult ICU to be monitored for at least 24 hours. The subjects are patients with an ASA score of II, III, or IV.

The patients with the following conditions were excluded from the study: those younger than 18 years old; patients with a preoperative infection; patients who were treated with preoperative chemotherapy or with steroids (for longer than 3 months); patients with lung failure, renal failure (severe enough to require dialysis), liver function disorder (with serum alanine aminotransferase [ALT] and aspartate aminotransferase [AST] levels above normal limits); or patients who were postoperatively intubated for any reason. Patients who were urgently operated on without measuring the ALT and AST levels were excluded from the study.

The patients' age, gender, ASA score, and surgery type (urgent or elective) were recorded along with the primary surgical diagnostics and the surgical procedures.

Those patients who were transferred to the ICU were treated with an antibiotic prophylaxis, which included a gentamicin and metronidazole protocol, in the first 48 postoperative hours. The following analyses were routinely made in the postoperative phase: hemogram, biochemical analysis (glucose, urea, creatinine, ALT, AST, sodium, potassium, chloride, calcium), coagulation (APTT, INR), and arterial and venous blood gases. The PCT and CRP levels were measured and recorded at the 1st, 24th, 48th, and 72nd postoperative hours. All the blood samples were kept at room temperature for 30 minutes and were then centrifuged at 4,000 RPM. Both biomarkers were analyzed in the COBAS 8000 ANALIZER device using commercial kits (ROCHE DIAGNOSTIC, NORTH AMERICA). The PCT analysis was conducted using the immunoluminometric assay method with the sandwich principle. The CRP was analyzed using the extended immunoturbidimetric method.

The diagnosis of postoperative intraabdominal infection was made according to the Centers for Disease Control/ National Healthcare Safety Network (CDC/NHNS) criteria. Following clinical and laboratory examinations, the diagnosed postoperative infections were defined as surgical site infections (intraabdominal abscess, wound infection, anastomotic leakages) and distant organ infections (pneumonia, urinary tract infection, catheter infection). Of these infections, intraabdominal abscess and anastomotic leakage were recorded as intraabdominal infections, together with the day of diagnosis. Those patients who were not postoperatively diagnosed with intraabdominal infection were included in the control group. The patients with wound infections or distant organ infections were excluded from the study.

The patients who were found to have the symptoms of defense, rebound, or fever underwent computerized tomography or ultrasonography examinations. Those patients with undefined fluid collection were evaluated by the general surgery department, and some of them underwent repeated laparotomy or laparoscopy. Those abscesses that were determined to be intraabdominal abscesses were surgically and medically treated. In those cases where the drain contained purulent or fecaloid materials, the patients underwent radiological examinations (such as computerized tomography or ultrasonography). Specimens were taken from the drain contents and tested with the methylene blue. The leakages that were determined during these examinations or during relaparotomy were defined as anastomotic leakages and were surgically corrected.

The patients were postoperatively monitored in the ICU for at least 24 hours. The patients that did not require intensive care were transferred to the general surgery clinic after 24 hours. The daily physical examinations of the patients were carried out and recorded by a general surgery specialist. The parameters that were monitored in the ICU were also monitored daily in the clinics.

The clinical monitoring of the patients lasted 5 to 7 days, and the patients that did not develop complications were discharged. The patients were contacted 10 days after their discharge to determine the presence of any symptoms and any applications made to a medical center. Those patients who developed intraabdominal infections were monitored throughout their hospitalization. After 7 days only, the mortalities were recorded.

Power analysis

The average effect size for the changes in the serum PCT and CRP levels was considered to be statistically significant in both patient groups (infected and non-infected) at the 1st, 24th, 48th, and 72nd hours, and at the 95% confidence interval, the sample size was determined to be 36 patients.

Statistical analysis

The sample size was calculated using the G*Power Version 3.1.6., while the SPSS 15.0 for Windows program was used for statistical analysis. The descriptive statistics are given as follows: number and percentage for categorical variables; and the mean, standard deviation, minimum, maximum, and median for numerical variables. The intraclass correlation coefficient was used to evaluate the consistencies of the continuous measurements for the two markers. In the dependent groups, the numerical variables were analyzed with the repeated measures analysis of variance (ANOVA) test when the differences followed a normal distribution, and with the Friedman analysis when the normal distribution condition was not met. The analyses of the multiple independent variables were made using the one-way ANOVA test when the normal distribution condition was met, and the Kruskal–Wallis test when the normal distribution condition was not met. Comparisons between subgroups were made using the Tukey test for parametric tests and the Mann–Whitney U-test for non-parametric tests. The results were interpreted using the Bonferroni correction. The ratios of the categorical variables among the groups were tested using the chi-squared analysis. The comparison of the ratios between the dependent groups was done with the Cochran Q test. An alpha level of $p<0.05$ was considered to be statistically significant.

RESULTS

A total of 60 patients were included in the study. The data of 11 patients were excluded from the study. One of these patients died on the 1st day of hospitalization due to myocardial infarction, and one patient developed acute kidney failure on the second day of hospitalization. Three patients developed wound infections, and one patient developed a urinary system infection. Serum samples could not be accessed for two patients.

The study included the data from 24 female and 25 male patients. It was determined that 19 patients had developed postoperative abdominal infections and that 30 patients had not. Those 19 patients were diagnosed with intraabdominal infection according to CDC/NHSN criteria. It was observed that nine patients had anastomotic leakages and 10 patients had an intraabdominal abscess. The average diagnosis times or the intraabdominal infections were as follows: 4.44 days for anastomotic leakage and 4.4 days for an intraabdominal abscess (Table 1).

Table 1. Intraabdominal infections and the average day of diagnosis

	n	%
Postoperative abdominal infection		
Absent	30	61.2
Present	19	38.8
Postoperative infection diagnosis		
Anastomotic leakage	9	18.4
Intraabdominal abscess	10	20.4
	Mean±SD	**Min-Max**
The day of postoperative infection diagnosis	4.42±0.84	3–7

SD: Standard deviation; Min: Minimum; max: Maximum.

There were no significant differences between the two groups of patients in terms of age, gender, the ASA distribution, type of surgery (elective-urgent), and primary surgical diagnoses (patients with or without postoperative abdominal infections) (Table 2).

In the daily follow-ups, it was observed that tachycardia occurred in 100% of the patients who developed intraabdominal infections, and fever occurred in 94.7%. As there were not enough clinical, imaging, and laboratory findings, a total of six patients underwent repeated laparotomy: four patients for diagnostic purposes and two patients for treatment. Both patients were diagnosed with anastomotic leakage.

The mean CRP levels of the patients who developed postoperative abdominal infection were significantly higher than those of the non-infected patients at all times ($p=0.002$, $p=0.001$, $p=0.001$, $p=0.001$) (Table 3). When the groups were compared regarding changes in mean CRP levels, it was determined that the changes in the CRP levels between the following hours were statistically significant: 1–24, 1–48, 1–72, 24–48 ($p=0.001$, $p=0.002$, $p=0.001$, $p=0.002$, $p=0.028$, $p=0.024$, $p=0.036$, $p=0.031$) (Table 4). For both groups, the lowest CRP values were measured at the 1st postoperative hour, and the highest CRP values were measured at the 48th postoperative hour.

The mean PCT values of the patients with postoperative abdominal infections were significantly higher than the patients without infections at all times ($p=0.007$, $p<0.001$, $p<0.001$, $p<0.001$) (Table 5). When the groups were compared regarding changes in the mean PCT levels, it was determined that the changes in the PCT levels between the following hours were statistically significant: 1–24, 24–48, 24–72, 48–72 ($p=0.001$, $p<0.001$, $p=0.004$, $p<0.001$). The increases between the 1st and 24th hours, and the 1st and 48th hours, were statistically significant ($p=0.033$, $p=0.027$) (Table 6). Procalcitonin levels were found to be highest at the 48th postoperative hour and lowest at the 1st hour for the patients with postoperative

Table 2. The demographic data of the patients, primary surgical diagnoses, and the surgical procedure

	Postoperative abdominal infection				p
	Absent (n=30)		Present (n=19)		
	n	%	n	%	
Age (Mean±SD)	62.6±11.7		68.0±11.5		0.125
Gender					
Male	14	46.7	11	57.9	0.444
Female	16	53.3	8	42.1	
Urgent-elective					
Urgent	9	30.0	7	36.8	0.619
Elective	21	70.0	12	63.2	
ASA Score					
II	8	26.7	6	31.6	0.102
III	22	73.3	11	57.9	
IV	0	0.0	2	10.5	
Primary surgical diagnosis					
Ileus	3	10.0	1	5.3	1.000
Incarcerated hernia	3	10.0	1	5.3	1.000
Colon tumor	9	30.0	5	26.3	0.781
Mesenteric ischemia	2	6.7	4	21.1	0.190
Gastric Ca	4	13.3	4	21.1	0.694
Pancreas Ca	4	13.3	0	0.0	0.148
Rectum Ca	4	13.3	3	15.8	1.000
Volvulus	1	3.3	0	0.0	1.000
Appendicitis	0	0.0	1	5.3	0.388
Surgical procedure					
Low anterior resection	4	13.3	3	15.8	1.000
Resection anastomosis	0	0.0	1	5.3	0.388
Right hemicolectomy	5	16.7	2	10.5	0.691
Segmental resection					
end-to-end anastomosis	8	26.7	6	31.6	0.711
Total gastrectomy	4	13.3	4	21.1	0.694
Total colectomy	5	16.7	2	10.5	0.691
Whipple	4	13.3	0	0.0	0.148
Appendectomy	0	0.0	1	5.3	0.388

ASA: American Society of Anesthesiologists; SD: Standard deviation.

intraabdominal infections. Procalcitonin levels were found to be highest at the 24th postoperative hour and lowest at the 72nd hour for the patients without postoperative intraabdominal infections.

It was determined that the sensitivity of CRP was 73.7% at the 1st, 24th, and 48th hour, and 78.9% at the 72nd hour. It was determined that the specificity of CRP was 66.7% at the 1st hour, 70% at the 24th and 48th hours, and 73.3% at the 72nd hour (Fig. 1, Table 7).

The sensitivity of PCT was 73.7% at the 1st and 24th hours, and 94.7% at the 48th and 72nd hours. The specificity of PCT was 63.3% at the 1st hour, 66.7% at the 24th hour, and 86.7% at the 48th and 72nd hours (Fig. 2, Table 8).

Table 3. The C-reactive protein levels of the patients who did/did not develop intraabdominal infections

	Postoperative abdominal infection		p
	Absent	Present	
	Mean±SD	Mean±SD	
CRP			
1st hour	73.6±114.1	176.7±162.6	0.002
24th hour	131.5±112.9	275.2±166.8	0.001
48th hour	175.1±105.0	328.8±157.3	0.001
72nd hour	118.8±80.3	273.4±152.7	0.001
P	<0.001	<0.001	

CRP: C-reactive protein; SD: Standard deviation.

Table 4. The hourly changes in the C-reactive protein levels of the patients who did/did not develop intraabdominal infections

	Postoperative abdominal infection	
	Absent	Present
	p	p
1st hour vs. 24th hour	0.001	0.002
1st hour vs. 48th hour	0.001	0.002
1st hour vs. 72nd hour	0.028	0.024
24th hour vs. 48th hour	0.036	0.031
24th hour vs. 72nd hour	0.681	0.872
48th hour vs. 72nd hour	<0.001	0.008

Table 5. The average procalcitonin levels of the patients who did/did not develop intraabdominal infections

	Postoperative abdominal infection		p
	Absent	Present	
PCT			
1st hour	2.3±6.8	18.9±34.7	0.007
24th hour	4.0±5.9	27.8±33.2	<0.001
48th hour	2.1±2.9	32.6±42.2	<0.001
72nd hour	1.0±1.5	27.6±42.8	<0.001
P	<0.001	0.005	

DISCUSSION

Intraabdominal infections are common and fatal complications observed after abdominal operations. The circumstances associated with these infections (such as anastomotic leakages and abscess) result in increased hospitalization periods, increased costs, and recurrent operations. Therefore, an early diagnosis of intraabdominal infections is vital for an early diagnosis and treatment.[10]

Table 6. The changes in the procalcitonin levels of the patients who did/did not develop intraabdominal infections

	Postoperative abdominal infection	
	Absent	Present
	p	p
1st hour vs. 24th hour	0.001	0.033
1st hour vs. 48th hour	0.072	0.027
1st hour vs. 72nd hour	0.271	0.077
24th hour vs. 48th hour	<0.001	0.295
24th hour vs. 72nd hour	0.004	0.978
48th hour vs. 72nd hour	<0.001	0.067

Bonferroni correction, p=0.01.

Table 7. The receiver operating characteristic curve: the area under the curve, standard deviation, and confidence interval values

	The area under the curve	Standard deviation	95% Confidence interval	
CRP 1st hour	0.768	0.067	0.636	0.899
CRP 24th hour	0.779	0.070	0.641	0.917
CRP 48th hour	0.791	0.069	0.655	0.927
CRP 72nd hour	0.796	0.071	0.656	0.935

CRP 1st hour Cut-off: 50.5 Sensitivity 73.7% Specificity 66.7%
CRP 24th hourCut-off: 125 Sensitivity 73.7% Specificity 70%
CRP 48th hour Cut-off: 220.5 Sensitivity 73,7% Specificity 70%
CRP 72nd hour Cut-off: 140.5 Sensitivity 78.9% Specificity 73.3%.
CRP: C-reactive protein.

Table 8. The receiver operating characteristic curve: the area under the curve, standard deviation, and confidence interval values

	The area under the curve	Standard deviation	95% Confidence interval	
PCT 1st hour	0.768	0.067	0.636	0.899
PCT 24th hour	0.779	0.070	0.641	0.917
PCT 48th hour	0.791	0.069	0.655	0.927
PCT 72nd hour	0.796	0.071	0.656	0.935

PCT 1st hour Cut-off: 0.92 Sensitivity 73.7% Specificity 63.3%.
PCT 24th hour Cut-off: 3.78 Sensitivity 73.7% Specificity 66.7%.
PCT 48th hour Cut-off: 3.75 Sensitivity 94.7% Specificity 86.7%.
PCT 72nd hour Cut-off: 1.64 Sensitivity 94.7% Specificity 86.7%.
PCT: Procalcitonin.

In our study, we determined that PCT is a more reliable biomarker for an early detection of postoperative intraabdominal infections compared to CRP. The highest diagnostic accuracy for both PCT and CRP was at the 72nd hour in the infected patient group.

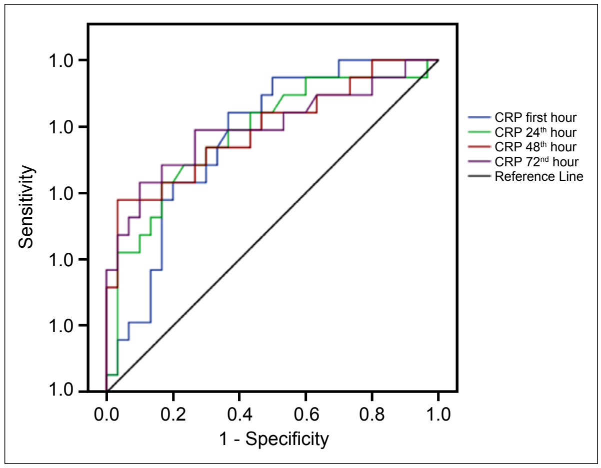

Figure 1. The receiver operating characteristic (ROC) curve of the statistically significant c-reactive protein sensitivity and specificity levels at the 24th, 48th, and 72nd hours.

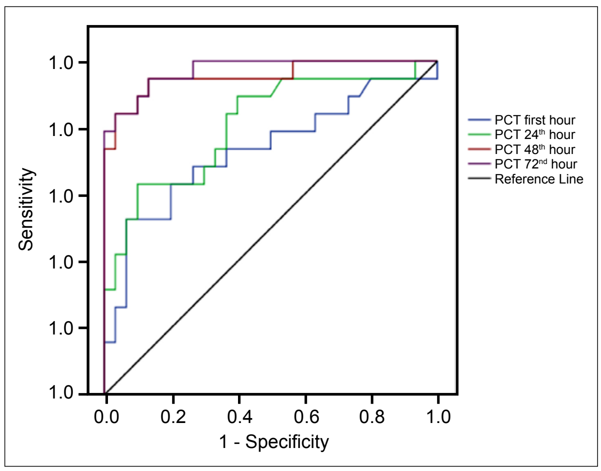

Figure 2. The receiver operating characteristic (ROC) curve of the statistically significant procalcitonin sensitivity and specificity levels at the 24th, 48th, and 72nd hours.

The rate of infective complications in our study is higher compared to similar studies in the literature.[11–13] This is because our study includes the ASA II and III patients who required urgent operations and postoperative intensive care.

An early diagnosis and treatment are vital for patients with sepsis. Even though there are several biomarkers that can be used for the early diagnosis of sepsis, PCT and CRP are more commonly used.[14,15] It is reported that PCT is a more valuable marker than CRP in cases of complications such as anastomotic leakages following colorectal, gastrointestinal and esophagus operations.[10,16–18] It was also determined that PCT is valuable for determining mortality and that the mortality rates were higher among patients with extreme levels of PCT (>100 ng/mL).[19] There were several studies that evaluated the prognostic value of serum PCT levels and 12 of the 17 studies found a positive result whereas five of them had negative or inconclusive results.[20]

On the other hand, in some studies, it has been reported that CRP is more valuable for the prediction of infections that develop after abdominal operations.[11,21–24] Studies that were conducted among elective colorectal surgery patients reported that CRP has a more predictive value compared to PCT for the diagnosis of postoperative intraabdominal infections. If we only look at the studies that were conducted only with CRP; Platt et al.[25] reported that high serum CRP levels on the 3rd day after the colorectal surgery are important for predicting infective complications, and there are also similar studies showing that high serum CRP levels on the 2nd and 4th days after colorectal surgery play a crucial role for predicting infective complications.[26] However, as CRP levels increase in all cases of inflammation, it can be difficult for the physician to utilize.[20]

Even if there are no infections after a trauma or in the first postoperative days, both biomarkers may be found to be elevated, which also presents a difficulty for the physician. These can cause unnecessary hospitalizations or antibiotherapy treatments. The laboratory, clinical and radiological findings should be evaluated as a whole to minimize incorrect interpretations.

The average time for the clinical diagnosis of the intraabdominal infections in our study was 4.4 days. It is reported that intraabdominal infections are diagnosed on the 5th postoperative day on average. However, Hoeboer et al.[18] indicated that the diagnosis was made on the 3rd day on average for esophagus operations, while Giaccaglia et al.[10] indicated that this was 12.7 days.[11,25] The main issue here for clinicians is that the biomarkers should be definitive for early diagnosis before the development of clinical findings, because mortality and morbidity occur in those cases where infections are diagnosed late.[27]

If it is considered that intraabdominal infections are diagnosed on the 5th day on average and that the biomarkers are elevated even on the 1st postoperative day, it can be suggested that the infections may actually develop much earlier than expected. It should be kept in mind that the early inflammatory responses may not be related only to the infections. In fact, severe inflammatory response may lead to intraabdominal infections.[11] Also, several authors have suggested that the false-positive results due to the severe inflammation on the 1st postoperative day make it unnecessary to check the PCT and CRP levels.[10]

Several studies indicate that it is more important to follow the CRP and PCT levels through multiple measurements for the diagnosis of sepsis rather than deciding based on just one measurement,[28,29] meaning that the increasing or decreasing trends of these biomarkers can guide a physician with respect to infections. In our study, the decreasing trend began at the 72nd hour for CRP and at the 48th hour for PCT. Facy et al.[11] conducted a study among elective colorectal surgery patients and suggested that discharge be postponed for patients with the CRP and PCT levels above a certain limit.

In our study, the highest biomarker levels were determined at the 48th hour for patients with intraabdominal infections. Also, these biomarkers were found to be more elevated in infected patients than in non-infected patients. The cut-off values at the 72nd hour were determined to be 1.64 ng/mL for PCT and 140.5 mg/dl for CRP. Ren et al.[27] evaluated patients that underwent intestinal fistula operation. They determined that the PCT values peaked on the 3rd day (compatible with our study) and that the cut-off value was 0.98 mg/ml. With respect to postoperative infections among patients that underwent laparoscopic sleeve gastrectomy due to morbid obesity, it was observed that the PCT cut-off value was 0.95 ng/ml with 100% sensitivity and specificity at the 48th postoperative hour.[30] Also, a study that examined postoperative intraabdominal infections in patients that had undergone esophagus surgery determined the PCT cut-off value to be 1.15 ng/ml at the 72nd hour.[18] Studies of colorectal surgery patients indicate that the measurements at the 48th and 72nd hours are important for the prediction of intraabdominal infections and that the cut-off value for PCT is 1.34 ng/mL.[24]

The studies looking at CRP suggest that the CRP cut-off levels at the 72nd hour can vary between 125–190 mg/dL for patients who develop intraabdominal infections, which is similar to our findings.[11,22,26] It should be noted that the CRP levels are higher for intraabdominal infections compared to extraabdominal infections. Some studies found the PCT and CRP levels to be higher compared to other studies. This can be caused by increased contamination during the operation due to contamination of the region of operation.[11]

The limitations of our study are as follows: Our study is monocentric, and the number of subjects is low compared to other similar studies. The patients who were thought to have systemic intraabdominal infections were not verified through radiological examination. Also, the monitoring time was limited to 72 hours for both biomarkers, and the relations to mortality were not determined.

To conclude, PCT levels can help us in the early diagnosis of intraabdominal infections. Furthermore, elevated PCT levels can be a guide in clinical practice for the early diagnosis of infectious surgical complications, allowing the early application of additional diagnostic methods and the application of empirical antibiotics.

Ethics Committee Approval

Approved by the local ethics committee.

Informed Consent

Prospective study.

Peer-review

Internally peer-reviewed.

Authorship Contributions

Concept: M.A., S.Ç., M.Ak., H.Ş.T.; Design: M.A., S.Ç., M.A., H.Ş.T.; Data collection &/or processing: M.A., S.Ç., M.Ak., H.Ş.T.; Analysis and/or interpretation: M.A., M.Ak.; Literature search: M.A., M.Ak.; Writing: M.A., H.Ş.T.; Critical review: S.Ç.

Conflict of Interest

None declared.

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Gastrointestinal Cerrahi Geçirmiş Kritik Hastalarda Erken İntraabdominal Enfeksiyonun Tanısında C-Reaktif Protein ve Prokalsitoninin Rolü

Amaç: Bu çalışmanın amacı gastrointestinal cerrahi hastalarının intraabdominal infektif komplikasyonlarında C-reaktif protein (CRP) ve prokalsitoninin (PCT) rolünü belirlemektir.

Gereç ve Yöntem: Bu çalışma ileriye yönelik, tek kör bir çalışmadır. Hastalar yoğun bakım ünitesine transfer edilen kritik gastrointestinal sistem cerrahisi hastalarıydı. Hastaların serum CRP ve PCT düzeyleri ameliyat sonrası 1., 24., 48. ve 72. saatlerde ölçüldü. İntraabdominal enfeksiyonlu hastalar kaydedildi.

Bulgular: Çalışmaya 49 hasta dahil edilmiştir. Bu hastaların %38'inde intraabdominal enfeksiyon gelişti ve mortalite oranı %4 idi. Özellikle PCT düzeylerinin 48 ve 72. saatlerde istatistiksel olarak anlamlı olduğu görüldü. Duyarlılık ve özgüllük ameliyat sonrası 48. ve 72. saatlerde CRP düzeyinin sırasıyla %78.9 ve %70 olduğu saptandı. PCT düzeyinin duyarlılığı ve özgüllüğü ameliyat sonrası 48. saatte sırasıyla %73.7 ve %96.7 ve 72. saatte sırasıyla %84.2 ve %90 idi.

Sonuç: Kırk sekiz ve 72. saatlerde artmış serum PCT ve CRP konsantrasyonları, intraabdominal enfeksiyonların erken teşhisi için kritiktir. Ameliyat sonrası PCT konsantrasyonlarının 48 ve 72. saatlerdeki prediktifliği, CRP'ye kıyasla enfektif komplikasyonlar açısından daha yüksektir.

Anahtar Sözcükler: C-reaktif protein; gastrointestinal cerrahi; intraabdominal enfeksiyon; prokalsitonin.