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Research Article

The Prognostic Nutritional Index (Pni) And The Controlling Nutritional Status (Conut) Score Make Good Prognostic Markers For Acute Pancreatitis.

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Abstract

Background and Goals: It has been shown that metrics like the Prognostic Nutrition Index (PNI) and the Controlled Nutrition Status (CONUT) score are useful for evaluating patients' nutritional status. Our goal in this study was to examine the possible advantages of CONUT and the PNI as a predictive indicator of acute pancreatitis.

Materials and Procedures: A retrospective analysis of 361 patients' data was conducted. These patients' PNI and CONUT scores were determined after the fact.

They were divided into two groups: CONUT-low (≤2) and CONUT-high (≥3). PNI ≥ 45 was regarded as high, and PNI < 45 as low. Based on Atlanta 2012, the degree of AP and organ failure from illness were assessed.

Results: 152 patients had severe malnutrition, while 209 patients had normal to mild malnutrition based on the CONUT score. Of the 293 individuals with mild AP, 68 also had severe AP. Patients with a high CONUT score were more likely to have organ failure, be admitted to critical care units, and utilize antibiotics.Patients with a higher PNI score did not have any local problems, surgical requirements, mortality, or critical care hospitalizations. Conclusions: The PNI and CONUT have shown promise as prognostic indicators for assessing the severity and outcomes of AP in addition to predicting nutritional status.

Keywords : *cholangitis; [18F] FDG PET; ERCP.*

INTRODUCTION

Acute pancreatitis is a non-bacterial acute inflammation of the pancreas that can be clinically and histologically regressed. It is caused by the gland's auto-digestion, which is triggered by the entry of pancreatic enzymes into the parenchyma and their activation dependent on etiological causes. High levels of pancreatic enzymes in the blood and urine, as well as, most frequently, a stomach ache during a physical examination, are laboratory indicators of this acute picture, which can range from a minor pancreatic inflammation that goes away on its own to life-threatening advanced systemic symptoms.The symptoms of acute pancreatitis are often recurrent bouts.Chronic pancreatitis or pancreatic failure may develop from the pancreas being permanently damaged by the recurrence of episodes. There is no known cure for acute pancreatitis, which can proceed to death or morbidity [1–6].

A hyper-dynamic and systemic inflammatory response syndrome, along with a hypermetabolic state marked by acute pancreatitis-induced elevated protein catabolism, lipolysis, and glucose intolerance, results in a high level of catabolic stress [7]. These individuals have a 20% energy deficit and an 80% increase in protein catabolism [8].The dietary support for acute pancreatitis varies according on the disease's severity. Patients with mild to moderate pancreatitis can usually resume their regular diet in three to seven days, and the condition has no effect on metabolism or nutritional status. Severe AP can have a detrimental effect on nutritional status and disease development because of increased protein energy deficit, protein catabolism, and even a negative nitrogen balance [9]. According to a study, patients with a negative nitrogen balance had ten times the mortality rates of those with a normal nitrogen balance [10]. It has recently been demonstrated that indicators of nutritional status and inflammation, as determined by metrics like the Prognostic Nutritional Index (PNI) and the Controlled Nutritional Status (CONUT) score, can

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accurately predict poor prognosis and postoperative complications in a variety of cancer patients undergoing surgical resection or chemotherapy. In everyday clinical practice, these inflammatory and nutritional status metrics are regularly assessed and depend on serum and/or peripheral blood counts [11–15]. The potential utility of the PNI and CONUT as prognostic indicators in acute pancreatitis (AP) was examined in this study.

MATERIALS AND METHOD

A retrospective assessment of the hospital records of every patient who received a follow-up diagnosis of AP in our gastrointestinal clinic during the previous seven years was conducted. The study comprised a total of 361 participants who had been diagnosed with acute pancreatitis. The Mersin University Ethics Committee granted approval for this project (Date: 30 October 2021; Issue No: 1867977). Each patient's demographic information and risk factors were documented. File reviews were used to determine each patient's score, which was then recorded using the AP severity scoring systems. Acute pancreatitis was diagnosed based on two criteria: the presence of imaging abnormalities, amylase and lipase levels greater than three times normal, and characteristic abdominal pain. The study excluded participants who were less than 18 years old, had a history of chronic pancreatitis, had multiple organ failure, or had cancer. Using the Atlanta criteria, patients were categorized as either mild or severe. Individuals in the mild pancreatitis group were included if their organ failure symptoms subsided in the first 48 hours. Patients in the severe pancreatitis group had organ failure and consequences that lasted more than 48 hours. The patients who were admitted to the intensive care unit had their APACHE-2 scores determined. Mild pancreatitis was defined as cases with fewer than 8 points, and severe pancreatitis as cases with more than 8 points [7,16,17].Retrospectively, the CONUT score and PNI were determined using the patients' initial diagnosis laboratory results. Different laboratory indicators make up the CONUT score and PNI. The albumin, lymphocyte count, and total cholesterol levels are used to compute the CONUT score using the PNI albumin and lymphocyte count. PNI, a measure of peripheral blood lymphocyte count and serum albumin, is used to evaluate the nutritional and immunological condition of patients with digestive disorders. It is not a standard scoring method for AP severity. Patients with acute pancreatitis responded well to the Prognostic Nutritional Index, and it was discovered that if the PNI value at the start of the illness was lower for 100-day mortality, the mortality rate was higher [18–20].For each patient, the outcome of adding five times the number of lymphocytes and ten times the serum albumin level [(10xalbumin) + (lymphocytesx5)] was noted. Individuals who scored more than 45 on the PNI were deemed to be at normal risk, whereas those who scored lower than 45 were deemed to be at risk of severe malnutrition. For hospitalized patients, the Control of Nutritional Status Score (CONUT), a screening tool that evaluates nutritional status based on biochemical results, is useful and simple to apply. It is computed using values for cholesterol, albumin, and lymphocytes [21] (Table 1). Protein stores are represented by albumin, calorie depletion by total cholesterol, and immunological defense by lymphocyte count. A high score is given to each component that decreases. Consequently, poorer nutritional status is indicated by a high score [22]. In many clinical situations, including cardiac problems and gastrointestinal tumors, this scale was used as a measure of severity and mortality [23–27]. Based on their CONUT scores, patients were classified as CONUT-low (≤2) and CONUT-high (≥3).Antibiotic use was defined as the administration of antibiotics to patients suffering from infected necrosis or acute chole-cystitis. Patients with necrotizing pancreatitis underwent the procedure. The patients underwent abscess drainage and necrosectomy.

STATISTICAL ANALYSIS

Frequency, mean, and standard deviation were used to express the variables. PNI scores (PNI ≥ 45 and PNI < 45), Revised Atlanta criteria (mild-severe), and CONUT scores (low ≤ 2-high ≥ 3) were used to classify the patients. To determine whether there was a difference between the subgroups in terms of CONUT score, Revised Atlanta criterion, and PNI scores, the Pearson Chi-square test was employed. If a normal distribution was seen for continuous variables, the difference between groups was examined using the Student's t-test. For parameters that did not follow a normal distribution, the Mann-Whitney U test was employed. IBM SPSS Statistics, Version 24 (IBM, A.B.D.) was utilized for statistical analysis. A p-value of less than 0.05 was deemed statistically significant.

RESULTS

The total number of patients enrolled in the trial was 361. The mean age of the 361 patients was 54.8 ± 17 years, with 184 (51%) being female and 177 (49%)

being male. Men's average age was 55 ± 17 years, while women's average age was 54.6 ± 6 years. Age differences between the sexes were not statistically significant. 24 (6.6%) had hypertriglyceridemia, 33 (9.1%) had alcoholism, 222 (61.5%) had biliary disorders, and 82 (22.7%) had additional etiological factors (tumor, post-ERCP, oddi fibrosis, etc.). (Table 2).42.1% of the patients had a high CONUT score, whereas 57.9% had a low CONUT score. According to the Atlanta categorization, 25% of patients with high CONUT scores also had severe pancreatitis. Severe pancreatitis was found in 14.3% of individuals with a poor CONUT score ($p < 0.05$). Likewise, a high APACHE score was seen in 75.6% of patients with a high CONUT score and 80.4% of patients with a low CONUT score (Table 2). Stated differently, there was a statistically significant correlation ($p < 0.05$) between the severity of pancreatitis and the CONUT score.5.2% of patients with a low CONUT score and 4.6% of patients with a high CONUT score required surgery. 11.8% of patients with a high CONUT score and 7.17% of those with a low CONUT score experienced local problems (Table 2). The CONUT score did not substantially correlate with local problems ($p = 0.092$) or the requirement for surgery ($p = 0.489$).

The use of antibiotics was defined as giving them to patients who had infected necrosis or acute cholecystitis. Patients with concurrent cholecystitis were started on ceftriaxone, while those with infected necrosis were put on imipenem. 42.1% of patients with a high CONUT score and 27.2% of individuals with a low CONUT score required antibiotics (Table 3). The CONUT score and the requirement for antibiotics were statistically correlated ($p < 0.05$).

Patients with a high CONUT score spent an average of 6.4 ± 4.7 days in the hospital, whereas those with a low CONUT score spent an average of 4.2 ± 3.5 days. Those with a high CONUT score were admitted to the critical care unit in 9.8% of cases, whereas those with a low CONUT score were admitted to the same facility. In patients with a high CONUT score, organ failure arose in 34.9% of cases, whereas in those with a low CONUT score, it occurred in 23.9% of cases. 3.9% of patients with a high CONUT score and 0.95% of patients with a low CONUT score experienced exitus (Table 3). Organ failure, death, length of hospital stay, and length of stay in an intensive care unit were all significantly correlated with a high CONUT score ($p < 0.05$).

According to our analysis of PNI > 45 and PNI < 45, severe pancreatitis was present in 1.32% of patients with a high PNI and 31.4% of patients with a low PNI. In contrast, none of the patients with a high PNI were admitted to an intensive care unit, while 15.9% of the patients with a low PNI were. All of the patients had low PNI scores. The average length of stay for patients with a high PNI score was 4.72 ± 3.14, while the average length of stay for patients with a low PNI score was 5.04 ± 3.8. Antibiotics were necessary for 48% of patients with a low PNI and 13.2% of individuals with a high PNI. None of the patients with a high PNI score underwent surgery, but 11.9% of those with a low PNI score did. While none of the individuals with a high PNI experienced local problems, 15.7% of the patients with a low PNI did. To put it another way, all (100%) of the patients who required surgery, were admitted to intensive care, died, or experienced local problems had poor PNI scores (Table 4). The severity of pancreatitis, death, the need for antibiotics, the length of hospitalization or intensive care unit stay, the necessity for surgery, and local complications were all statistically correlated with a low PNI ($p < 0.05$).

A total of 41.8% of the patients had a high PNI and 58.1% had a low PNI when we compared the PNI > 45 and PNI < 45. 38.1% of patients with low CONUT scores and 61.9% of patients with high CONUT scores had low PNIs. According to Table 5, the PNI was elevated in 85.4% of patients with a low CONUT score and in 14.6% of patients with a high CONUT score.

DISCUSSION

Acute pancreatitis (AP) patients, particularly those with severe cases, need proper nutritional care because of their prolonged food restriction and elevated calorie needs. The connection between AP patients' clinical and nutritional state is, nevertheless, poorly understood. Between 20 and 50 percent of hospitalized medical patients suffer from malnutrition as a result of their illness [25–27]. Medical inpatients at risk of malnutrition experienced fewer problems and deaths when individualized nutritional support was started early, according to the Early Nutritional Support to Frailty, Functional Outcomes, and Recovery of Malnourished Medical Inpatients Trial (EFFORT) [28–31]. Remarkably, there was minimal evidence in this trial about the associated subgroup effects of disease type and nutritional condition. It was discovered that individuals with a high PNI score and a low CONUT score—that is, those with a higher nutritional status—had a better course for acute pancreatitis. Regardless of the underlying medical condition, individuals' inflammatory status may influence how they react to nutritional support for a variety of reasons. Increased insulin resistance and decreased appetite are two metabolic outcomes of inflammation that prevent nutrients from entering cells [32, 33]. In fact, inflammation is believed to be a major driving factor behind disease-related anorexia, decreased food intake, and muscle catabolism, irrespective of the underlying condition. This could also partially explain the poorer outcomes of individuals with inflammation, such as lengthier hospital admissions and higher fatality rates [34, 35]. The European Society for Clinical Nutrition and Metabolism's (ESPEN) classification system also takes into account the role that inflammation plays in the pathophysiology of malnutrition. They propose to further categorize malnutrition into two groups: inflammatory and non-inflammatory [36]. The term "inflammatory malnutrition associated with a disease" refers to both underlying disorders that cause inflammation and consequent food intake deficiencies or intakes with a negative nutritional balance [37].

In our research, patients with low PNI (i.e., poor nutritional status) and high CONUT scores had significantly higher rates of exitus, mean length of hospital stay, organ failure, antibiotic requirements, pancreatitis severity, and intensive care unit stays. The PNI score was substantial, but the CONUT score was negligible in terms of local problems and the necessity for surgery. A low PNI score was already present in 61.9% of individuals with a high CONUT score. This showed that the two scores had a strong connection ($p < 0.05$).

Malnutrition can raise inflammation and slow the repair of illnesses, according to numerous research. In several inflammatory disorders, it has also been demonstrated that the CONUT score and PNI can predict mortality [38–41]. We believe that the underlying mechanisms are intimately related to both the acute worsening of the disease and nutrition. Regarding the evaluation of the severity and prognosis of AP patients, we propose that the CONUT score—a combination of immune state, protein reserve, and lipid metabolism—and the PNI score have a progressively significant influence. According to this study, severe AP, a low PNI score, and poor nutritional and inflammatory condition were all substantially correlated with a higher CONUT score. Thus, we believe that as soon as the patient's discomfort is reduced in acute pancreatitis, nourishment should begin. We believe that in cases of acute pancreatitis, early and proper diet might have a significant impact on the prognosis.

STUDY LIMITATIONS

The small sample size and retrospective, uncontrolled methodology of this study are its limitations. To the best of our knowledge, however, this is the first study in the world to show the value of the CONUT score and PNI as a nutritional screening tool and a severity prediction for AP patients. Additional prospective studies should be conducted to assess these findings.

CONCLUSIONS

These findings demonstrated the value of a nutritional evaluation combined with the PNI and CONUT score in forecasting the outcome of AP patients. Consequently, we believe that a suitable intervention that enhances the nutritional status of patients with low PNI and high CONUT scores in acute pancreatitis may help to improve the prognosis of AP patients. In summary, AP patients' nutritional status can be evaluated by comparing their CONUT and PNI scores. By making it simple to calculate the CONUT score and PNI, we believe that early nutrition therapy in FP can improve the prognosis

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