RESEARCH ARTICLE

The AST to platelet ratio index is a predictor of pleural effusion development in acute pancreatitis

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ABSTRACT

Pleural effusion is a common extra pancreatic complication of acute pancreatitis and is associated with a more severe clinical course and poorer outcomes. Early identification of patients at risk remains clinically important. The aim of this study was to evaluate the predictive value of non-invasive liver fibrosis indices for the development of pleural effusion in patients with acute pancreatitis. This retrospective single-centre observational study included 97 patients hospitalised with acute pancreatitis. Laboratory parameters obtained at admission were used to calculate several liver fibrosis indices, including APRI, AARPRI, FIB-4, ALBI, ABAI, GPR, APP, and FIS. The presence of pleural effusion was assessed using chest radiography. Comparative analysis demonstrated that ABAI, AARPRI, ALBI, APRI, FIS, and FIB-4 were significantly associated with pleural effusion. Receiver operating characteristic analysis showed the highest discriminative ability for ALBI (AUC 0.707), followed by ABAI (AUC 0.695) and APRI (AUC 0.650). In univariate logistic regression, ALBI, FIS, and APRI were significant predictors of pleural effusion, whereas in multivariate analysis only APRI remained an independent predictor (OR 3.677, p=0.047). These findings indicate that non-invasive liver fibrosis indices, particularly APRI, may serve as simple and accessible biomarkers for early prediction of pleural effusion in patients with acute pancreatitis.

Keywords: Biomarkers, disease severity, liver function tests, prognosis, risk assessment

INTRODUCTION

Acute pancreatitis (AP) is an acute inflammatory condition of the exocrine pancreas characterised by acinar cell injury and a cascade of local and systemic inflammatory responses, with clinical severity ranging from mild, self-limited pancreatic oedema to fulminant disease complicated by necrosis, organ failure, and death (Bejjani et al., 2024; Tenner et al., 2024). In clinical practice, gallstone disease and alcohol use remain the most common aetiological factors, while hypertriglyceridaemia, drug-induced pancreatitis, malignant obstruction, and infectious triggers represent less frequent but clinically relevant causes (Tenner et al., 2024; Walkowska et al., 2022). The diagnostic work-up is typically grounded in characteristic abdominal pain—often epigastric, occasionally radiating to the shoulder and exacerbated by oral intake—together with biochemical and imaging confirmation when indicated (Walkowska et al., 2022; Tenner et al., 2024).

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Although serum amylase is widely used as a biochemical marker, its diagnostic sensitivity may be reduced in late presentations and in hypertriglyceridaemia, underscoring the need for a broader laboratory context when evaluating suspected AP (Walkowska et al., 2022). In this setting, hepatobiliary parameters such as bilirubin, gamma-glutamyl transferase, and transaminases may provide useful additional signals, reflecting either shared biliary pathology or systemic involvement, and potentially contributing to early risk stratification (Tenner et al., 2024; Xu et al., 2020). At the same time, the pathophysiology of AP is driven by a complex inflammatory network, with prominent cytokine activation—including interleukin-1β, interleukin-6, interleukin-8, and tumour necrosis factor-α—contributing to systemic inflammatory response syndrome and the progression toward multiorgan dysfunction in severe cases (Bejjani et al., 2024; Metri et al., 2024).

Given the clinical need to anticipate deterioration, several severity scores have been developed and used to estimate disease course and the risk of organ failure, including radiology-based indices and clinical scoring systems such as Ranson and APACHE (Raghuwanshi et al., 2016). Nevertheless, thoracic complications frequently emerge as early systemic manifestations of AP and remain among the most clinically consequential. Pleural effusion (PE), in particular, represents one of the most common extra-pancreatic radiological findings, often preceding pulmonary oedema and infiltrates and, in many patients, signalling a more severe disease phenotype requiring closer monitoring and occasionally ventilatory support (Kumar et al., 2018; Shah and Rana, 2020). Contemporary evidence further supports PE as an early marker of severe pancreatitis, with left-sided effusions being reported most frequently, followed by bilateral and right-sided distributions, and with clinically meaningful associations with adverse outcomes (Luiken et al., 2022).

Mechanistically, PE in AP may develop through several pathways, including pseudocyst formation, trans-diaphragmatic lymphatic obstruction, and pancreaticopleural fistulae that allow enzyme-rich fluid to track into the pleural cavity, potentially compromising respiratory mechanics when effusions are large or progressive (Kumar et al., 2018; Luiken et al., 2022). Importantly, PE has also been linked to broader systemic involvement, including hepatic impairment, which may manifest through derangements in albumin and bilirubin levels during the acute inflammatory phase (Xu et al., 2020; Luiken et al., 2022).

In parallel with these clinical observations, non-invasive indices originally developed to estimate liver fibrosis—constructed from routine laboratory parameters such as transaminases, platelets, bilirubin, and albumin—have increasingly been explored beyond chronic liver disease contexts. However, the predictive role of such indices for PE development during AP remains insufficiently studied. Notably, Kirdok et al. (2024) evaluated Fibrosis-4 (FIB-4) in relation to AP severity using traditional clinical scores but did not assess PE as a distinct complication despite its recognised value as a severity signal . Likewise, studies focusing on single hepatobiliary markers have suggested prognostic roles for bilirubin or albumin in assessing AP severity, yet without specifically addressing PE as an early event in the clinical trajectory (Xu et al., 2020).

Accordingly, the present study aimed to determine whether non-invasive liver fibrosis indices calculated from admission laboratory parameters are associated with, and can predict, the development of PE in patients hospitalised with AP, irrespective of underlying aetiology and baseline severity status.

MATERIAL AND METHODS

The present study was conducted as a retrospective single-centre observational study at the Department of Gastroenterohepatology, General Hospital "Primarius Abdulah Nakaš", Sarajevo, Bosnia and Herzegovina. The study included patients hospitalised with a diagnosis of AP between 2016 and 2021. A total of 97 adult patients of both sexes were analysed, comprising 41 women and 56 men. The study was carried out in accordance with the principles of the Declaration of Helsinki and was approved by the Ethical Committee of the General Hospital "Prim. dr. Abdulah Nakaš".

The diagnosis of AP was established using standard clinical criteria, requiring at least two of the following: characteristic abdominal pain consistent with pancreatitis, serum amylase levels at least three times above the upper reference limit, and radiological findings compatible with pancreatitis on abdominal ultrasonography (Walkowska et al., 2022). Ultrasonographic examinations were performed using a Toshiba Aplio 300 system equipped with a convex probe (PVT-375BT).

Patients with already known medical history of clinically established chronic liver disease, chronic pancreatitis, chronic heart failure, chronic kidney disease, shock requiring mechanical ventilation, recent respiratory infection within the previous three months, or those who did not provide informed consent were excluded from the study. All patients received standard supportive therapy for AP, including intravenous fluid resuscitation, analgesia, and electrolyte correction. Antibiotic therapy was administered only when clinically indicated.

Blood samples were obtained from the cubital vein at hospital admission and processed according to standard laboratory procedures. Serum was separated by centrifugation within 30 minutes and stored at −20°C until analysis. Laboratory assessments included platelet count, serum amylase, and hepatobiliary parameters, namely aspartate aminotransferase (AST), alanine aminotransferase (ALT), gamma-glutamyl transferase (GGT), total bilirubin, and albumin. Biochemical analyses were performed using standard enzymatic colorimetric methods on automated analysers, while platelet counts were determined using an automated haematology analyser.

PE was assessed during hospitalisation using standard posteroanterior and lateral chest radiography. Chest radiography was performed within the first 48 hours of admission or earlier if respiratory symptoms were present. Radiographic signs consistent with pleural fluid, such as costophrenic angle blunting, were considered diagnostic for PE (Karkhanis and Joshi, 2012).

Based on admission laboratory values, several non-invasive liver fibrosis indices were calculated. These indices were derived from routinely measured biochemical and haematological parameters and have previously been applied in the non-invasive assessment of liver fibrosis and systemic disease states (Deng et al., 2015; Chou et al., 2023). The following formulas were used:

APRI (AST to Platelet Ratio Index):
$APRI = [(AST / ULN) / PLT] \times 100$
AARPRI (AST/ALT ratio to Platelet Ratio Index):
$AARPRI = (AST / ALT) / PLT \times 100$
FIB-4 (Fibrosis-4 Index):
$FIB\text{-}4 = (Age \times AST) / [PLT \times \sqrt{ALT}]$
GPR (GGT to Platelet Ratio):
$GPR = (GGT / ULN) / PLT \times 100$
APP (Albumin–Platelet Product):
$APP = (Albumin \times PLT) / 1000$
ALBI (Albumin–Bilirubin Index):
$ALBI^* = (0.66 \times \log10\ Bilirubin) - (0.085 \times Albumin)$
*Based on the ALBI score, patients were stratified into prognostic classes: grade 1 (≤ -2.60), grade 2 (> -2.60 to ≤ -1.39), and grade 3 (> -1.39).
ABAI (Age–Bilirubin–Albumin Index):
$ABAI = 1.5 + (0.065 \times Age) + (1.85 \times Bilirubin) - (1.65 \times Albumin)$
FIS (Fibrosis Index Score):
$FIS = 8 - (0.01 \times PLT) - Albumin$

In these formulas, PLT represents platelet count expressed in $\times 10^9$/L, while ULN denotes the upper limit of normal for AST (40 U/L) and GGT (73 U/L). AST indicates aspartate aminotransferase, ALT alanine aminotransferase, and GGT gamma-glutamyl transferase. Albumin and bilirubin represent their respective serum concentrations according to standard laboratory units.

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 22.0. The distribution of variables was assessed using the Kolmogorov–Smirnov test. Continuous variables with normal distribution were expressed as mean ± standard deviation, while non-normally distributed variables were presented as median and interquartile range. Between-group comparisons were performed using the Student's t-test or the Mann–Whitney U test, as appropriate. The diagnostic performance of non-invasive indices for PE was evaluated using receiver operating characteristic (ROC) curve analysis with calculation of the area under the curve and corresponding 95% confidence intervals. Binary logistic regression analysis was used to identify independent predictors of PE. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 97 patients with AP were included in the study, comprising 41 women (42.3%) and 56 men (57.7%), with a mean age of 57.6 ± 14.3 years. PE was observed in 24 patients (24.7%), while 73 patients (75.3%) had no radiographic evidence of PE. Baseline demographic, laboratory, and index-derived parameters are presented in Table 1.

Table 1 Demographic and clinical characteristics of acute pancreatitis patients

Parameters	Value
Gender	
Female	41 (42.3%)
Male	56 (57.7%)
Pleural Effusion	
No	73 (75.3%)
Yes	24 (24.7%)
Age	57.59 ± 14.25
Amylase	540 (301.50 – 1572.50)
AST (U/L)	37.0 (24.0 – 107.0)
ALT (U/L)	57.0 (33.5 – 129.0)
GGT (U/L)	54.0 (27.0 – 144.50)
Platelets (10*9)	221.0 (180.50 – 281.50)
APRI	0.488 (0.234 – 1.209)
AARPRI	0.312 (0.165– 0.756)
FIB4	1.393 (0.866 – 2.314)
GPR	38.074 (11.553 – 61.222)
Total Bilirubin (μmol/L)	12.800 (7.950 – 26.700)
Albumin (g/L)	33.0 (29.0 – 37.0)
ALBI	-2.03 ± 0.506
APP	7.182 (5.514 – 9.553)
ABAI	-20.290 (-34.077 – -0.1150)
FIS	-27.35 ± 5.567

Data expressed as mean (±SD) and median (interquartile range (IQR)).

AST: aspartate aminotransferase; ALT: alanine aminotransferase; GGT: gamma-glutamyl transferase; APRI: AST to platelet ratio index; AARPRI: aspartate aminotransferase to alanine aminotransferase ratio to platelet ratio index; FIB4: Fibrosis-4; GPR: gamma-glutamyl transferase to platelet ratio; ALBI: albumin-bilirubin score, APP: albumin-platelet product; ABAI: age, bilirubin, albumin index; FIS: Fibrosis Score

Comparison between patients with and without PE revealed statistically significant differences in several non-invasive liver fibrosis indices (Table 2). Patients with PE had significantly higher values of ABAI, AARPRI, APRI, FIS, and FIB-4, as well as less favourable ALBI scores. In contrast, APP and GPR did not differ significantly between the groups. No statistically significant difference was observed in the distribution of ALBI grades between the groups.

Table 2 Comparison of non-invasive liver fibrosis indices between patients with and without pleural effusion

Parameter	AP with PE (n=24)	AP without PE (n=73)	p-value
ABAI	−4.250 (−22.211–16.196)	−27.325 (−38.415 to −6.617)	0.004*
AARPRI	0.472 (0.254–2.952)	0.271 (0.120–0.688)	0.014*
ALBI	−1.747 ± 0.488	−2.119 ± 0.479	0.001**
ALBI grade 1	4 (16.7%)	2 (2.7%)	
ALBI grade 2	20 (83.3%)	71 (97.3%)	0.221
APP	6.943 ± 2.591	8.025 ± 3.141	0.131

Parameter	AP with PE (n=24)	AP without PE (n=73)	p-value
APRI	0.727 (0.357–2.281)	0.421 (0.211–1.077)	0.028*
FIS	−24.927 ± 6.594	−28.146 ± 4.982	0.013*
FIB-4	1.860 (1.065–3.962)	1.208 (0.828–1.944)	0.018*
GPR	34.371 (14.423–55.406)	21.673 (10.847–76.069)	0.570

Data expressed as mean (±SD) and median (the interquartile range-IQR). The student's t-test assessed differences in normally distributed variables, while the Mann-Whitney U test was applied for non-normally distributed variables.

AP: acute pancreatitis; PE: pleural effusion; ABAI: age, bilirubin, albumin index; AARPRI: aspartate aminotransferase to alanine aminotransferase ratio to platelet ratio index; ALBI: albumin-bilirubin score, APP: albumin-platelet product; APRI: aspartate aminotransferase to platelet ratio index; FIS: Fibrosis Score; FIB4: Fibrosis-4; GPR: gamma-glutamyl transferase to platelet ratio

*p<0.05; **p<0.001

Receiver operating characteristic (ROC) analysis was performed to evaluate the ability of the non-invasive indices to discriminate patients with PE (Table 3, Figure 1). Among the evaluated indices, the ALBI score demonstrated the highest discriminatory performance (AUC 0.707; p=0.001) at a cut-off value of −1.890, with a sensitivity of 66.7% and specificity of 68.5%. The ABAI index showed similar performance (AUC 0.695; p<0.001) at a cut-off value of −32.085, yielding a sensitivity of 91.7% and specificity of 61.6%. Other indices, including APRI, FIS, AARPRI, and FIB-4, showed modest but statistically significant discriminatory ability, with AUC values ranging from 0.650 to 0.667.

Table 3 ROC analysis of non-invasive liver fibrosis indices for prediction of pleural effusion

Test Result Variables	AUC	p-value	95% CI		Cut-off Value	Sensitivity	Specificity
			Lower Bound	Upper Bound			
APRI	0.650	0.019*	0.525	0.774	0.241	87.8%	30.1%
ALBI	0.707	0.001**	0.583	0.831	-1.890	66.7%	68.5%
ABAI	0.695	<0.001**	0.587	0.803	-32.085	91.7%	61.6%
FIS	0.658	0.037*	0.510	0.807	-26.685	70.8%	61.6%
AARPRI	0.667	0.004*	0.552	0.782	0.212	84.5%	45.2%
FIB-4	0.662	0.013*	0.534	0.791	1.412	70.8%	58.9%

AUC – area under curve; CI – confidence interval; ABAI: age, bilirubin, albumin index; AARPRI: aspartate aminotransferase to alanine aminotransferase ratio to platelet ratio index; ALBI: albumin-bilirubin score; APRI: AST to platelet ratio index; FIS: Fibrosis Score; FIB4: Fibrosis-4

*p<0.05 ** p≤0.001

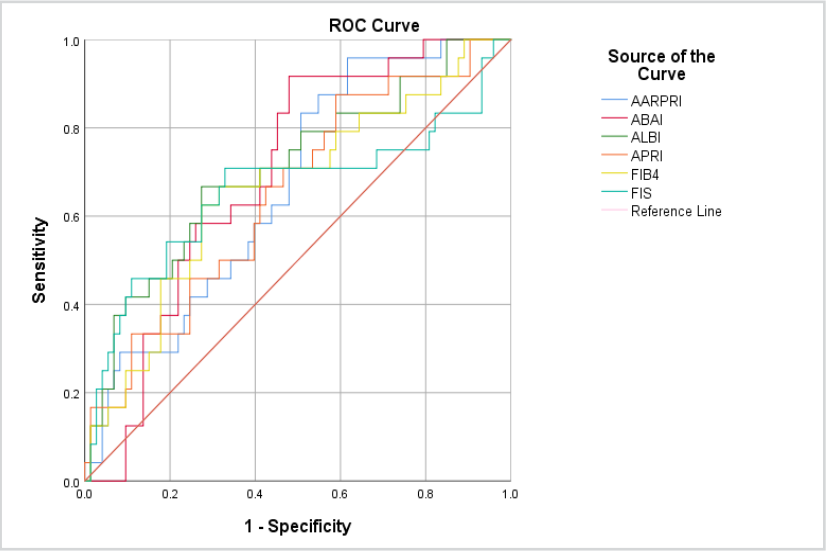

Figure 1 ROC curve analysis for differentiating pleural effusion using noninvasive liver fibrosis indices in acute pancreatitis patients

Data was expressed using ROC (receiver operating characteristic) analysis.

ABAindex: age, bilirubin, albumin index; AARPRI: aspartate aminotransferase to alanine aminotransferase ratio to platelet ratio index; ALBI: albumin-bilirubin score; APRI: AST to platelet ratio index; FIS: Fibrosis Score; FIB4: Fibrosis-4 Univariate binary logistic regression analysis identified ALBI, FIS, and APRI as significant predictors of PE in patients with AP (Table 4). Higher ALBI (OR 5.080; 95% CI 1.734–14.882; p=0.003), higher FIS (OR 1.115; 95% CI 1.019–1.219; p=0.017), and higher APRI values (OR 1.436; 95% CI 1.024–2.013; p=0.036) were associated with the presence of PE. However, in the multivariable logistic regression model, only APRI remained an independent predictor of PE (OR 3.677; 95% CI 1.020–13.255; p=0.047).

Table 4 Logistic regression analysis of non-invasive liver indices as predictors of pleural effusion

Variables	Univariate			Multivariate		
	OR	95% CI	p-value	OR	95% CI	p-value
ALBI	5.080	(1.734-14.882)	0.003*	4.186	0.398-14.490	0.235
ALBI Grade 2	0.420	(0.088-2.010)	0.277			
ABAI	1.007	(0.997-1.018)	0.180			
FIS	1.115	(1.019-1.219)	0.017*	0.689	(0.444-1.071)	0.098
APRI	**1.436**	**(1.024-2.013)**	**0.036***	**3.677***	**(1.020-13.255)**	**0.047***
AARPRI	1.261	(0.972-1.634)	0.080			
FIB4	1.264	(0.998-1.601)	0.052			

Dependent variable: Pleural Effusion

CI – confidence interval; ABAI: age, bilirubin, albumin index; AARPRI: aspartate aminotransferase to alanine aminotransferase ratio to platelet ratio index; ALBI: albumin-bilirubin score; APRI: AST to platelet ratio index; FIS: Fibrosis Score; FIB4: Fibrosis-4

*p<0.05 ** p≤0.001

DISCUSSION AND CONCLUSION

The investigation of early predictors of complications in AP is of major clinical importance, as the disease course may deteriorate rapidly and lead to respiratory complications, systemic inflammatory response, and multiorgan failure. Among extrapancreatic manifestations, PE is recognised as a marker of more severe disease and poorer clinical outcomes (Luiken et al., 2022). Therefore, identifying laboratory-derived indices capable of predicting PE at admission may contribute to earlier risk stratification and improved patient management.

Previous studies have investigated the prognostic role of hepatobiliary parameters and liver-related indices in AP. In the study by Kirdok et al. (2024), the predictive value of the FIB-4 index for AP severity was evaluated. The authors reported that higher FIB-4 values were associated with more severe disease, particularly in patients with underlying non-alcoholic fatty liver disease. However, PE was not assessed as a specific outcome parameter. Similarly, Shi et al. (2020) examined the association between the ALBI score and in-hospital mortality in critically ill patients with AP. They found that higher ALBI values were significantly associated with increased mortality, suggesting that liver-related indices may serve as useful prognostic tools, although PE was not analysed separately. Our findings are in line with emerging evidence suggesting that non-invasive liver-related indices may have prognostic value in AP. Although previous studies primarily focused on outcomes such as disease severity and mortality, they support the concept that composite liver-related indices reflect systemic inflammatory burden and organ involvement. In this context, our results extend these observations by demonstrating a potential role of APRI in predicting PE as an early extrapancreatic complication.

In the present study, several non-invasive liver fibrosis indices differed significantly between patients with and without PE, including APRI, ALBI, ABAI, FIS, AARPRI, and FIB-4. Among them, ALBI demonstrated the highest discriminatory ability in ROC analysis, while APRI emerged as the only independent predictor of PE in the multivariable model. These findings suggest that indices incorporating transaminases, platelet count, albumin, and bilirubin may reflect systemic inflammatory and perfusion-related disturbances occurring in more severe forms of AP.

The pathophysiological mechanisms underlying these associations are likely multifactorial. AP is characterised by a systemic inflammatory response involving cytokine activation, oxidative stress, and microcirculatory disturbances (Komara et al., 2020; Shah and Rana, 2020). These processes may impair hepatic perfusion and function, leading to elevations in transaminases, alterations in bilirubin metabolism, and reductions in serum albumin concentrations (Zhang et al., 2024). Since several of the investigated indices combine these parameters, they may act as indirect markers of systemic disease severity rather than isolated hepatic injury.

Platelet activation and consumption are also recognised features of systemic inflammation and microvascular dysfunction in AP. Thrombocytopenia and altered platelet dynamics have been associated with the development of multiorgan failure and poorer outcomes (Metri et al., 2024). Because platelet count represents a key component of indices such as APRI and FIB-4, these scores may partially reflect the severity of systemic inflammatory and microcirculatory changes.

Experimental and clinical studies have demonstrated significant alterations in hepatic perfusion during AP, including reductions in portal venous flow during the inflammatory phase and partial recovery after adequate fluid resuscitation (Tutcu et al., 2010). Such haemodynamic changes may influence liver-related biochemical parameters and contribute to the observed associations between fibrosis indices and PE.

Serum albumin and bilirubin are widely used, inexpensive biochemical markers that reflect hepatic synthetic and excretory function. Previous studies have shown that decreased albumin and altered bilirubin levels are associated with increased severity and mortality in AP (Xu et al., 2020; Shi et al., 2020). Because indices such as ALBI and ABAI incorporate these parameters, they may capture systemic metabolic and inflammatory disturbances associated with more severe disease.

Elderly patients are particularly vulnerable to severe forms of AP, and the presence of PE in this population is often associated with worse outcomes. Previous research has demonstrated that PE may serve as an independent predictor of disease severity in older patients, particularly when combined with other risk factors (He et al., 2021).

From a clinical perspective, the early prediction of PE using simple and widely available indices such as APRI may enable closer monitoring and earlier therapeutic interventions. Such an approach may help prevent disease progression, respiratory complications, and multiorgan failure.

This study has several limitations. First, the relatively small sample size limits the generalisability of the findings. Second, the single-centre design may introduce selection bias. Third, the limited number of comparable studies in the literature restricts direct comparisons with previous research. Therefore, larger prospective multicentre studies are needed to confirm the prognostic value of these indices. Although patients with clinically established chronic kidney disease were excluded, renal function was not systematically assessed beyond available clinical data. Condition such as acute kidney injury may influence fluid balance and contribute to the development of PE. Therefore, a potential confounding effect cannot be excluded and should be considered when interpreting the results. However, despite this potential limitation, APRI remained independently associated with PE, suggesting a degree of robustness of the observed relationship.

The persistence of APRI as an independent predictor in the multivariable model may be explained by intercorrelations among the evaluated indices. Many of the analysed parameters share common components, including transaminases, bilirubin, albumin, and platelet count, which may lead to collinearity and reduce their independent contribution in adjusted models. Therefore, simpler composite indices such as APRI may demonstrate greater stability in multivariable analysis.

In conclusion, the present study demonstrated that several non-invasive liver fibrosis indices are associated with the development of PE in patients with AP. Among them, APRI emerged as an independent predictor in the multivariable model. These findings highlight the relationship between liver-related laboratory parameters and the severity of AP and suggest that simple, low-cost indices may assist in early risk stratification. However, external validation in larger, prospective, and multicentre cohorts is required before routine clinical implementation. Such validation is necessary to confirm the reproducibility and generalisability of these findings across different patient populations and healthcare settings.

CONTRIBUTIONS

All authors contributed equally to this work.

CONFLICT OF INTEREST

The authors declared that there is no conflict of interest.

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Indeks omjera AST i trombocita je prediktor razvoja pleuralne efuzije kod akutnog pankreatitisa

SAŽETAK

Pleuralna efuzija predstavlja čestu ekstrapankreasnu komplikaciju akutnog pankreatitisa te je povezana s težom kliničkom slikom i lošijim ishodima liječenja. Rano prepoznavanje pacijenata s povećanim rizikom od razvoja pleuralne efuzije i dalje ima značajan klinički značaj. Cilj ovog istraživanja bio je procijeniti prediktivnu vrijednost neinvazivnih indeksa fibroze jetre za razvoj pleuralne efuzije kod pacijenata s akutnim pankreatitisom.

Ova retrospektivna opservaciona studija provedena u jednom centru obuhvatila je 97 pacijenata hospitaliziranih zbog akutnog pankreatitisa. Laboratorijski parametri prikupljeni pri prijemu korišteni su za izračunavanje više indeksa fibroze jetre, uključujući APRI, AARPRI, FIB-4, ALBI, ABAI, GPR, APP i FIS. Prisustvo pleuralne efuzije procijenjeno je radiografijom grudnog koša. Komparativna analiza pokazala je da su ABAI, AARPRI, ALBI, APRI, FIS i FIB-4 značajno povezani s prisustvom pleuralne efuzije. Analiza ROC krivulje pokazala je najveću diskriminacijsku sposobnost za ALBI (AUC 0,707), zatim za ABAI (AUC 0,695) i APRI (AUC 0,650). U univarijantnoj logističkoj regresijskoj analizi, ALBI, FIS i APRI bili su značajni prediktori razvoja pleuralne efuzije, dok je u multivarijantnoj analizi samo APRI ostao nezavisni prediktor (OR 3,677; p=0,047).

Dobijeni rezultati ukazuju da neinvazivni indeksi fibroze jetre, naročito APRI, mogu predstavljati jednostavne i lako dostupne biomarkere za rano predviđanje razvoja pleuralne efuzije kod pacijenata s akutnim pankreatitisom.

Ključne riječi: Biomarkeri, težina bolesti, testovi funkcije jetre, prognoza, procjena rizika