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Zheng Y, Liu DR, Ma J, Tan WB. Longitudinal dynamics of the gut microbiota during colorectal cancer treatment: Insights and implications for therapy. *World J Gastroenterol* 2026; 32(40): 120855 [DOI: 10.3748/wjg.120855]

Zhang YN, Duan JN, Michael N, Wang Y, Chen DF, Wang B. Balancing malignancy risk and healthcare resources: Optimizing surveillance for branch-duct intraductal papillary mucinous neoplasm. *World J Gastroenterol* 2026; 32(40): 121301 [DOI: 10.3748/wjg.121301]

OPINION REVIEW

Qi WT, Jia XH, Xue KL, Wang JW, Liang L. Interleukin-33/suppression of tumorigenicity 2 signaling in gastric injury: From mechanistic validation to spatiotemporal precision. *World J Gastroenterol* 2026; 32(40): 119684 [DOI: 10.3748/wjg.119684]

Ren ZY, Liang LP, Deng Y, Yang MD, Wang ZQ, Liu L. *Helicobacter pylori* retreatment: When clinical guidelines meet patient reality. *World J Gastroenterol* 2026; 32(40): 120001 [DOI: 10.3748/wjg.120001]

MINIREVIEWS

Song XR, Liu YX, Wu XF, Xue R. Esophageal diverticulum: A clinical framework for patient-tailored endoscopic management. *World J Gastroenterol* 2026; 32(40): 120622 [DOI: 10.3748/wjg.120622]

ORIGINAL ARTICLE

Case Control Study

Li ZK, Cai JT, Zhang PH, Wang LL, Yan HH. Assessment indicators of steatotic liver disease in non-hepatology specialty clinics: A real-world retrospective case-control study. *World J Gastroenterol* 2026; 32(40): 121401 [DOI: 10.3748/wjg.121401]

Retrospective Cohort Study

Li YC, Pan D, Liu HN, Pei ZC, Li YQ, Han ZX, Liu WL. Baseline cytokines and programmed death-ligand 1 prognostic value in advanced gastric cancer with sintilimab plus chemotherapy. *World J Gastroenterol* 2026; 32(40): 120447 [DOI: 10.3748/wjg.120447]

Retrospective Study

Xu ZP, Li L, Sun GD, Wu YY, Cai EW, Wen K, Shao WJ, Chen YG. Magnetic resonance imaging predicts perianal fistula in Crohn's disease. *World J Gastroenterol* 2026; 32(40): 116827 [DOI: 10.3748/wjg.116827]

Observational Study

Kwiatek-Średzińska KA, Trochimczyk K, Jamiołkowski J, Lebensztejn DM. Urinary trypsinogens and trypsinogen activation peptide as biomarkers in pediatric acute pancreatitis: A prospective observational study. *World J Gastroenterol* 2026; 32(40): 119619 [DOI: 10.3748/wjg.119619]

Özden Y, Cankurtaran RE, Keklikkıran Ç, Erdoğan Ç. Burnout and endoscopy-specific workload among gastroenterologists and gastroenterology fellows in Türkiye: A national cross-sectional survey. *World J Gastroenterol* 2026; 32(40): 124864 [DOI: 10.3748/wjg.124864]

Basic Study

Chen YL, Lin BA, Chen X, Liu XP, Huang JS. *ARPC1B* contributes to colorectal cancer progression and is associated with programmed death-ligand 1 expression. *World J Gastroenterol* 2026; 32(40): 117677 [DOI: 10.3748/wjg.117677]

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SYSTEMATIC REVIEWS

Li C, Yang JW, Zhang SY, Cheng W, Shi HB, Shi HB, Li C. Clinical efficacy of pharmacological and non-pharmacological interventions for constipation-predominant irritable bowel syndrome. *World J Gastroenterol* 2026; 32(40): 120563 [DOI: 10.3748/wjg.120563]

CORRESPONDENCE

Yu X, Huang XY, Zhang XY, Sun YJ, Lu P, Cai SL, Zhang K. Letter to the Editor: Optimizing *Helicobacter pylori* eradication and cardiovascular risk assessment in long-term aspirin users: Methodological perspective. *World J Gastroenterol* 2026; 32(40): 123728 [DOI: 10.3748/wjg.123728]

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Peer Review of *World Journal of Gastroenterology*, Payton Yau, PhD, Lecturer, Department of Biosciences, School of Science and Technology, Nottingham Trent University, Nottingham NG11 8NS, United Kingdom. payton.yau@ntu.ac.uk

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ORIGINAL ARTICLE

Observational Study

Urinary trypsinogens and trypsinogen activation peptide as biomarkers in pediatric acute pancreatitis: A prospective observational study

Kamila A Kwiatek-Średzińska, Kinga Trochimczyk, Jacek Jamiołkowski, Dariusz M Lebensztejn

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Abstract

BACKGROUND

The natural history of acute pancreatitis (AP) in children remains poorly understood, and no reliable noninvasive biomarkers are available to predict progression to severe disease. Studies in adults suggest the usefulness of trypsinogens and trypsinogen activation peptide (TAP) as biomarkers in AP.

AIM

To evaluate the predictive value of urinary trypsinogen-1, trypsinogen-2, and TAP in pediatric AP.

METHODS

This observational study included 61 children with AP hospitalized at the Department of Gastroenterology over a 5-year period and 29 controls with functional abdominal pain. In patients with AP, urinary trypsinogen-1, trypsinogen-2, and TAP were measured at three time points: at admission or within 24 hours, after 48 hours, and after 72 hours of hospitalization. Their predictive value for disease severity was compared with that of serum C-reactive protein (CRP), using receiver operating characteristic analysis and univariate logistic regression.

RESULTS

AP was classified as mild in 49 patients and moderately severe in 12 patients.

Urinary trypsinogen-2 after 48 hours was higher in AP than controls (P = 0.022). Moderately severe AP was associated with higher urinary TAP after 48 hours (P = 0.043) and 72 hours (P = 0.001), and higher serum CRP after 48 hours (P = 0.002) and 72 hours (P < 0.001). Receiver operating characteristic analysis showed moderate to good diagnostic performance for TAP and CRP after 48 hours and 72 hours, with area under the curve values ranging from 0.692 to 0.857 (95%CI: 0.542-0.998). Logistic regression revealed that TAP after 72 hours (odds ratio = 1.034, 95%CI: 1.009-1.059) and CRP after 48 hours and 72 hours predicted AP severity.

CONCLUSION
Urinary trypsinogen-2 may serve as a noninvasive biomarker of AP, whereas TAP may be a useful indicator of disease severity in children.

Key Words: Trypsinogen-1; Trypsinogen-2; Trypsinogen activation peptide; Urinary biomarkers; Acute pancreatitis; Pediatric pancreatitis; Children

Core Tip: This is the first observational study in children evaluating the usefulness of urinary trypsinogens and trypsinogen activation peptide as biomarkers in pediatric acute pancreatitis. Urinary trypsinogen-2 may serve as a noninvasive biomarker of acute pancreatitis, whereas urinary trypsinogen activation peptide may reflect disease severity in children, although with certain time-dependent limitations. Assessment of urinary parameters offers a simple, noninvasive, and painless approach with potential clinical utility.

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INTRODUCTION

Acute pancreatitis (AP) is an acute inflammatory process involving the pancreatic parenchyma and is associated with premature activation of pancreatic proenzymes (mainly trypsin). The most common causes of AP in children are structural anomalies, trauma, infections, biliary disease, medications, systemic diseases, and genetic etiologies[1-4]. A diagnosis of AP is established by meeting at least two of the following three criteria: (1) Acute-onset abdominal pain, especially in the epigastric region; (2) Serum amylase and/or lipase activity at least three times greater than the upper limit of normal; and (3) Characteristic imaging findings of AP[1,5].

In the course of AP, the inflammatory process may remain localized in the pancreas, spread to regional tissues, or involve distant organ systems[6]. According to the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) Pancreas Committee, the severity of pediatric AP is classified as mild, moderately severe, or severe. Mild AP is the most common form in children. It is not associated with organ failure or local or systemic complications, and usually resolves within the first week after presentation. Moderately severe AP is diagnosed when transient organ dysfunction or local (fluid collection, necrosis) or systemic (exacerbation of preexisting comorbid disease) complications occur. Severe AP is defined as the development of organ failure persisting beyond 48 hours[7].

The incidence of AP is increasing in the pediatric population worldwide[8]. Despite this more frequent presentation, the natural history of AP remains poorly understood, and no reliable predictors of progression to severe disease in children have been established[7]. In recent years, increasing focus has been given to identification of noninvasive biomarkers that could improve early diagnosis and risk stratification in AP[9-11]. In particular, urinary biomarkers have drawn interest due to their ease of collection and potential application in clinical practice[10]. Studies in adults suggest the usefulness of trypsinogens and trypsinogen activation peptide (TAP) as biomarkers in AP[11-13]. Therefore, the aim of this study was to evaluate the predictive value of urinary concentrations of cationic and anionic trypsinogen (trypsinogen-1 and trypsinogen-2), and TAP in pediatric patients with AP.

MATERIALS AND METHODS

This observational study included children with AP hospitalized at the Department of Gastroenterology of a university hospital over a 5-year period (2020-2024). The patients with AP were followed until August 2025 for the occurrence of subsequent episodes of the disease. A diagnosis of AP was established on the basis of the revised Atlanta criteria, approved by the International Study Group of Pediatric Pancreatitis: In Search for a Cure[5]. Only children during their first episode of AP were included. The study sample comprised all consecutive pediatric patients meeting the inclusion criteria who were hospitalized during the study period. Due to the relatively low incidence of AP in children, no formal sample size calculation was performed. The disease was classified as mild, moderately severe, or severe in accordance with the NASPGHAN consensus statement[7]. The control group consisted of pediatric patients with functional ab-

dominal pain. The study was approved by the Bioethics Committee of the Medical University of Bialystok (approval No. R-I-002/299/2019, dated May 30, 2019). The research was conducted in accordance with the ethical standards established in the Declaration of Helsinki. Written informed consent was obtained from the legal guardian of each patient and from children over 16 years of age.

The demographic data and information about possible etiologic factors were recorded. Urine samples from children with AP were collected at three time points: (1) At admission or within 24 hours; (2) After 48 hours; and (3) After 72 hours of hospital admission. For the control group, urine samples were obtained once, after a diagnosis of functional abdominal pain had been established. These samples were frozen at -80 °C and stored until analysis was performed. Urinary concentrations of trypsinogen-1, trypsinogen-2, and TAP were measured using an enzyme-linked immunosorbent assay (Cloud-Clone, United States). In patients with AP, the concentrations of these urinary parameters were analyzed in relation to disease severity. The predictive value of the urinary parameters for disease severity was compared with the predictive value of serum C-reactive protein (CRP). Blood samples for CRP were obtained at the same three time points: (1) At admission; (2) After 48 hours; and (3) After 72 hours. Serum CRP was determined by immunoturbidimetry (Cobas 6000-c501). All laboratory analyses were conducted in accordance with the manufacturer's instructions.

Statistical analysis

The statistical analyses were performed using Statistica software (Statsoft, Krakow, Poland, version 14.1.0.4). Categorical variables were summarized as *n* (%). Continuous data were presented as means with SD and compared between the groups using the Student's *t*-test or the Mann-Whitney *U* test, depending on normality of the distribution, as assessed by the Shapiro-Wilk test. The variables showing statistically significant associations with AP were further analyzed using the receiver operating characteristic curves to establish optimal cut-off values based on the area under the curve (AUC). The diagnostic value of these variables was further assessed using univariate logistic regression. In order to compare parameters at three time points, the Friedman test was applied. The P value < 0.05 was considered statistically significant. The statistical review of the study was performed by a biomedical statistician.

RESULTS

A total of 90 pediatric patients were enrolled in the study (median age 12 years), including 61 patients diagnosed with AP and 29 with functional abdominal pain (control group). AP was classified as mild in 49 children (80%) and as moderately severe in 12 patients (20%). No child developed persistent organ failure. In 13 patients with AP (21%), recurrent episodes occurred during the follow-up period. The etiology of the disease is shown in Figure 1.

Children with AP had higher urinary concentrations of trypsinogen-2 48 hours after admission than patients in the control group (P = 0.022). There were no statistically significant differences in urinary concentrations of trypsinogen-2 at other time points or in trypsinogen-1 or TAP levels at any time point between patients with AP and controls (Table 1).

Table 2 shows the performance of urinary trypsinogen-2 after 48 hours for AP diagnosis in children. The concentration of trypsinogen-2 after 48 hours ≥ 0.381 ng/mL predicted AP with 48.3% sensitivity and 82.8% specificity (AUC = 0.651, 95%CI: 0.535-0.767; P = 0.010).

The urinary concentrations of trypsinogen-1, trypsinogen-2, and TAP in patients with AP did not differ significantly among the three time points (Table 3).

Compared with patients with mild AP, those with moderately severe AP had higher urinary TAP concentrations after 48 hours (P = 0.043) and 72 hours (P = 0.001) of hospitalization, as well as higher serum CRP concentrations after 48 hours (P = 0.002) and 72 hours (P < 0.001). There were no statistically significant differences between disease severity and urinary trypsinogen-1 or trypsinogen-2 levels at any time point, urinary TAP levels within 24 hours, or the serum CRP concentrations at admission (Table 4).

Table 5 and Figure 2 present the assessment of urinary TAP after 48 hours and 72 hours as biomarkers of AP severity compared with serum CRP. The concentration of TAP after 48 hours ≥ 25.412 pg/mL predicted moderately severe AP with 83.3% sensitivity and 54.3% specificity (AUC = 0.692, 95%CI: 0.542-0.842; P = 0.012), while after 72 hours, a cut-off ≥ 43.844 pg/mL yielded 83.3% sensitivity and 73.9% specificity (AUC = 0.810, 95%CI: 0.692-0.928; P < 0.001).

In the univariate logistic regression analysis, urinary TAP concentrations after 72 hours [odds ratio (OR) = 1.034, 95%CI: 1.009-1.059; P = 0.007] and serum CRP concentrations after 48 hours (OR = 1.031, 95%CI: 1.012-1.050; P = 0.001) and 72 hours (OR = 1.039, 95%CI: 1.017-1.061; P = 0.001) were identified as predictors of AP severity (Table 6).

DISCUSSION

Pancreatitis is a disease entity that requires identification of the etiologic factors, early recognition, accurate diagnostic testing, appropriate risk stratification, timely intervention with optimal management during the initial presentation, and efforts to prevent the recurrence of AP or its progression to a more severe or chronic state[9]. Most cases of AP in children are mild and single-episode, with up to 30% of patients experiencing severe courses or recurrence[14-18]. The results of this study revealed that 20% of the children had moderately severe AP and that 21% experienced a subsequent episode of the disease, and this corresponds with the published data. In the present study, idiopathic pancreatitis, infections and biliary disease were among the most common etiologic factors, which is consistent with the findings of other studies[9,14,16].

Table 1 Urinary biomarkers in patients with acute pancreatitis and controls, mean ± SD

Parameter	Patients with AP (*n* = 61)	Control group (*n* = 29)	*P* value
Trypsinogen-1 within 24 hours (ng/mL)	0.91 ± 0.80	0.86 ± 0.43	0.137
Trypsinogen-1 after 48 hours (ng/mL)	0.86 ± 0.59	0.86 ± 0.43	0.384
Trypsinogen-1 after 72 hours (ng/mL)	0.79 ± 0.49	0.86 ± 0.43	0.111
Trypsinogen-2 within 24 hours (ng/mL)	0.50 ± 0.86	0.30 ± 0.12	0.117
Trypsinogen-2 after 48 hours (ng/mL)	0.64 ± 1.19	0.30 ± 0.12	0.022
Trypsinogen-2 after 72 hours (ng/mL)	0.38 ± 0.19	0.30 ± 0.12	0.144
TAP within 24 hours (pg/mL)	52.91 ± 48.60	44.70 ± 22.08	0.963
TAP after 48 hours (pg/mL)	42.21 ± 39.74	44.70 ± 22.08	0.143
TAP after 72 hours (pg/mL)	42.79 ± 28.32	44.70 ± 22.08	0.503

P < 0.05 is statistically significant. AP: Acute pancreatitis; TAP: Trypsinogen activation peptide.

Table 2 Performance of urinary trypsinogen-2 after 48 hours in acute pancreatitis

Parameter	AUC (95%CI)	Cut-off	Se (%)	Sp (%)	PPV (%)	NPV (%)	LR+	LR-	DOR	*P* value
Trypsinogen-2 after 48 hours (ng/mL)	0.651 (0.535-0.767)	0.381	48.3	82.8	84.8	44.4	2.8	0.625	4.48	0.010

P < 0.05 is statistically significant. AUC: Area under the curve; DOR: Diagnostic odds ratio; LR: Likelihood ratio; NPV: Negative predictive value; PPV: Positive predictive value; Se: Sensitivity; Sp: Specificity.

Table 3 Urinary biomarkers at three time points in acute pancreatitis, mean ± SD

Parameter	Within 24 hours	After 48 hours	After 72 hours	*P* value
Trypsinogen-1 (ng/mL)	0.91 ± 0.80	0.86 ± 0.59	0.79 ± 0.49	0.164
Trypsinogen-2 (ng/mL)	0.50 ± 0.86	0.64 ± 1.19	0.38 ± 0.19	0.670
TAP (pg/mL)	52.91 ± 48.60	42.21 ± 39.74	42.79 ± 28.32	0.504

P < 0.05 is statistically significant. TAP: Trypsinogen activation peptide.

Trypsinogen, a proenzyme synthesized in the pancreas, is activated to trypsin in the duodenum by intestinal enterokinase. During pancreatitis, both trypsinogen-1 (cationic) and trypsinogen-2 (anionic) are released into the bloodstream and subsequently filtered into the urine, with trypsinogen-2 usually reaching higher concentrations[10,19]. Recent mechanistic studies continue to emphasize the central role of pathological trypsinogen activation in the initiation and progression of pancreatitis, providing biological support for the evaluation of trypsinogen-derived biomarkers[20]. The urine trypsinogen-2 dipstick test has been presented as a useful diagnostic tool for AP in both children and adults[10,13]. In the study conducted by Yasuda *et al*[12], urinary trypsinogen-2 was shown to be a marker of extrapancreatic inflammation in AP in adults. The present study demonstrated that pediatric patients with AP had higher urinary trypsinogen-2 concentrations after 48 hours than children in the control group. However, its diagnostic performance was only moderate (AUC = 0.651, 95%CI: 0.535-0.767; diagnostic OR = 4.48), suggesting that urinary trypsinogen-2 may support the diagnosis of pediatric AP, particularly as a noninvasive biomarker, although it should be interpreted in conjunction with clinical findings and standard biochemical parameters.

Predicting the severity of AP in children is challenging because there is no universally accepted pediatric-specific scoring system[21]. The Pediatric Acute Pancreatitis Severity Score, proposed by the Midwest Multicenter Pancreatic Study Group in 2002, was the first predictive tool designed specifically for children. It included eight parameters: (1) Age; (2) Weight; (3) White blood cell count; (4) Lactate dehydrogenase; (5) Calcium; (6) Albumin; (7) Fluid sequestration; and (8) Rise in blood urea nitrogen[17,18]. However, its sensitivity and negative predictive values have varied among studies [16,17,21,22]. Therefore, numerous laboratory parameters have been assessed as potential indicators of AP severity[23-27]. Recent pediatric research has highlighted the need for reliable biomarkers that could enhance early risk stratification and guide clinical management in children with AP[9].

Table 4 Biomarkers in mild and moderately severe acute pancreatitis, mean ± SD

Parameter	Mild AP (*n* = 49)	Moderately severe AP (*n* = 12)	*P* value
Trypsinogen-1 within 24 hours (ng/mL)	0.86 ± 0.75	1.09 ± 1.00	0.973
Trypsinogen-1 after 48 hours (ng/mL)	0.85 ± 0.51	0.89 ± 0.85	0.484
Trypsinogen-1 after 72 hours (ng/mL)	0.82 ± 0.52	0.66 ± 0.35	0.411
Trypsinogen-2 within 24 hours (ng/mL)	0.52 ± 0.95	0.43 ± 0.15	0.256
Trypsinogen-2 after 48 hours (ng/mL)	0.70 ± 1.33	0.44 ± 0.28	0.803
Trypsinogen-2 after 72 hours (ng/mL)	0.37 ± 0.18	0.41 ± 0.24	0.632
TAP within 24 hours (pg/mL)	55.27 ± 52.30	42.25 ± 25.42	0.608
TAP after 48 hours (pg/mL)	37.84 ± 35.60	58.94 ± 51.11	0.043
TAP after 72 hours (pg/mL)	37.11 ± 26.81	64.58 ± 23.76	0.001
CRP at admission (mg/L)	12.41 ± 25.37	25.45 ± 50.61	0.468
CRP after 48 hours (mg/L)	16.54 ± 25.06	65.84 ± 54.73	0.002
CRP after 72 hours (mg/L)	18.53 ± 23.99	105.90 ± 83.61	< 0.001

$P < 0.05$ is statistically significant. AP: Acute pancreatitis; CRP: C-reactive protein; TAP: Trypsinogen activation peptide.

Table 5 Performance of biomarkers in predicting acute pancreatitis severity

Parameter	AUC (95%CI)	Cut-off	Se (%)	Sp (%)	PPV (%)	NPV (%)	LR+	LR-	DOR	*P* value
TAP after 48 hours (pg/mL)	0.692 (0.542-0.842)	25.412	83.3	54.3	32.3	92.6	1.825	0.307	5.945	0.012
TAP after 72 hours (pg/mL)	0.810 (0.692-0.928)	43.844	83.3	73.9	45.5	94.4	3.194	0.225	14.196	< 0.001
CRP after 48 hours (mg/L)	0.794 (0.642-0.946)	21.900	75.0	79.6	47.4	92.9	3.675	0.314	11.704	< 0.001
CRP after 72 hours (mg/L)	0.857 (0.717-0.998)	60.890	75.0	89.8	64.3	93.6	7.350	0.278	26.439	< 0.001

$P < 0.05$ is statistically significant. AUC: Area under the curve; CRP: C-reactive protein; DOR: Diagnostic odds ratio; LR: Likelihood ratio; NPV: Negative predictive value; PPV: Positive predictive value; Se: Sensitivity; Sp: Specificity; TAP: Trypsinogen activation peptide.

Table 6 Univariate logistic regression for predictors of acute pancreatitis severity

Parameter	OR	95%CI (OR)	*P* value
TAP after 48 hours	1.012	0.997-1.027	0.118
TAP after 72 hours	1.034	1.009-1.059	0.007
CRP after 48 hours	1.031	1.012-1.050	0.001
CRP after 72 hours	1.039	1.017-1.061	0.001

$P < 0.05$ is statistically significant. CRP: C-reactive protein; OR: Odds ratio; TAP: Trypsinogen activation peptide.

Urinary TAP has been evaluated as a marker of AP severity in adults[13,28-31]. The measurement of TAP for severity assessment is appealing, as the activation of trypsinogen to trypsin, resulting in TAP release, occurs prior to all other systemic and clinical manifestations of severe AP[28,29]. In the present study, urinary TAP measured after 48 hours and 72 hours was demonstrated to be a predictor of AP severity in pediatric patients, with TAP after 72 hours showing good discriminatory ability (AUC = 0.810, 95%CI: 0.692-0.928; diagnostic OR = 14.196). In the study conducted by Neoptolemos *et al*[28], the TAP concentrations differed significantly between patients with AP and controls after symptom onset and between mild and severe pancreatitis over time. The differences between mild and severe pancreatitis were significant at 24 hours and 48 hours, but not between mild pancreatitis and the control group[28]. Lempinen *et al*[13] reported that

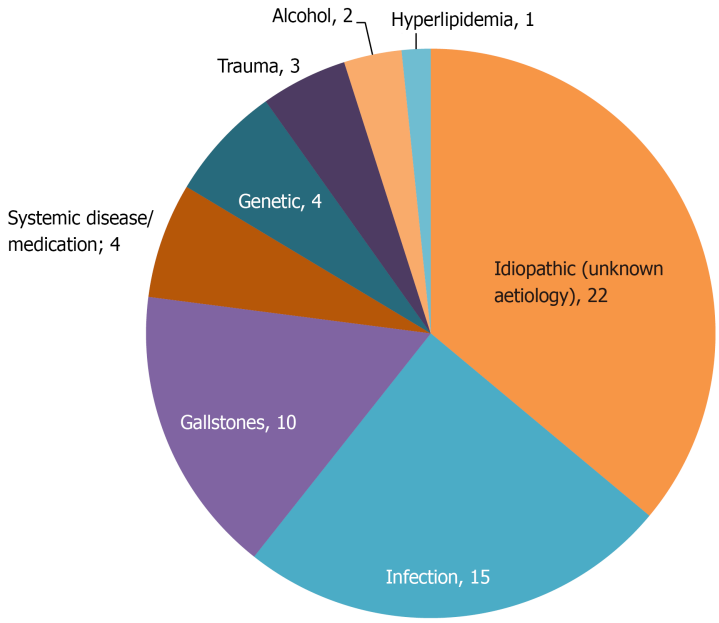

Figure 1 Etiology of acute pancreatitis in the study group. Bars represent the number of patients in each etiological category.

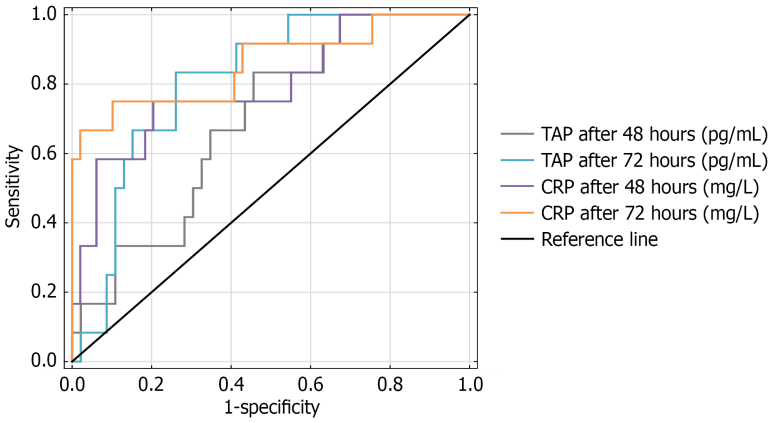

Figure 2 Receiver operating characteristic curves showing the diagnostic performance of urinary trypsinogen activation peptide and serum C-reactive protein concentrations in predicting moderately severe acute pancreatitis. Area under the curve values are presented in Table 5. All receiver operating characteristic analyses reached statistical significance ($P < 0.05$). CRP: C-reactive protein; TAP: Trypsinogen activation peptide.

during the early phase of AP, TAP correlated with disease severity in both plasma and urine, but there was no difference between controls and patients with mild AP. In this study, there was no statistically significant difference in urinary TAP concentrations between children with AP and those in the control group, most likely because the number of patients with mild pancreatitis was much greater than that with moderately severe or severe AP. Moreover, there was no significant difference between disease severity and urinary TAP concentrations within 24 hours, perhaps due to the fact that parents are more likely to bring their children to the emergency department soon after symptom onset, whereas adults often delay presentation.

Additionally, in the present study, the predictive value of urinary TAP for disease severity was compared with that of serum CRP. For a disorder such as AP, a useful prognostic assay should have high negative predictive value for severe disease, enabling most patients with mild disease to be managed in low-cost wards[28]. This study demonstrated better diagnostic performance of TAP after 72 hours than after 48 hours, similar to CRP. Generally, the performance of TAP was slightly worse than that of CRP (AUC after 48 hours = 0.692 *vs* 0.794; AUC after 72 hours = 0.810 *vs* 0.857; with TAP after 48 hours failing to reach significance as a predictor of AP severity in univariate logistic regression). On the other hand, in the study conducted by Neoptolemos *et al*[28], the AUC values for urinary TAP were greater than those for CRP. Notably, in this study the highest negative predictive value (94.4%) was observed for urinary TAP after 72 hours, suggesting that this biomarker may help identify children at low risk of developing severe disease. Information like this could potentially support clinical decision-making and assist in the appropriate allocation of healthcare resources.

To the best of our knowledge, this study is the first to evaluate the predictive value of urinary trypsinogen-1, trypsinogen-2, and TAP concentrations in pediatric patients with AP. Another strength of the present research is the use of AP classification on the basis of the NASPGHAN consensus statement[7] and its prospective design. In addition, the analysis of urinary parameters represents a noninvasive and painless method. This may be particularly relevant in pediatric populations, where repeated blood sampling can be challenging. Moreover, various biomarkers may be more reliable in children because, unlike adults, they typically do not have multiple comorbidities. There are several limitations to this study. First, owing to its single-center design and the relatively rare occurrence of pancreatic complications and organ failure in children with AP, the study group was relatively small, particularly for severe cases. There were only patients with moderately severe disease, and no child with severe AP. Therefore, the generalizability of the results is limited, and assessment of the biomarkers in the most severe forms of the disease was restricted. Additionally, no formal sample size calculation was performed. Furthermore, the urinary parameters assessed in this study cannot be utilized upon hospital admission, and their performance in predicting AP severity was slightly worse than that of CRP.

The present observational study contributes additional evidence regarding the potential role of urinary biomarkers in children with AP. Recent advances in urine proteomics have underscored the diagnostic potential of noninvasive markers in pediatric pancreatitis[32]. Akshintala *et al*[32] identified several novel urine protein candidates that may improve diagnosis accuracy, supporting the concept that the use of noninvasive biomarkers may shorten diagnostic time and reduce healthcare costs. Further multicenter research with larger populations is needed to determine the precise roles of urinary trypsinogen-1, trypsinogen-2, and TAP in pediatric AP, and to establish whether urinary biomarkers could be incorporated into clinical prediction models for the disease.

CONCLUSION

Urinary trypsinogen-2 may serve as a noninvasive biomarker of AP, whereas urinary TAP may indicate disease severity in children, although within specific time windows. Determination of these urinary parameters is promising and may facilitate diagnosis and prediction of AP severity; therefore, further studies are warranted. Future research should focus on integrating urinary biomarkers with clinical and laboratory parameters to develop predictive models for severity assessment in pediatric AP.

REFERENCES

1 **Párniczky A**, Abu-El-Haija M, Husain S, Lowe M, Oracz G, Sahin-Tóth M, Szabó FK, Uc A, Wilschanski M, Witt H, Czakó L, Grammatikopoulos T, Rasmussen IC, Sutton R, Hegyi P. EPC/HPSG evidence-based guidelines for the management of pediatric pancreatitis. *Pancreatology* 2018; **18**: 146-160 [*RCA*] [PMID: 29398347 DOI: 10.1016/j.pan.2018.01.001] [FullText]

2 **Kopiczko N**, Kwiatek-Średzińska K, Uścinowicz M, Kowalczuk-Krystoń M, Lebensztejn DM. SARS-CoV-2 Infection as a Cause of Acute Pancreatitis in a Child-A Case Report. *Pediatr Rep* 2021; **13**: 552-557 [*RCA*] [PMID: 34698241 DOI: 10.3390/pediatric13040065] [FullText] [Full Text(PDF)]

3 **Daniluk U**, Krawiec P, Pac-Kożuchowska E, Dembiński Ł, Bukowski JS, Banaszkiewicz A, Woźniuk-Kaźmierczak A, Czkwianianc E, Brylak J, Walkowiak J, Borys-Iwanicka A, Kofla-Dłubacz A, Pytrus T, Zdanowicz K, Lebensztejn DM. Pancreatic Involvement in the Course of Inflammatory Bowel Disease in Children-A Multi-Center Study. *J Clin Med* 2023; **12**: 4174 [*RCA*] [PMID: 37445210 DOI: 10.3390/jcm12134174] [FullText]

4 **Jakimiec P**, Zdanowicz K, Kwiatek-Sredzinska K, Filimoniuk A, Lebensztejn D, Daniluk U. Pancreatic Disorders in Children with Inflammatory Bowel Disease. *Medicina (Kaunas)* 2021; **57**: 473 [*RCA*] [PMID: 34064706 DOI: 10.3390/medicina57050473] [FullText] [Full Text(PDF)]

5 **Morinville VD**, Husain SZ, Bai H, Barth B, Alhosh R, Durie PR, Freedman SD, Himes R, Lowe ME, Pohl J, Werlin S, Wilschanski M, Uc A; INSPPIRE Group. Definitions of pediatric pancreatitis and survey of present clinical practices. *J Pediatr Gastroenterol Nutr* 2012; **55**: 261-265 [*RCA*] [PMID: 22357117 DOI: 10.1097/MPG.0b013e31824f1516] [FullText]

6 **Bradley EL 3rd**. A clinically based classification system for acute pancreatitis. Summary of the International Symposium on Acute Pancreatitis, Atlanta, Ga, September 11 through 13, 1992. *Arch Surg* 1993; **128**: 586-590 [*RCA*] [PMID: 8489394 DOI: 10.1001/archsurg.1993.01420170122019] [FullText]

7 **Abu-El-Haija M**, Kumar S, Szabo F, Werlin S, Conwell D, Banks P, Morinville VD; NASPGHAN Pancreas Committee. Classification of Acute Pancreatitis in the Pediatric Population: Clinical Report From the NASPGHAN Pancreas Committee. *J Pediatr Gastroenterol Nutr* 2017; **64**: 984-990 [*RCA*] [PMID: 28333771 DOI: 10.1097/MPG.0000000000001583] [FullText]

8 **Pant C**, Deshpande A, Olyaee M, Anderson MP, Bitar A, Steele MI, Bass PF 3rd, Sferra TJ. Epidemiology of acute pancreatitis in hospitalized children in the United States from 2000-2009. *PLoS One* 2014; **9**: e95552 [*RCA*] [PMID: 24805879 DOI: 10.1371/journal.pone.0095552] [Full Text] [Full Text(PDF)]

9 **Ahmed F**, Abu-El-Haija M. Acute Pancreatitis in Children: It's Not Just a Simple Attack. *Gastroenterology* 2025; **169**: 572-584 [*RCA*] [PMID: 40228704 DOI: 10.1053/j.gastro.2025.04.001] [FullText] [Full Text(PDF)]

10 **Orgad T**, Abu-Rahma I, Rekhtman D, Hashavya S, Milman P, Slae M, Davidovics Z, Wilschanski M, Birimberg-Schwartz L. Utility of a noninvasive urine-based test for diagnosing acute pancreatitis in children. *J Pediatr Gastroenterol Nutr* 2025; **81**: 683-689 [*RCA*] [PMID: 40528341 DOI: 10.1002/jpn3.70119] [FullText]

11 **Allemann A**, Staubli SM, Nebiker CA. Trypsin and Trypsinogen Activation Peptide in the Prediction of Severity of Acute Pancreatitis. *Life (Basel)* 2024; **14**: 1055 [*RCA*] [PMID: 39337841 DOI: 10.3390/life14091055] [FullText]

12 **Yasuda H**, Kataoka K, Takeyama Y, Takeda K, Ito T, Mayumi T, Isaji S, Mine T, Kitagawa M, Kiriyama S, Sakagami J, Masamune A, Inui K, Hirano K, Akashi R, Yokoe M, Sogame Y, Okazaki K, Morioka C, Kihara Y, Kawa S, Tanaka M, Andoh A, Kimura W, Nishimori I, Furuse

J, Yokota I, Shimosegawa T. Usefulness of urinary trypsinogen-2 and trypsinogen activation peptide in acute pancreatitis: A multicenter study in Japan. *World J Gastroenterol* 2019; **25**: 107-117 [*RCA*] [PMID: 30643362 DOI: 10.3748/wjg.v25.i1.107] [FullText] [Full Text(PDF)]

13 **Lempinen M**, Stenman UH, Puolakkainen P, Hietaranta A, Haapiainen R, Kemppainen E. Sequential changes in pancreatic markers in acute pancreatitis. *Scand J Gastroenterol* 2003; **38**: 666-675 [*RCA*] [PMID: 12825877 DOI: 10.1080/00365520310000357] [FullText]

14 **Kwiatek-Średzińska K**, Kiryłowska M, Uścinowicz M, Daniluk U, Lebensztejn D. The course of acute pancreatitis in children and potential simple laboratory markers of severity - A single Centre retrospective study. *Acta Paediatr* 2022; **111**: 2229-2234 [*RCA*] [PMID: 35960175 DOI: 10.1111/apa.16514] [FullText]

15 **Coffey MJ**, Nightingale S, Ooi CY. Serum lipase as an early predictor of severity in pediatric acute pancreatitis. *J Pediatr Gastroenterol Nutr* 2013; **56**: 602-608 [*RCA*] [PMID: 23403441 DOI: 10.1097/MPG.0b013e31828b36d8] [FullText]

16 **Lautz TB**, Chin AC, Radhakrishnan J. Acute pancreatitis in children: spectrum of disease and predictors of severity. *J Pediatr Surg* 2011; **46**: 1144-1149 [*RCA*] [PMID: 21683213 DOI: 10.1016/j.jpedsurg.2011.03.044] [FullText]

17 **DeBanto JR**, Goday PS, Pedroso MR, Iftikhar R, Fazel A, Nayyar S, Conwell DL, Demeo MT, Burton FR, Whitcomb DC, Ulrich CD 2nd, Gates LK Jr; Midwest Multicenter Pancreatic Study Group. Acute pancreatitis in children. *Am J Gastroenterol* 2002; **97**: 1726-1731 [*RCA*] [PMID: 12135026 DOI: 10.1111/j.1572-0241.2002.05833.x] [FullText]

18 **Szabo FK**, Hornung L, Oparaji JA, Alhosh R, Husain SZ, Liu QY, Palermo J, Lin TK, Nathan JD, Podberesky DJ, Lowe M, Fei L, Abu-El-Haija M. A prognostic tool to predict severe acute pancreatitis in pediatrics. *Pancreatology* 2016; **16**: 358-364 [*RCA*] [PMID: 27051062 DOI: 10.1016/j.pan.2016.03.002] [FullText]

19 **Hedström J**, Sainio V, Kemppainen E, Puolakkainen P, Haapiainen R, Kivilaakso E, Schauman KO, Stenman UH. Urine trypsinogen-2 as marker of acute pancreatitis. *Clin Chem* 1996; **42**: 685-690 [*RCA*] [PMID: 8653892]

20 **Geisz-Fremy A**. Pathologically relevant trypsinogen activation in pancreatitis. *Am J Physiol Gastrointest Liver Physiol* 2026; **330**: G87-G97 [*RCA*] [PMID: 41412572 DOI: 10.1152/ajpgi.00152.2025] [FullText] [Full Text(PDF)]

21 **Fabre A**, Petit P, Gaudart J, Mas E, Vial J, Olives JP, Sarles J. Severity scores in children with acute pancreatitis. *J Pediatr Gastroenterol Nutr* 2012; **55**: 266-267 [*RCA*] [PMID: 22437470 DOI: 10.1097/MPG.0b013e318254c1c7] [FullText]

22 **Suzuki M**, Fujii T, Takahiro K, Ohtsuka Y, Nagata S, Shimizu T. Scoring system for the severity of acute pancreatitis in children. *Pancreas* 2008; **37**: 222-223 [*RCA*] [PMID: 18665087 DOI: 10.1097/MPA.0b013e31816618e1] [FullText]

23 **Nauka PC**, Weinstein TA, Dolinger MT, Miller JM, Kohn N, Bitton S, Rilo HLR. Validation of Lipase and Systemic Inflammatory Response Syndrome as Prognostic Indicators in Pediatric Acute Pancreatitis: A Retrospective Analysis. *J Pediatr Gastroenterol Nutr* 2019; **68**: 389-393 [*RCA*] [PMID: 30540708 DOI: 10.1097/MPG.0000000000002217] [FullText]

24 **Izquierdo YE**, Fonseca EV, Moreno LÁ, Montoya RD, Guerrero R. Multivariate Model for the Prediction of Severity of Acute Pancreatitis in Children. *J Pediatr Gastroenterol Nutr* 2018; **66**: 949-952 [*RCA*] [PMID: 29601435 DOI: 10.1097/MPG.0000000000001983] [FullText]

25 **Walker H**, Melling J, Jones M, Melling CV. C-reactive protein accurately predicts severity of acute pancreatitis in children. *J Pediatr Surg* 2022; **57**: 759-764 [*RCA*] [PMID: 34493377 DOI: 10.1016/j.jpedsurg.2021.08.007] [FullText]

26 **van den Berg FF**, de Bruijn AC, van Santvoort HC, Issa Y, Boermeester MA. Early laboratory biomarkers for severity in acute pancreatitis; A systematic review and meta-analysis. *Pancreatology* 2020; **20**: 1302-1311 [*RCA*] [PMID: 32938552 DOI: 10.1016/j.pan.2020.09.007] [Full Text]

27 **Vitale DS**, Lahni P, Hornung L, Thompson T, Farrell PR, Lin TK, Nathan JD, Wong HR, Abu-El-Haija M. Matrix metalloproteinases and their inhibitors in pediatric severe acute pancreatitis. *PLoS One* 2022; **17**: e0261708 [*RCA*] [PMID: 35157709 DOI: 10.1371/journal.pone.0261708] [FullText] [Full Text(PDF)]

28 **Neoptolemos JP**, Kemppainen EA, Mayer JM, Fitzpatrick JM, Raraty MG, Slavin J, Beger HG, Hietaranta AJ, Puolakkainen PA. Early prediction of severity in acute pancreatitis by urinary trypsinogen activation peptide: a multicentre study. *Lancet* 2000; **355**: 1955-1960 [*RCA*] [PMID: 10859041 DOI: 10.1016/s0140-6736(00)02327-8] [FullText]

29 **Gudgeon AM**, Heath DI, Hurley P, Jehanli A, Patel G, Wilson C, Shenkin A, Austen BM, Imrie CW, Hermon-Taylor J. Trypsinogen activation peptides assay in the early prediction of severity of acute pancreatitis. *Lancet* 1990; **335**: 4-8 [*RCA*] [PMID: 1967341 DOI: 10.1016/0140-6736(90)90135-r] [FullText]

30 **Johnson CD**, Lempinen M, Imrie CW, Puolakkainen P, Kemppainen E, Carter R, McKay C. Urinary trypsinogen activation peptide as a marker of severe acute pancreatitis. *Br J Surg* 2004; **91**: 1027-1033 [*RCA*] [PMID: 15286966 DOI: 10.1002/bjs.4612] [FullText]

31 **Huang W**, Altaf K, Jin T, Xiong JJ, Wen L, Javed MA, Johnstone M, Xue P, Halloran CM, Xia Q. Prediction of the severity of acute pancreatitis on admission by urinary trypsinogen activation peptide: a meta-analysis. *World J Gastroenterol* 2013; **19**: 4607-4615 [*RCA*] [PMID: 23901239 DOI: 10.3748/wjg.v19.i28.4607] [FullText] [Full Text(PDF)]

32 **Akshintala VS**, Moore MG, Cruz-Monserrate Z, Nathan JD, Searle BC, Abu-El-Haija M. Urine Proteomics Profiling Identifies Novel Acute Pancreatitis Diagnostic Biomarkers in a Pediatric Population. *Gastroenterology* 2024; **167**: 1019-1021.e2 [*RCA*] [PMID: 38797238 DOI: 10.1053/j.gastro.2024.05.015] [FullText] [Full Text(PDF)]

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