

Association, Clinical and Biochemical Profile of Pediatric Acute Pancreatitis in a Tertiary care hospital of Bangladesh

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Abstract

Original Research Article

Background: Acute pancreatitis in children typically presents differently and has a different course than in adults.

Objective: To evaluate the association, clinical profile & biochemical evidence of childhood acute pancreatitis.

Method: This cross-sectional study was done in the Department of Pediatrics Dhaka Medical College Hospital, Dhaka, Bangladesh during January 2019 to July 2022. Total 65 children below 12 year of age having diagnostic criteria of acute pancreatitis made by INSPPIRE group were included in this study. **Results:** Children examined had a mean age of 8.1 3.2 years, with 35 (53.8%) being boys. The majority of patients presented with abdominal discomfort. The epigastric area was the most prevalent site of discomfort (82%), affecting 55 people (84.6%). Before being admitted, the average patient had been in agony for 3.4 2.2 days. Fifty (76.0%) patients presented with vomiting, 22 (33.8%) cases presented with fever, 5.7 (7.7%) cases presented with shock, and 3.4 (4.6%) cases presented with melena. Leukocytosis was detected in 32% of patients, whereas elevated blood lipase and amylase levels were found in 89% and 72% of patients, respectively, according to laboratory testing. We detected biochemical abnormalities including hypokalemia (8, or 12.3%), elevated ALT (6, 9.2%), hypocalcemia (5, or 7.7%), and elevated triglycerides (3, 4.6%). In 40 (61.5%) individuals, positive ultrasonographic results were seen. Four patients (6.2%) had pancreatic pseudocysts, while three patients (4.6%) had pancreatic necrosis. Acute pancreatitis occurred for no apparent reason in 36 people (55.4%). Five patients (7.7%) had biliary sludge, four (6.2%) had biliary ascariasis, four (6.2%) had a choledochal cyst, three (4.6%) had Henoch-Schönlein purpura, and three (4.6%) had hepatitis caused by drugs (valproic acid/L-asparaginase). **Conclusion:** Epigastric pain was shown to be the most prevalent symptom of acute pancreatitis in youngsters. This was usually due to an unknown reason. An elevated serum amylase or lipase level, as well as an abdominal ultrasound, were helpful early diagnostic tools for acute pancreatitis.

Keywords: Acute pancreatitis, children, clinical profile, etiology.

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INTRODUCTION

Histological evidence of inflammation inside the pancreatic parenchyma is required for a diagnosis of acute pancreatitis. Interstitial edema, inflammatory cell infiltration, and varying degrees of cell apoptosis, necrosis, and hemorrhage are all hallmarks of this reversible process [1]. While adults still make up the majority of those diagnosed with acute pancreatitis, this condition has been on the rise among youngsters over the last several decades. The rate of sickness in children

is similar to that in adults, with 3.6 to 13.2 cases per 100,000 people per year [2].

An increase in the number of cases diagnosed as pancreatitis may be traced to an uptick in biochemical testing for the disease among doctors. Even infants² may get acute pancreatitis.

Most occurrences of AP in adults may be traced back to gallstones and alcohol use [3]. However,

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unlike in adults, the causes of acute pancreatitis in children may range widely. Acute pancreatitis in children has a wide variety of root causes, including biliary, drug, idiopathic, systemic illness, trauma, infection, metabolic, and genetic factors [2].

Despite the lack of classic symptoms, a strong index of suspicion is warranted for a diagnosis of acute pancreatitis in children due to the variability in the disease's presentation. The epigastric area is the most prevalent site of discomfort in children with acute pancreatitis (80%-95% of the time). Nausea and vomiting make about 40–80% of all cases. Around a quarter to almost half of individuals have abdominal bloating. In addition to these, you may also have a high body temperature, jaundice, abdominal or lung fluid accumulation (called ascites or pleural effusion), or all four. There may also be a mass in the abdomen that may be felt. Finally, the INSPPIRE (International Study Group of Pediatric Pancreatitis: Between quest for a cure) meeting in December 2010 and May 2011 reached agreement on the following three criteria as being necessary for the diagnosis of acute pancreatitis: 1) Abdominal pain of abrupt onset, particularly in the epigastric area, which is suggestive or consistent with acute pancreatitis; 2) Serum amylase and/or lipase activity at least 3 times more than upper limit of normal; and 3) Imaging abnormalities associated with acute pancreatitis. Acute pancreatitis therapy focuses on restoring fluid and electrolyte balance, decreasing inflammation, and alleviating discomfort. Acute pancreatitis is a life-threatening condition that may be severely impacted by a delayed diagnosis, making it imperative that this condition be diagnosed as soon as possible. However, we do not know the true scope of the problem when it comes to pediatric acute pancreatitis in Bangladesh. Therefore, the purpose of this research is to assess the typical manifestations of acute pancreatitis in children presenting to a tertiary care hospital in Bangladesh.

OBJECTIVE

To evaluate the association, clinical profile & biochemical evidence of childhood acute pancreatitis.

METHODOLOGY

This cross-sectional study was done in the Department of Pediatrics Dhaka Medical College Hospital, Dhaka, Bangladesh during January 2019 to July 2022. Total 65 children below 12 year of age having diagnostic criteria of acute pancreatitis made by INSPPIRE group were included in this study.

Children were included if they fulfilled any two of the following three criteria: 1) Abdominal pain suggestive of, or compatible with acute pancreatitis (abdominal pain of acute onset, especially in the

epigastric region get relieved on leaning forward), 2) Serum amylase and/ or lipase level greater than at least three times of the upper limit of normal, 3) Imaging like USG, CT scan or MRCP findings characteristic of, or compatible with acute pancreatitis. Children were excluded if they had any one of the following: 1) children having chronic pancreatitis, 2) Abdominal pain due to any surgical causes, 3) unwilling to give consent.

RESULTS

Table-1 shows demographic status of the patients where the mean age of studied children was 8.1 ± 3.2 year and 35(53.8%) were male. The following table is given below in detail:

Table-1: Demographic status of the patients

Variable	Mean±SD
Age	8.1 ± 3.2 year
Gender	N, %
Male	35(53.8%)
Female	30(46.2%)

Table-2 shows clinical profile of the patients where abdominal pain was the most common presenting feature 55(84.6%). Mean duration of pain was 3.4 ± 2.2 days before admission. Vomiting was present in 50(76.9%) cases, fever 22(33.8%) cases, 5(7.7%) cases presented with shock and 3(4.6%) cases had melena.

Table-2: Clinical profile of the patients

Clinical profile	N, %
Abdominal pain	55(84.6%)
Vomiting	50(76.9%)
Fever	22(33.8%)
Septic Shock	5(7.7%)
Melena	3(4.6%)
Jaundice	2(3.08%)
Epigastric tenderness	2(3.08%)

*multiple response were noted.

Table-3 shows location of abdominal pains where epigastric region was the common location of pain (82%). The following table is given below in detail:

Table-3: Location of abdominal pain

Location of abdominal pain	%
Epigastric region	53(82%)
Diffuse	9(13.84%)
Other	3(4.16%)

Figure-1 shows laboratory findings of the patients where laboratory tests showed leukocytosis in 32% patients, high serum lipase and amylase level in 89% and 72% patients respectively. The following figure is given below in detail:

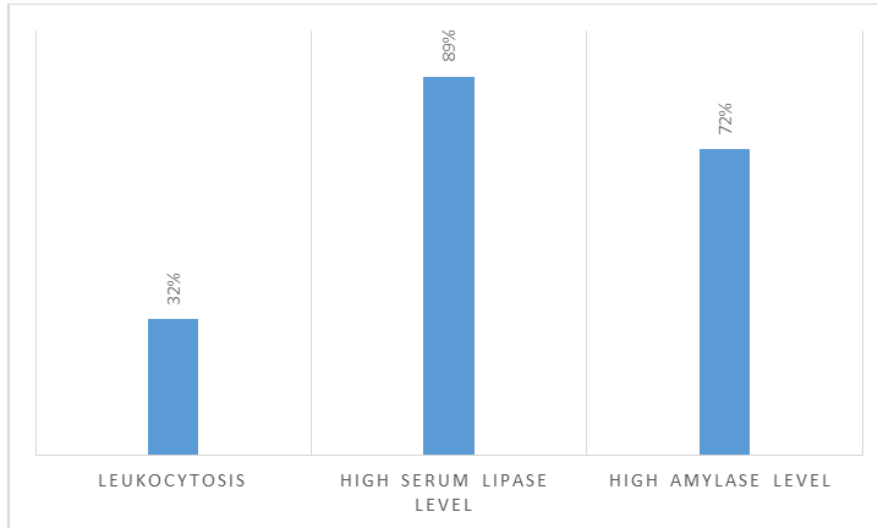


Figure-1: Laboratory findings of the patients

Figure-2 shows biochemical findings of the patients where hypokalemia (8, or 12.3%), elevated

ALT (6, 9.2%), hypocalcemia (5, or 7.7%), and elevated triglycerides (3, 4.6%).

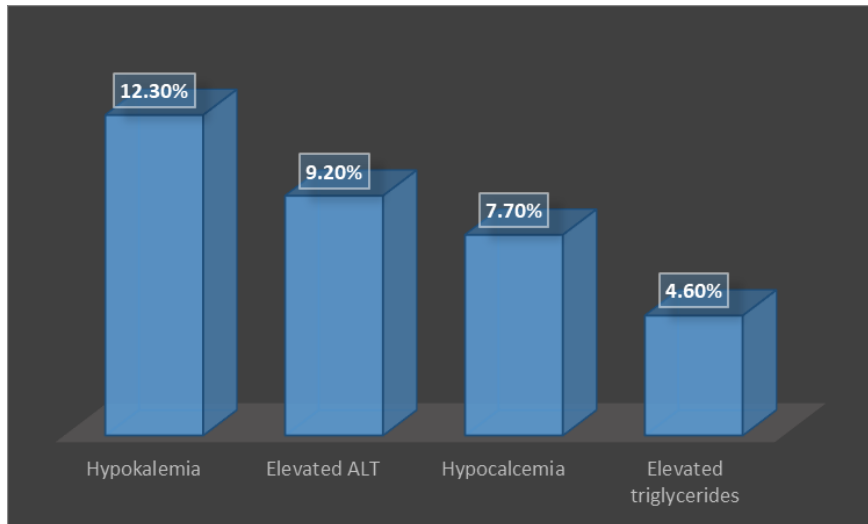


Figure-2: Biochemical findings

Table-4 shows ultrasonogram findings where 61.5% had positive cases. Followed by five patients

(7.7%) had biliary sludge, four (6.2%) had biliary ascariasis, four (6.2%) had a choledochal cyst.

Table-4: Ultrasonogram findings

Ultrasonogram findings	N,%
Positive	40(61.5%)
Pancreatic pseudocyst	4(6.2%)
pancreatic necrosis	3(4.6%)
Biliary sludge	5(7.7%)
biliary ascariasis	4(6.2%)
choledochal cyst	4(6.2%)

Figure-3 shows etiology of acute pancreatitis where most of the cause of acute pancreatitis was idiopathic 36(55.4%). Henoch-Schönlein purpura

3(4.6%) and drug induced (Valproic acid/L-asparaginase). The following figure is given below in detail:

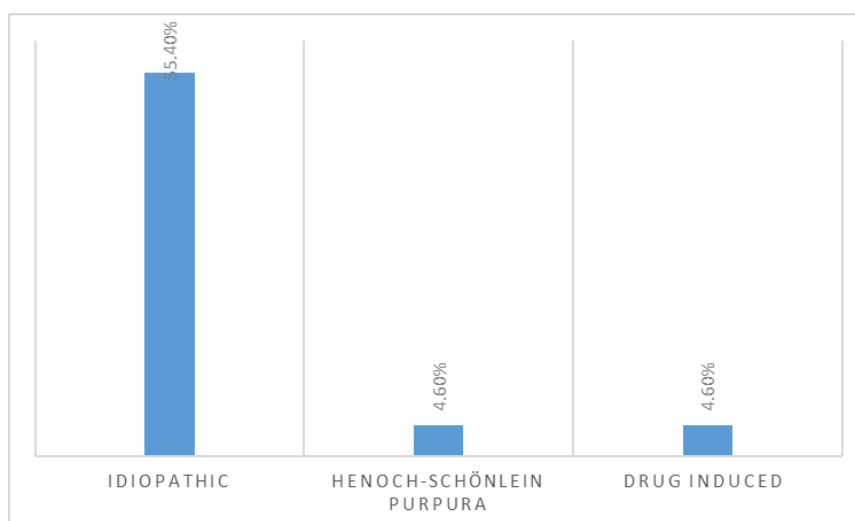


Figure-3: Etiology of acute pancreatic

DISCUSSION

Usually acute pancreatitis can affect all age groups, but it is more common in mean age of studied children was 8.1 ± 3.2 year. The lowest age at presentation was 19 months. No case was observed in infant under the age of one year. In a large study with 279 cases of acute pancreatitis conducted by Nydegger *et al.*, found some different scenarios. They demonstrated that in their study 43.7% cases were in 10-15 year age group, 31.9% cases in 5-10 year group and 24.4% were under 5 year age group. In the present study, 45% patients were female. Henedina *et al.*, also found in their study that 59.5% patients were female [7].

The diagnosis of acute pancreatitis can be made with reasonable certainty on the basis of clinical, radiological and laboratory findings. An overwhelming majority of patients of the present study presented with abdominal pain was the most common presenting feature 55(84.6%). Mean duration of pain was 3.4 ± 2.2 days before admission. Vomiting was present in 50(76.9%) cases, fever 22(33.8%) cases, 5(7.7%) cases presented with shock and 3(4.6%) cases had melena. Epigastric region was the common location of pain (82%). leukocytosis in 32% patients, high serum lipase and amylase level in 89% and 72% patients respectively.

Similar study was conducted by Henedina *et al.*, which showed abdominal pain was the most common presenting symptom in children occurring in 97.3% of cases and the most common location of pain was as follows : epigastric (70.3%) and diffuse (27%). In about 13.5% of cases pain radiated to back. Vomiting was present in 45.9% of cases followed by fever (10.8%). Other symptoms such as jaundice and palpable mass were present respectively in 8.1% and 5.4% of cases. Regarding the diagnostic biochemical evaluation, serum amylase and lipase are the most common serum

assays employed for the diagnosis of acute pancreatitis in children [10] According to final consensus meeting by INSPPIRE, serum amylase and lipase activity three times greater than upper limit of normal is considered significant for diagnosis of acute pancreatitis. In this study, serum amylase and lipase level were determined in all patients and amylase level more than 3 fold was discovered in 56% of patients. Serum lipase level was found to be elevated in patients. Median amylase level was 500 U/L (range 44-6013 U/L) and median lipase level was 1045 U/L (range 23-7148 U/L). This is comparable to findings of other studies [11, 12]. Park *et al.*, found in their study that 50% patients had serum amylase value more than 3 times upper limit of normal and 73% patients had elevated lipase value [11]. Werlin *et al.*, found serum amylase $>3x$ normal in 83% of cases and lipase $>3x$ normal in 82% of cases [12].

In that study, median amylase was 485 U/L and median lipase was 1841 U/L. In the current study, correlation between serum amylase, serum lipase level and day at presentation of studied subjects were also observed. In acute pancreatitis, serum amylase level starts increasing from two to twelve hours after onset of symptoms and peak at 12 to 72 hours and usually returns to normal within 1 week [13]. On the other hand, serum lipase level increases within 4 to 8 hours of onset of symptoms and peak at about 24 hours and level decreases within 8 to 14 days [13].

In this study, it was also found that serum amylase level was elevated in patients who came on 1st day of presentation and normal who came after 7th day of presentation. But serum lipase level remained elevated who came within 1st 5th day of presentation and found normal who came after 14th day of presentation. Regarding other laboratory investigations, it was found that haematocrit values were within normal range in all patients, total WBC count was elevated in 28% patients. An abdominal ultrasound examination is a useful tool for diagnosis and evaluation of causes of

pancreatitis. Its efficacy in diagnosing pancreatitis has been reported in 79.4% cases.

In the current study, USG was found effective in detecting pancreatitis in 61.5% cases. Apart from USG which was carried out in all patients, imaging techniques, such as computed tomography were performed in 14 patients in whom pancreas were not visualized on USG, showing evidence of pancreatitis in 78.6% of them. Thus it is suggested that CT scan should be advised for diagnosis of pancreatitis in clinically suggestive patients when abdominal ultrasound results are not clear.

Perk *et al.*, observed, in their retrospective study among 236 patients with acute pancreatitis, that 82% cases underwent radiographic evaluation to establish a diagnosis or find out etiology such as common bile duct stone [11]. Though MRCP is not routinely done in acute pancreatitis, but in this study MRCP was done in 4 patients according to opinion of hepatobiliary surgeon and all of them showed abnormal findings. In children, only a small percentage of patients were reported to have severe complications as opposed to adults. Fewer than 6% of children developed pancreatic necrosis [1]. Pseudocysts occurred in 10-20% of cases [1]. In this study, only 6% patients had pseudocyst and pancreatic necrosis was observed in 2% cases. Hypocalcemia was found in 38% patients. Although transient hyperglycemia (50-70%) is not uncommon in acute pancreatitis, permanent diabetes mellitus is exceedingly rare in children [1]. In this study no patient presented with hyperglycemia.

CONCLUSION

There seems to be an increase in the incidence of acute pancreatitis among young people. Abdominal discomfort, especially in the epigastric area, is the most frequent presenting symptom of acute pancreatitis. Abdominal ultrasonography and serum amylase and lipase levels are helpful for verifying a clinical diagnosis of pancreatitis. Acute pancreatitis in children is under-recognized but should be suspected in all children with unexplained stomach discomfort so that a prompt diagnosis may be obtained and the disease's complications can be avoided with prompt treatment.

REFERENCE

- Bai, H. X., Lowe, M. E., & Husain, S. Z. (2011). What have we learned about acute pancreatitis in children?. *Journal of pediatric gastroenterology and nutrition*, 52(3), 262-270.
- Srinath, A. I., & Lowe, M. E. (2013). Pediatric pancreatitis. *Pediatrics in review*, 34(2), 79-90.
- Park, A., Latif, S. U., Shah, A. U., Tian, J., Werlin, S., Hsiao, A., ... & Husain, S. Z. (2009). Changing referral trends of acute pancreatitis in children: a 12-year single-center analysis. *Journal of pediatric gastroenterology and nutrition*, 49(3), 316-322.
- EM Filho, C. W., & Silva, F. D. (2012). Acute pancreatitis in pediatrics: a systemic review of the literature. *J Pediatr*, 88, 101-114.
- Morinville, V. D., Husain, S. Z., Bai, H., Barth, B., Alhosh, R., Durie, P. R., ... & Uc, A. (2012). Definitions of pediatric pancreatitis and survey of current clinical practices: report from INSPPIRE (International Study Group of Pediatric Pancreatitis: in Search for a Cure). *Journal of pediatric gastroenterology and nutrition*, 55(3), 261-265.
- Lautz, T. B., Chin, A. C., & Radhakrishnan, J. (2011). Acute pancreatitis in children: spectrum of disease and predictors of severity. *Journal of pediatric surgery*, 46(6), 1144-1149.
- Nydegger, A., Heine, R. G., Ranuh, R., Gegati-Levy, R., Cramer, J., & Oliver, M. R. (2007). Changing incidence of acute pancreatitis: 10-year experience at the Royal Children's Hospital, Melbourne. *Journal of gastroenterology and hepatology*, 22(8), 1313-1316.
- Antunes, H., Nascimento, J., Mesquita, A., & Correia-Pinto, J. (2014). Acute pancreatitis in children: a tertiary hospital report. *Scandinavian Journal of Gastroenterology*, 49(5), 642-647.
- Cappell, M. S. (2008). Acute pancreatitis: etiology, clinical presentation, diagnosis, and therapy. *Medical Clinics of North America*, 92(4), 889-923.
- Kandula, L., & Lowe, M. E. (2008). Etiology and outcome of acute pancreatitis in infants and toddlers. *The Journal of pediatrics*, 152(1), 106-110.
- Park, A. J., Latif, S. U., Ahmad, M. U., Bultron, G., Orabi, A. I., Bhandari, V., & Husain, S. Z. (2010). A comparison of presentation and management trends in acute pancreatitis between infants/toddlers and older children. *Journal of pediatric gastroenterology and nutrition*, 51(2), 167-170.
- Werlin, S. L., Kugathasan, S., & Frautschy, B. C. (2003). Pancreatitis in children. *Journal of pediatric gastroenterology and nutrition*, 37(5), 591-595.
- Munoz, A., & Katerndahl, D. A. (2000). Diagnosis and management of acute pancreatitis. *Am Fam Physician*, 62, 164-74.