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ORIGINAL ARTICLE

Clinical spectrum and outcome of pancreatic disorders in children.

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ABSTRACT… Objective: To determine the clinical spectrum and immediate outcome of pancreatic disorders in children attending National Institute of Child Health, Karachi, Pakistan. **Study Design:** Cross Sectional study. **Setting:** Inpatient and Outpatient Department of Pediatric Medicine, National Institute of Child Health, Karachi. **Period:** January 2022 to December 2022. **Material & Methods:** A total of 49 children of either gender aged between 2 to 15 years presenting with clinical features of pancreatic disorders were analyzed. At the time of enrollment, data about demographic and clinical characteristics were noted. Important laboratory investigations were sent to local institutional laboratory. Ultrasound and/or CT scan of abdomen of each child was performed and reported by consultant radiologist having 3 years of experience for confirmation of the diagnosis. Immediate outcome was noted after 15 days of treatment among all children. Outcomes were labeled in terms of improved, not improved or expired. **Results:** In a total of 49 children, 30 (61.2%) were male while the mean age was 8.46±3.40 years. Epigastric pain, vomiting and whole abdominal pain were the most frequent presenting complaints noted in 40 (81.6%), 35 (71.4%) and 32 (65.3%) children respectively. Atrophy, inflammation and edema, calcifications, pancreatic duct dilation and pancreatic divisum were the commonest radiological findings noted in 10 (20.4%), 21 (42.9%), 18 (36.7%), 13 (26.5%) and 2 (4.1%) children respectively. Chronic pancreatitis was found to be the most frequent pancreatic disorder in 29 (59.2%) patients and they were associated with low fecal elastase level while acute pancreatitis was noted in 20 (40.8%) cases. Improved outcomes were observed in 44 (89.8%) children while no mortality was reported. **Conclusion:** Majority of the children with pancreatic disorders were male and aged between 6 to 12 years. Chronic pancreatitis was the most common type of pancreatic disorder. Epigastric pain, vomiting and whole abdominal pain were the most frequent presenting complaints. Outcome was generally good and no mortality was noted.

Key words: Abdominal Pain, Epigastric Pain, Pancreatitis, Pseudocyst, Vomiting.

INTRODUCTION

Pancreatic diseases are one of the common and important issues in children that need timely and effective management. Pancreatitis is known to be the most common and predominant pancreatic disease while other pancreatic diseases like annular pancreas, pancreatic pseudocyst, pancreatic divisum, and exocrine pancreatic insufficiency in cystic fibrosis are rarely reported as well.[1-3] Pancreatitis is an inflammatory infection of the pancreas that begins as an acute symptom and characterized as a pathological fibro-inflammatory pancreatic illness in children with genetic, environmental, or other risk factors who develop chronic pathologic reactions to parenchymal damage or stress.[4,5] Pancreatitis in children is a dangerous, sometimes fatal illness that can appear as either acute or chronic symptoms.[6]

A child with pancreatic disorder may experience abdominal pain, and the majority of them may also present with constant pain.[7] There is still a dearth of understanding of the long-term consequences of pancreatic illnesses, which is compounded by poor epidemiologic and management awareness. The primary care clinician's involvement in early diagnosis and management remains crucial, and it may influence the need for risk factor and outcome assessments to better understand the natural history of the disease.[8,9]

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Although lots of advancements have been made regarding the diagnosis and treatment of pancreatitis in the pediatric population but the etiology of various pancreatic disorders is still uncertain.[10] Though the incidence of pancreatic disorders in Pakistani children is not known, but a study conducted among Pakistani children in the United Kingdom (UK) reported a seven times increased risk of developing pancreatitis in Pakistani children than that of children having UK origin.[14] Furthermore, a recent report also reported that pancreatic disorders in children usually missed by physicians in Pakistan.[11] Another recent study from Pakistan also reported that timely diagnosis and prompt management can lead to successful recovery without any serious complications in pediatric pancreatitis.[12] It is comprehended that there is a dire need of study clinical spectrum of pancreatic disorder and its outcome in Pakistani children so the present study was planned. This study was aimed to determine the clinical spectrum and immediate outcome of pancreatic disorders in children attending National Institute of Child Health, Karachi, Pakistan.

MATERIAL & METHODS

This observational cross-sectional study was performed in inpatient and outpatient department of Pediatric Medicine, National Institute of Child Health, Karachi from January 2022 to December 2022. Epi Info sample size calculator was used for the estimation of sample size taking confidence level as 95%, margin of error 6%, Majbar AA et al reported the incidence of acute pancreatitis in Pakistani children as 4.5%.[13] The estimated sample size turned out to be 46. Non-probability consecutive sampling technique was used. Approval from Institutional Ethical Committee was acquired (IERB-21/2022). Informed as well as written consents were obtained from either children or their parents/guardians.

Inclusion criteria were children of either gender aged between 2 to 15 years presenting with clinical features of pancreatic disorders. Patients who left against medical advice or did not follow-up were excluded. Children having type I diabetes mellitus, chronic liver disease or renal failure were also not included. Pancreatic disorders were labeled as positive on the basis of presence of any of the following 2 features: i) Clinical characteristics as presence of one or more of the signs and symptoms at the time of presentation (whole abdominal pain, epigastric pain, nausea, vomiting, fever [98.4 ^{o}F], pallor and /or jaundice, palpable mass, ascites; ii) Pancreatic amylase level > 200IU/L and/or lipase level > 165IU/L; iii) Pancreatic changes such as, atrophy, inflammation and edema, calcifications and/or pancreatic duct dilation on abdominal ultrasound or CT scan. Acute pancreatitis was labeled as sudden onset of pancreatic disorder while chronic pancreatitis was termed as continuing, chronic, inflammatory process of the pancreas, characterized by irreversible morphologic changes.

At the time of enrollment, data about demographic and clinical characteristics were noted. Important laboratory investigations were sent to local institutional laboratory. Blood sample of each child was collected and sent to laboratory for pancreatic amylase and lipase level. Ultrasound and/or CT scan of abdomen of each child was performed and reported by consultant radiologist having 3 years of experience for confirmation of the diagnosis. All patients were managed as per standard institutional protocols. The initial management consisted of haemodynamic stability, maintenance of hydration and pain relief. Surgical procedures were performed among cases with chronic pancreatitis and those who had pseudocysts including Frey's procedure, pancreatic duct stenting, laparotomy and "endoscopic retrograde cholangiopancreatography (ERCP)". Immediate outcome was noted after 15 days of treatment among all children. Outcomes were labeled in terms of improved, not improved or expired. Improvement was labeled if the child reported symptomatic improvement in presenting features/ complaints. A special format was designed to note study data. Patients missing the planned follow up were excluded from the final analysis.

Data analysis was performed employing "Statistical Package for Social Science (SPSS)",

version 26.0. Mean and standard deviation were calculated for quantitative variable like age, height, weight, and laboratory parameters. Frequency and percentage were calculated for gender, sign and symptoms (abdominal pain, epigastric pain, nausea, vomiting, fever (>98.4F), pallor or jaundice), radiological findings (atrophy, inflammation and edema, calcification, or pancreatic duct dilation), type of pancreatitis, and outcomes. Inferential statistics were explored using chi-square test and independent t-test. P value ≤0.05 was considered as significant.

RESULTS

During the study period, a total of 49 children fulfilled the inclusion and exclusion criteria and they were analyzed. In a total of 49 children, 30 (61.2%) were male representing a male to female ratio of 1.5:1. The mean age was 8.46±3.40 years (ranging between 2-15 years) while 35 (71.4%) children were aged between 6-12 years. The mean height and weight were 120.34±19.74 cm and 23.50±10.33 kg respectively. Epigastric pain, vomiting and whole abdominal pain were the most frequent presenting complaints noted in 40 (81.6%), 35 (71.4%) and 32 (65.3%) children respectively. Table-I is showing details of demographic and clinical findings of all the children with pancreatic disorders.

At the time of enrollment, respiratory rate and heart rate were 26.11±6.7 breaths/minute and 102.8±15.6 beats/minute respectively. Descriptive details of vital signs and laboratory parameters are shown in Table-II.

Characteristics		Number (%)
Gender	Male	30 (61.2%)
	Female	19 (38.8%)
Age (years)	2-5	12 (24.4%)
	6-12	35 (71.4%)
	13-15	2 (4.1%)
Presenting Complaints & Clinical Features	Abdominal Pain	32 (65.3%)
	Epigastric pain	40 (81.6%)
	Nausea	30 (61.2%)
	Vomiting	35 (71.4%)
	Fever	27 (55.1%)
	Jaundice	7 (4.6%)
	Ascites	10 (6.6%)
	Abdominal tenderness	80 (52.6%)
	Hepato-splenomegaly	2 (1.3%)

Table-I. Demographic and clinical characteristics of children with pancreatic disorders (n=49)

Analysis of frequency of radiological findings revealed that atrophy, inflammation and edema, calcifications, pancreatic duct dilation and pancreatic divisum were the commonest radiological findings noted in 10 (20.4%), 21 (42.8%), 18 (36.7%), 13 (26.9%) patients and 2 (4%) respectively. Chronic pancreatitis was found to be the most frequent pancreatic disorder in 29 (59.2%) patients and they were associated with low fecal elastase level while acute pancreatitis was noted in 20 (40.8%) cases.

In terms of immediate outcome, improved outcomes were observed in 44 (89.8%) cases while remaining 5 (10.2%) cases did not improve. No mortality was reported in the present research.

Parameters	Mean	Standard Deviation	Minimum	Maximum
Respiratory rate (breaths/minute)	26.11	6.7	21	48
Heart rate (beats/minute)	102.8	15.6	72	139
Hemoglobin (g/dl)	10.3	1.6	6.3	14.6
Total leukocytes count (cells per cubic ml)	11.5	6.4	1.1	49.2
Platelets count ($x10^3$/ul)	327.4	134.0	139.0	755.0
Pancreatic amylase (IU/L)	1352.3	6036.6	18	41700
Lipase (IU/L)	624.6	1105.0	10	7114
Serum calcium (mg/dl)	9.7	10.0	7.4	92.0
Serum albumin (g/dl)	3.3	0.5	1.9	4.7
Serum triglycerides (mg/dl)	108.8	21.3	63	171

Table-II. Vital signs and laboratory parameters in children with pancreatic disorders (n=49)

Complications developed in 3 patients who did not improve. Among patients who did not improve, 2 (4.1%) had pseudocyst, 2 (4.0%) had pancreatic ascites and 1 (2.0%) had paralytic ileus. The mean duration of hospitalization was noted to be 8.4±3.2 days.

DISCUSSION

Pancreatic disorders are a common cause of morbidity among children. The burden of pancreatitis has been observed to increase in the recent decades and it is now estimated that the annual incidence of pancreatitis is between 2-13 per 100000 children annually.[14] Around 25% of children with pancreatic disorders develop some kinds of serious complications while the mortality rates hovering around 4% are reported in these children.[15]

The frequency of acute pancreatitis was noted to be 40.8% in this study while chronic pancreatitis was noted among 59.2% children. A local study from Islamabad reported the proportion of acute and chronic pancreatitis to be 45.1% and 17.6% children respectively.[16] A study from United States reported that 61.2% visits of children at the healthcare facility due to pancreatic disorders were because of acute pancreatitis.[17] So, there exists a difference between the burden of acute pancreatitis between our findings and data from the developed world.[17] There could be more awareness and better facilities for the diagnosis of pancreatic disorders in the developed world. Clinical, radiological and laboratory parameters were considered in the diagnosis of pancreatic disorders in this study. The literature reports that children presenting with acute pancreatitis may not be precisely identified using clinical and laboratory studies within first 48 hours following hospitalization.[18] So, there might be an increased need of monitoring and observation for the accurate diagnosis of children presenting with acute pancreatitis.

In this study, epigastric pain, vomiting and whole abdominal pain were the most frequent presenting complaints noted in 81.6%, 71.4% and 65.3% children respectively. Recent local data evaluating children with acute, recurrent and chronic pancreatitis has shown vomiting (88.2%), epigastric pain (76.5%) and nausea (62.7%) to be the most frequent presenting complaints.[12] Another study revealed abdominal pain (100%), vomiting (57.1%), fever (35.7%) and nauseas (23.2%) to be the most common presentations but they only evaluated children with acute pancreatitis.[19]

In the present study, no mortality occurred while 89.8% children showed improvement. Our findings exhibited that outcome of children with pancreatic disorders is generally good. Our findings are consistent with the previously published local literature where the researchers did not record any mortality among children with pancreatic disorders.[12] In this study, the mean duration of hospitalization was 8.4±3.2 days. The literature reports hospital duration between 6.5 to 14 days among children presenting with pancreatic disorders.[12,20-22]

The present study had some limitations. Being a single center study conducted on a relatively small sample size, our findings should not be generalized. We noted immediate outcomes among children with pancreatic disorders which warrant further prospective trials for mid-term and long-term outcomes among these cases.

CONCLUSION

Majority of the children with pancreatic disorders were male and aged between 6 to 12 years. Chronic pancreatitis was the most common type of pancreatic disorder. Epigastric pain, vomiting and whole abdominal pain were the most frequent presenting complaints. Outcome was generally good and no mortality was noted.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

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2	Arit Parakash	Concept and design, Critical revision.	
3	Aisha Merchant	Data analysis, Literature review.	
4	Mehmood Shaikh	Proof reading, Literature review.	