

## Original Research Article

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# Nutrition status and outcome in children with acute pancreatitis

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## ABSTRACT

**Background:** AP (Acute Pancreatitis) in children is being more and more diagnosed across the world and developing nation like India. This may be because of multiple factors like better health sector developments, change in dietary and social lifestyle changes due to fast improving economy. There are lots of unknown factors also leading to increase in incidence of AP in children in developing nations like India.

**Methods:** Five-year retrospective data of AP patients admitted Paediatric Gastroenterology department extracted. Data of 63 children collected in five years from 2012 to 2016. Anthropometric data, feeding details, liver function test (LFT) data recorded. Anthropometric data analysed with IAP growth charts. Data entered in excel sheet of window 10. Appropriate statistical data used for analysis of variables.

**Results:** Majority of children of AP were 11-15 years age group. In 63 patients, 28 (44.4%) were undernourished, 23 (36.5%) having normal BMI, 9 (14.3%) were overweight and 3 (4.8%) were obese. Nasojejunal feeding was associated mostly in patients with severe AP. LFT were deranged mostly in cases of severe AP.

**Conclusions:** Overweight, obese and also undernourished children were having more severe AP. Children on nasojejunal feeding (NJ) were mostly having severe AP.

**Keywords:** Acute pancreatitis, Body mass index, Children, Nasojejunal, Nutrition

## INTRODUCTION

Acute pancreatitis (AP) in children is being diagnosed more and more in the world and also from developing nations like India.<sup>1-3</sup> In India more cases of AP being diagnosed particularly in the last decade. There had been many advances in the management of AP in the last decade worldwide. Earlier, specially two decades back AP was not being recognised and also not being considered as differential diagnosis in paediatric population. Apart from management advances in the medical science speciality, there have been simultaneous fast advancement in socioeconomic status. In the recent past times, India becomes one of the fastest growing economy, that lead to better affordability, faster life style

of citizens. These socioeconomic changes also lead to change in dietary lifestyle of people. The children started having more and more readymade foods, fast food. The Indian market flooded with all kinds of packaged food items. Restaurant culture and dining out becomes very frequent in dietary habits of Indians. On the other hand, rapid advancement in telecommunication and electronics technology affected children's lifestyle also and changed from outdoor physical, sports activity to indoor with television, video games and computer like electronics. These life style changes lead to decrease in physical activity and increase consumption of high calories readymade foods. These social factors might have also led to increasing obesity and overweight in children, especially in last decade.<sup>4</sup> It is now clear from many adult

studies that obesity is risk factor for development of multiple morbidity and increase in mortality.<sup>5-8</sup>

Overall prognosis of mild acute pancreatitis is very good. Mild cases resolve with supportive management only. Moderately severe and severe acute pancreatitis (SAP) cases are associated with significant mortality and morbidity. Complications like pseudocyst, walled off pancreatic necrosis and collection in situ has been also seen.<sup>9</sup> Many adult studies shown that nutritional status of patients with AP is important risk factor in the outcome of AP. In pediatric population there is very scanty data available regarding impact of nutritional status and its impact on various parameters related to AP. In this study our objective was to study the nutritional status and laboratory parameters of acute pancreatitis and to see the its impact on outcome of AP.

## METHODS

Retrospective study planned on patients diagnosed with AP, who were admitted in department of Pediatric Gastroenterology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, INDIA. Retrospective data collected in children with AP admitted from 2012 to 2016 (five years).

Authors collected data of children aged between 1-20 years. Diagnosis of AP were made as per the International Study Group of Pediatric Pancreatitis: In Search for a Cure (INSSPIRE) definitions and Atlanta criteria, having 2 of the 3 criteria support the diagnosis of acute pancreatitis: clinical findings, including abdominal pain, nausea, vomiting; levels of serum pancreatic amylase and/or lipase  $\geq 3$  times the upper limit of normal, radiographic evidence of acute pancreatitis including pancreatic edema on ultrasound or computed tomography.<sup>10</sup> The diagnosis of AP was made in all the cases only according to INSSPIRE criteria. Anthropometric data analyzed as per IAP growth charts to assess BMI and nutritional status. The following laboratory variable was also recorded from the patient file (Table 1).

**Table 1: Laboratory variables of patient with AP.**

| S. No | Variables            |
|-------|----------------------|
| 1.    | Serum bilirubin      |
| 2.    | SGOT/SGPT            |
| 3.    | Serum Amylase/Lipase |
| 4.    | Total cholesterol    |
| 5.    | Serum calcium        |
| 6.    | Serum albumin        |
| 7.    | Total protein        |

Data of local and systemic complications, type of pancreatitis and route of feeding (NG (Nasogastric), Oral, NJ (Nasojejunal)) during admission were also extracted from hospital HIS (Hospital Information System).

Obesity was defined as BMI at or more than 95th centile for the age and sex. Overweight was defined as BMI between 85th to 95th centile for the age and sex.<sup>11</sup>

## Statistical analysis

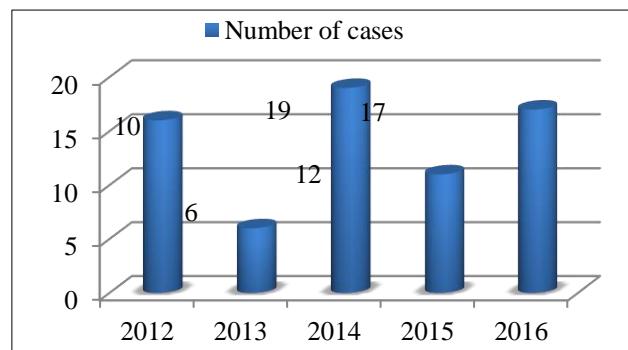
Data initially entered in window 10 excel sheet. BMI was calculated based on IAP growth charts.<sup>12</sup> Data were analyzed using appropriate statistical techniques using SPSS 20.

## RESULTS

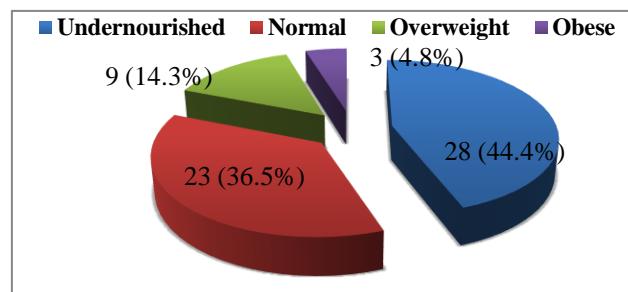
Department of Pediatric Gastroenterology had admitted total 63 patients of AP in the five years from 2012 to 2016. Male to female ratio was 39 (61.9%): 24 (38.1%) The mean age of presentation was 13.2 years. The youngest patient was 2 years and oldest patient was 20 years. Minimum cases of AP were seen in the age group of less than 5 years and maximum cases seen between 11-15 years age group (Table 2). Year wise case presentation is given in bar chart. Maximum 19 cases presented in 2014 and minimum in 2013 (Figure 1).

**Table 2: Age wise subgroup presentation of AP.**

| S. No. | Age (Years) | N  | N (%) |
|--------|-------------|----|-------|
| 1      | <=5         | 5  | 7.9   |
| 2      | 6-10        | 10 | 15.9  |
| 3      | 11-15       | 28 | 44.4  |
| 4      | >=16        | 20 | 31.7  |
|        | Total       | 63 |       |



**Figure 1: Year wise case distribution.**



**Figure 2: BMI category.**

BMI was calculated as per IAP standards. Mean BMI was 19.09 with minimum of 11.31 and maximum of 29.76. Out of 63 patients, 28 (44.4%) were undernourished, 23 (36.5%) having normal BMI, 9 (14.3%) were overweight and 3 (4.8%) were obese (Figure 2).

Out of total 63 cases of AP, 8 (12.7%) were mild, 47 (74.6%) were moderately severe and 8 (12.7%) were severe AP. Initiation of feeding was done by oral/NG route in 52 (82.5%), 10 (15.9%) patients required NJ feeding and one patient data was missing regarding route of feeding. Regarding local complications of AP, 26 (41.3%) patients develop no local complications, 25 (39.7%) developed pseudocyst, 3 (4.8%) patients developed walled of necrosis, 6 (9.5%) developed collection in situ, 1 (1.6%) in each developed ascites, pancreatic avulsion and pancreatic duct disruption respectively (Table 3).

Degree of LFT (liver function derangement) abnormality was significantly associated with severity of AP. Severe type of AP were associated with more derangement of LFT (Serum bilirubin, SGOT, SGPT). Feeding type (NJ

or NG/Oral) and duration of feeding by NJ/NG was also significantly associated with AP. NJ/NG feeding was started mostly in severe AP (Table 4).

**Table 3: Clinical characteristics of AP.**

| Clinical characteristic | N                              | N (%)   |
|-------------------------|--------------------------------|---------|
| Severity of AP          | Mild                           | 8 12.7  |
|                         | Moderately severe              | 47 74.6 |
|                         | Severe                         | 8 12.7  |
| Feeding                 | Oral/NG                        | 52 82.5 |
|                         | NJ                             | 10 15.9 |
|                         | NA                             | 1 1.6   |
| Local complications     | Ascites                        | 1 1.6   |
|                         | Collection in situ             | 6 9.5   |
|                         | Nil                            | 26 41.3 |
|                         | Pancreatic avulsion            | 1 1.6   |
|                         | Pancreatic pseudocyst          | 25 39.7 |
|                         | Pancreatic duct(PD) disruption | 1 1.6   |
|                         | Walled of pancreatic necrosis  | 3 4.8   |
|                         |                                |         |
|                         |                                |         |

**Table 4: Association of severity of AP with data.**

|                 | Severity of AP |            |                   |            |        |            | p-value |            |       |
|-----------------|----------------|------------|-------------------|------------|--------|------------|---------|------------|-------|
|                 | Mild           |            | Moderately severe |            | Severe |            |         |            |       |
|                 | N              | Percentage | N                 | Percentage | N      | Percentage | N       | Percentage |       |
| Serum bilirubin | Normal         | 2          | 3.2               | 36         | 57.1   | 4          | 6.3     | 42         | 66.7  |
|                 | Elevated Bil   | 0          | 0.0               | 5          | 7.9    | 3          | 4.8     | 8          | 12.7  |
|                 | NA             | 6          | 9.5               | 6          | 9.5    | 1          | 1.6     | 13         | 20.6  |
|                 | Total          | 8          | 12.7              | 47         | 74.6   | 8          | 12.7    | 63         | 100.0 |
| SGPT            | Normal         | 1          | 1.6               | 33         | 52.4   | 4          | 6.3     | 38         | 60.3  |
|                 | Elevated       | 1          | 1.6               | 6          | 9.5    | 2          | 3.2     | 9          | 14.3  |
|                 | NA             | 6          | 9.5               | 8          | 12.7   | 2          | 3.2     | 16         | 25.4  |
|                 | Total          | 8          | 12.7              | 47         | 74.6   | 8          | 12.7    | 63         | 100.0 |
| SGOT            | Normal         | 1          | 1.6               | 33         | 52.4   | 4          | 6.3     | 38         | 60.3  |
|                 | Elevated       | 1          | 1.6               | 6          | 9.5    | 2          | 3.2     | 9          | 14.3  |
|                 | NA             | 6          | 9.5               | 8          | 12.7   | 2          | 3.2     | 16         | 25.4  |
|                 | Total          | 8          | 12.7              | 47         | 74.6   | 8          | 12.7    | 63         | 100.0 |
| Feeding         | Oral           | 8          | 12.7              | 39         | 61.9   | 5          | 7.9     | 52         | 82.5  |
|                 | NJ             | 0          | 0.0               | 8          | 12.7   | 2          | 3.2     | 10         | 15.9  |
|                 | NA             | 0          | 0.0               | 0          | 0.0    | 1          | 1.6     | 1          | 1.6   |
|                 | Total          | 8          | 12.7              | 47         | 74.6   | 8          | 12.7    | 63         | 100.0 |

## DISCUSSION

AP in children is being recognised and diagnosed more commonly now a days. Around two decade ago AP was only thought to be disease of only adults. Because of improve in socioeconomic pattern of India. Many other factors like decrease physical activity in children and increase consumption of high calorie foods, especially high consumption of sugars, there is definite increase

incidence of overweight and obesity in children. Increase prevalence of obesity and overweight in recent past times has been shown by many studies.<sup>13-15</sup>

In this study, total 63 patients were admitted from 1012 to 2016. AP seems to be more affecting to males compared to females. Year wise trend is also slowly rising number of cases of AP. Children from all age group were being affected. Youngest case of AP in our

study was 2 years only. Most common age group affected with AP in children was 11-15 years age. This is the age when children are exposed to external environment, spent time with same peer children. Children are influenced by television commercial adds of various food companies also.<sup>16</sup> Contrary to other studies, there were more undernourished children 28 (44.4%) and only few overweight and obese children 12 (19%). It is possible that apart from obesity, undernutrition may be also a risk factor for the AP. But on the other hand mean BMI trends were correlated with severity of AP. Mild AP having mean BMI 17.24, moderately severe pancreatitis type having mean BMI 19.06 and severe acute pancreatitis (SAP) having mean BMI of 21.07. So this increase in BMI trends is correlated with severity of AP.

Obese patients were mostly of severe AP type. On the other hand, undernourished patients also having severe pancreatitis in large numbers. In our study most cases were moderately severe or SAP. Only few cases of mild AP were admitted. This is because our institute is tertiary care referral institute and only complicated cases referred by pediatrician, peripheral physician and gastroenterologist. Most of the mild cases must be managed by local doctor. After stabilisation of cases of AP in our ICU feeding was tried with clear oral fluids. If patient able to tolerate then small and frequent feed with simple carbohydrate diet given. Then protein diet followed by small amount of fatty diet also introduced subsequently and slowly if tolerated.

If patient were not able to tolerate oral fluids or feed and persistently vomiting occur, then NJ feeding tube were placed endoscopically and feeding started small and frequently based on acceptability and tolerability of patient. Pancreatic pseudocyst was most common complications seen in our study like other studies.<sup>17,18</sup> These pseudocysts are sometimes big enough to cause gastric compression and oral feeding in these cases not possible. So, in case of huge pseudocyst, NJ feeding is placed without any delay. None of the mild AP required NG/NJ feeding. Patients associated with both local complications (pancreatic pseudocyst, walled of pancreatic necrosis) and systemic complications (sepsis, renal impairment, pneumonia etc) stayed more duration and most of them need NJ/NG feeding.

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