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Evaluation of surgical abdomen in pediatric subjects admitted for acute abdomen at our tertiary care centre

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Abstract---Acute abdominal pain is one of the most common problems in children admitted to the pediatric emergency department (ED), and often presents a diagnostic dilemma for primary clinicians. Acute abdominal pain in patients presenting to the ED is often diagnosed as a disorder that does not require surgical intervention, such as acute gastroenteritis, functional digestive disorders or constipation. Objectives of our study: to evaluate various etiologies of acute abdomen in children presenting to paediatric emergency department and to estimate the prevalence of surgical abdomen in children presenting to pediatric emergency department. Methodology: Demographic information of the patients was noted down from the hospital case records, which include age, gender. Presenting complaints, clinical signs, etiologies of acute abdomen, laboratory investigations results TLC, DC, CRP, USG findings, CT abdomen findings, time and date of admission, daily progress, time and date of discharge were noted. In traumatic group apart of these observations additional lab investigations like amylase, lipase, ALT, AST, total protein and A:G ratio were noted. Results: We had a total of 132 subjects in non-traumatic group out of which 73% had acute appendicitis, 14% had incarcerated hernia, 7% had intussusception, 5% had perforation and 0.75% had torsion. The various etiologies accounted in traumatic group include 43% trauma to multiple organs, 17% had trauma to intestine and colon, 13% had trauma to liver, 10%

had trauma to spleen, 10% had trauma to kidney and 7% had trauma to pancreas. Discussion and Conclusion: The etiology of acute abdomen varied depending on the age of the patient. Acute appendicitis was the most common cause of acute abdomen in children older than 1 year of age, followed by traumatic injury. Abdominal USG and CT scanning was a useful diagnostic imaging modality in patients with both traumatic and non-traumatic abdominal pain.

Keywords---acute abdominal pain, emergency department, traumatic, non-traumatic, acute abdomen.

Introduction

Acute abdominal pain is one of the most common problems in children admitted to the pediatric emergency department (ED), and often presents a diagnostic dilemma for primary clinicians. Acute abdominal pain in patients presenting to the ED is often diagnosed as a disorder that does not require surgical intervention, such as acute gastroenteritis, functional digestive disorders or constipation.¹⁻³ The symptoms and signs that suggest acute abdomen include redounding pain, involuntary guarding or rigidity, abdominal distension and diffuse tenderness. However, acute abdomen may not be easily diagnosed in young children based on these clinical presentations because of their poor ability to express themselves and often they present with non-specific symptoms such as abdominal pain, nausea or vomiting which makes it difficult for emergency department physicians to confirm the etiology of symptoms thus accounting for delayed diagnosis. In previous studies, the frequency of perforation was reported to be between 17 and 33% and the rate of negative laparotomy was between 3 and 54%. Since ultrasonography (USG) does not emit radiation, it is one of the most preferred imaging methods in the differential diagnosis of conditions related to acute abdomen, with a specificity rate of 68-90% in children.⁴⁻⁶

Abdominal surgical emergencies can also be induced by trauma. Internal organ involvement resulting from traumatic insults in children can differ markedly from those in adults. Moreover, acute abdomen in children of different ages may have different etiologies and clinical courses, and may produce different laboratory test results and imaging findings. Different etiologies of acute abdomen can show different distributions in different months, but the reasons for this remain unclear.⁷⁻¹⁰ Hence we have taken up this study to evaluate various aetiologies of acute abdomen and estimate the prevalence of surgical abdomen in children aged from one month to 17 years who come to the emergency department of our hospital.

Objectives of the study

The objectives of our study include:

- To evaluate various etiologies of acute abdomen in children presenting to paediatric emergency department.

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- To estimate the prevalence of surgical abdomen in children presenting to pediatric emergency department.

Materials and Methods

Study site

This study was conducted at the Department of Pediatrics Emergency Department of S.L.N Hospital and Research Centre, Odisha.

Study population

Children admitted to the Pediatric Emergency Department in the age group of 1 month 17 years.

Study design

We conducted a retrospective analysis from the previous records of our hospital from January 2020 to December 2021.

Sample size

Among 600 patients admitted to the ED during the study period, there were 160 paediatric subjects aged one month to 17 years, we divided these children into traumatic and non-traumatic group. Non-traumatic group comprised of children with acute abdomen unrelated to the trauma but requiring surgical intervention. The traumatic group comprised patients who presented to the ED with acute abdominal pain caused by traumatic injury.

Inclusion criteria

- Diagnosed cases of acute abdomen in the ED
- at least one imaging study
- operative management
- complete chart information for appropriate data abstraction.

Technique and Tools & Data collection

Demographic information of the patients was noted down from the hospital case records, which include age, gender. Presenting complaints, clinical signs, etiologies of acute abdomen, laboratory investigations results TLC, DC, CRP, USG findings, CT abdomen findings, time and date of admission, daily progress, time and date of discharge were noted. In traumatic group apart of these observations additional lab investigations like amylase, lipase, ALT, AST, total protein and A:G ratio were noted. All the patients included in this study will be further divided into 4 groups as

- Infant (1 month to 1 year)
- Pre-school age (2-6 years)
- School age (7-12 years)

- Adolescent (13-17 years)

The aetiologies of non-traumatic group were divided into six major categories which include:

- Acute appendicitis
- Hollow organ perforation
- Incarcerated inguinal hernia
- Intussusception
- Intestinal obstruction
- Ovarian torsion

Similarly, in traumatic group they were divided into six major categories:

- Trauma to liver
- Trauma to spleen
- Trauma to kidney
- Trauma to pancreas
- Trauma to intestine/colon
- Multiple organ injuries

Statistical Analysis

Statistical analysis was done using Microsoft Excel spreadsheet, and statistical package for the social sciences (SPSS) version 20.0 software.

Results

Among 600 patients admitted to the ED during the study period, there were 160 paediatric subjects aged one month to 17 years, we divided these children into traumatic and non-traumatic group. We included a total of 160 pediatric subjects as per the inclusion and exclusion criteria. Out of 160 subjects 28 had traumatic acute abdomen and 132 were having admitted for non-traumatic acute abdomen. Out of 160 subjects 100 were males and 60 were females, aged between 1 month to 17 years, the mean age was found to be 11.3 ± 6.4 years.

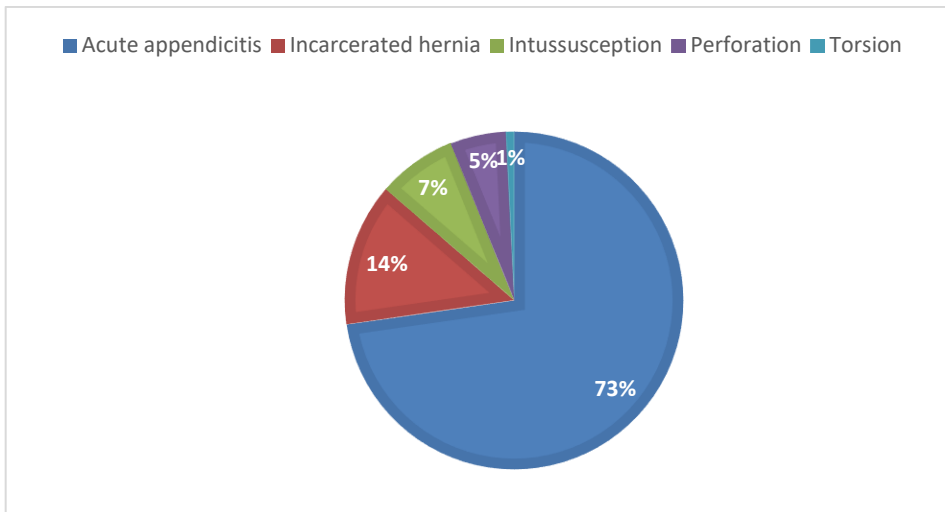


Figure 1. Shows the distribution of subjects based on etiology in non-traumatic group (n = 132)

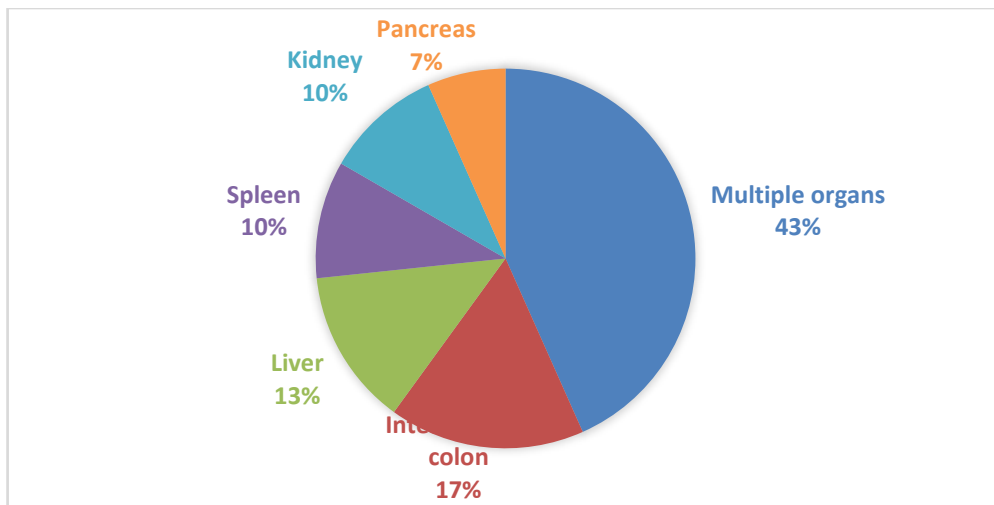


Figure 2. Shows the distribution of subjects based on etiology traumatic group (n = 28)

Discussion

Abdominal pain is one of the most common complaints in childhood. Although most of these complaints arise from self-limiting conditions, abdominal pain might herald a surgical or medical emergency. This retrospective study aimed to help primary pediatricians to better understand the clinical spectrum of acute abdomen in children, including the demographics, clinical presentations, laboratory test results, imaging findings, and clinical courses.¹⁰⁻¹² Among 600 patients admitted to the ED during the study period, there were 160 paediatric subjects aged one month to 17 years, we divided these children into traumatic and non-traumatic group. We included a total of 160 pediatric subjects as per the inclusion and exclusion criteria. Out of 160 subjects 28 had traumatic acute

abdomen and 132 were having admitted for non-traumatic acute abdomen. Out of 160 subjects 100 were males and 60 were females, aged between 1 month to 17 years, the mean age was found to be 11.3 ± 6.4 years.

We found the prevalence of 22% surgical abdomen in non-traumatic group of the total admitted in Emergency Department, after thorough investigation into the case records with the clinical presentation, laboratory investigations and imaging studies. We had a total of 132 subjects in non-traumatic group out of which 73% had acute appendicitis, 14% had incarcerated hernia, 7% had intussusception, 5% had perforation and 0.75% had torsion. The various etiologies accounted in traumatic group include 43% trauma to multiple organs, 17% had trauma to intestine and colon, 13% had trauma to liver, 10% had trauma to spleen, 10% had trauma to kidney and 7% had trauma to pancreas. An accurate knowledge of all the different causes of AAP is of paramount importance, and the patients can hence be simply classified as needing urgent management (i.e., requiring treatment within 24 h in order to prevent the onset of severe complications) or not needing urgent management. It has been previously reported that the urgent causes most frequently encountered include appendicitis, diverticulitis, cholecystitis, and bowel obstruction, whereas the most common non-urgent cause are nonspecific abdominal pain (NSAP), also known as undifferentiated abdominal pain (UDAP), which is mostly considered as a diagnosis of exclusion. Only one study has been performed in Italy to the best of our knowledge, and was mainly focused on evaluating resource utilization in management of AAP. The scarce information available so far is particularly concerning if one considers that abdominal pain represents one of the leading causes of repeated ED visits, often necessitating additional and expensive testing, and sometimes plagued by unfavorable outcomes.¹²⁻¹⁶

Acute abdomen is a condition that demands urgent attention and treatment. The acute abdomen may be caused by an infection, inflammation, vascular occlusion, or obstruction. The patient will usually present with sudden onset of abdominal pain with associated nausea or vomiting. Most patients with an acute abdomen appear ill. The history and physical exam serve to eliminate some diagnoses and suggest others. Acute care physicians are well aware of the modes of presentation of these disease entities. An acute abdomen may present in an obvious or subtle manner, but must always be recognized. Rapid, appropriate testing and concomitant resuscitative therapy are mandatory. If the condition is even possibly surgical, early consultation with a surgeon is mandatory.

Conclusion

The etiology of acute abdomen varied depending on the age of the patient. Acute appendicitis was the most common cause of acute abdomen in children older than 1 year of age, followed by traumatic injury. Abdominal USG and CT scanning was a useful diagnostic imaging modality in patients with both traumatic and non-traumatic abdominal pain.

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