



PAEDIATRIC ACUTE ABDOMEN: A STUDY IN A TERTIARY CARE CENTRE

Paediatric Surgery

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ABSTRACT

Introduction: Acute abdominal pain is one of the most common problems in the paediatric population admitted to the Emergency Room (ER) and often presents a diagnostic challenge for primary clinicians. Abdominal symptoms are among the most common reasons for paediatric emergency department visits and are the most frequently reported symptom. However, acute abdomen requiring surgical intervention must be picked up by surgeons because of their potentially life-threatening risks. The signs of acute abdomen include diffuse abdominal tenderness, rebound tenderness, involuntary guarding or rigidity, and abdominal distension. Acute abdomen in children of different ages may have different aetiologies and different clinical presentations and may produce different laboratory test results and imaging findings. In this study, the different aetiologies and the clinical course of paediatric patients with acute abdomen have been analysed, also the prevalence of various aetiologies of acute abdomen in different paediatric age groups admitted to the Emergency Room (ER) has been analysed. **Materials and Methods:** From January 2021 to June 2022, we retrospectively recruited 100 paediatric patients who presented to the Emergency Room with acute abdomen. These patients were divided into traumatic and non-traumatic groups. Differences between the traumatic and non-traumatic age groups in the prevalence, clinical presentations, and hospital courses were analysed statistically. **Results:** The mean age of presentation was 4 years of age. The most common sex in the early neonatal age group (<28 days) was male. The most common symptom in acute abdomen presentations was abdominal pain and vomiting in the age group <1 year age followed by distension of the abdomen at <28 days of age. The patients with acute abdomen presenting to the Emergency Room in the neonatal age group (<28 days of age) had the most common diagnosis necrotising enterocolitis followed by appendicitis in older children between 7 years to 15 years of age. The need for surgical intervention was more in older children >7 years of age. The majority of neonates (<28 days of age) were managed conservatively. **Conclusion:** Acute appendicitis was the most common cause of acute abdomen in the paediatric age group, particularly in >1 year of age, necrotising enterocolitis followed by intussusception was the most common cause of acute abdomen in <1 year of age. The splenic laceration was the most common cause of acute abdomen in the traumatic group.

KEYWORDS

Paediatric, acute abdomen, abdominal pain, appendicitis, splenic laceration, paediatric trauma

INTRODUCTION:

In a study done by Caperell K et al., acute abdominal pain is one of the most common problems in the paediatric population admitted to the Emergency Room (ER) and often presents a diagnostic challenge for primary clinicians. Acute abdominal pain accounts for around 5% to 10% of visits to the Emergency room.^[1]

Abdominal symptoms are among the most common reasons for paediatric emergency department visits and are the most frequently reported symptom. A proper history taking and thorough physical examination can often reach the correct diagnosis. A study by D'Agostino J shows that acute abdominal pain in patients presenting to the Emergency Room is often diagnosed as a disorder that does not require surgical intervention, such as acute gastroenteritis, constipation, or certain functional digestive disorders.^[2] However, acute abdomen requiring surgical intervention must be picked up by the surgeons because of their potentially life-threatening risks. The signs of acute abdomen include diffuse abdominal tenderness, rebound tenderness, involuntary guarding or rigidity, and abdominal distension.^[3]

However, the acute abdomen may not be easily diagnosed in young children based on these clinical presentations because of their poor expressing ability.^[4] Acute abdomen requiring emergency surgical intervention can also be induced by trauma. Internal organ involvement in children from traumatic insults can differ markedly from those in adults.^[4] Acute abdomen in children of different ages may have different aetiologies and different clinical presentations and may produce different laboratory test results and imaging findings. Knowing the abdominal conditions that are most common in each age group can help surgeons narrow the differential diagnosis.

In this study, the different aetiologies, the presenting symptoms and mean age of presentation of paediatric patients with acute abdomen

have been analysed, also the prevalence of various aetiologies of acute abdomen in different paediatric age groups admitted to the Emergency Room has been analysed.

AIM AND OBJECTIVES:

AIM:

To study and analyse the patients presenting with acute abdomen in the paediatric age group to the emergency room.

OBJECTIVES:

1. To estimate the incidence of acute abdomen in the paediatric population in our tertiary health care centre.
2. To evaluate the aetiology of acute abdomen in the paediatric population in our tertiary health care centre.
3. To estimate the age-wise abdominal emergency in the paediatric population in our tertiary health care centre.

MATERIALS AND METHODS:

Type of Study: Retrospective, observational study.

Place of Study: MGM Medical College and Hospital, Navi Mumbai, Kamothe

Period of Study: January 2021 to June 2022

Institute Ethics Committee approvals and consent were obtained prior to the start of the study

Sample size: 100

Statistical analysis: Plan and data were collected by using the standard tool and stored in MS excel. Basic descriptive statistics like frequency, percentage, mean, mode, median, standard deviation, and graphs were prepared using MS excel.

To test the significance, the level of significance <0.05 was used for parametric tests.

To test the test of significance, statistical package SPSS24 was used.

Plan of Study:

From January 2021 to June 2022, we retrospectively recruited 100 patients aged under 18 years who presented to the Emergency Room (ER) at MGM Hospital Kamothe, Navi Mumbai, with acute abdominal pain. These 100 patients were divided into two groups: a non-traumatic group and a traumatic group. The non-traumatic group included patients with acute abdomen unrelated to trauma requiring emergency surgical intervention or conservative management. The traumatic group included patients who presented to the Emergency Room with acute abdominal pain caused by traumatic insult.

Inclusion criteria:

- 1) Age 18 years or less than 18 years.
- 2) All paediatric patients presenting with acute abdomen.

Exclusion criteria:

- 1) Age more than 18 years.
- 2) Patients not willing to take part in the study.

All patients with acute abdomen in the paediatric age group coming to MGM Emergency Room were examined thoroughly and diagnosed based on history taking and clinical examination along with per rectal examination if required. All patients were subjected to blood and radiological investigations and then were classified into traumatic and non-traumatic groups. If the patient required surgery, the patient was immediately shifted to the Operation Room (OR) after consenting and patient preparation for surgery. Patients not requiring surgical intervention were managed conservatively.

OBSERVATIONS AND RESULTS:

The mean age of presentation was 4 years of age, with a standard deviation of 1.8. The most common sex in the early neonatal age group (<28 days) was male. Several patients fell in the <1 year age group. (Figure 1)

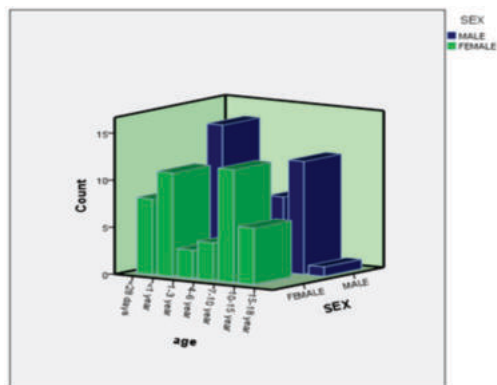


Figure 1: Age Group and Sex

The most common symptom in acute abdomen presentations was abdominal pain and vomiting in the age group <1 year age followed by distension of the abdomen at <28 days of age. (Figure 2)

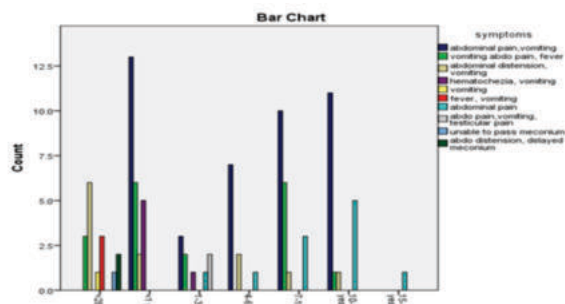


Figure 2: Symptomatology and Age Group

When the symptoms were studied according to sex, abdominal pain

was more in the female population followed by vomiting and fever. (Figure 3)

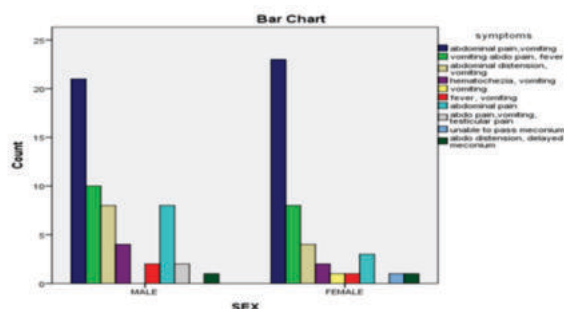


Figure 3: Symptomatology and Sex

The patients with acute abdomen presenting to the Emergency Room in the neonatal age group (<28 days of age) had the most common diagnosis Necrotising enterocolitis followed by appendicitis in older children between 7 years to 15 years of age. (Figure 4)

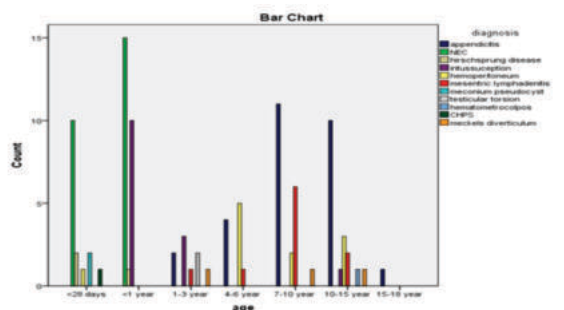


Figure 4: Diagnosis and Age Group

When correlated with gender, Necrotising enterocolitis was more common in the female population and appendicitis was more common in males. (Figure 5)

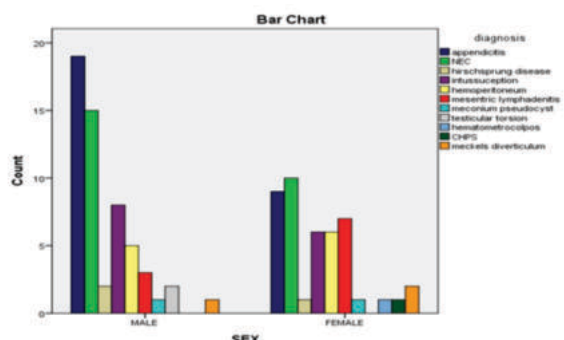


Figure 5: Diagnosis and Sex

The need for surgical intervention was more in older children >7 years of age. The majority of neonates (<28 days of age) were managed conservatively. (Figure 6)

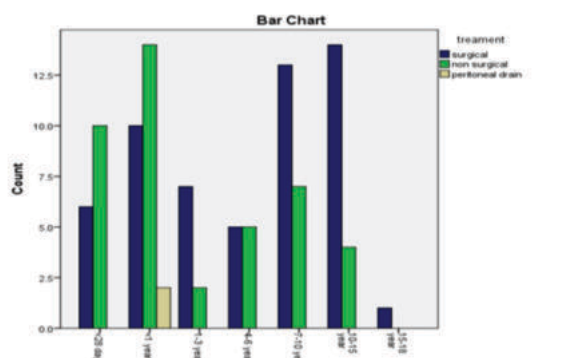


Figure 6: Treatment and Age Group

The patients presenting with abdominal pain and vomiting mostly underwent surgical intervention. (Figure 7)

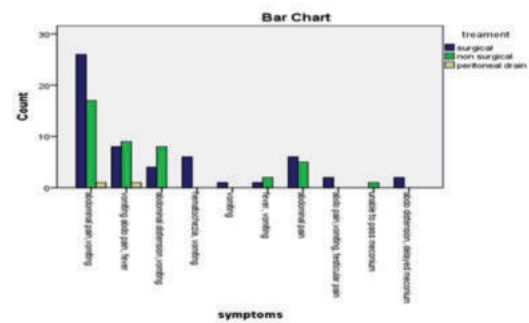


Figure 7: Treatment and Symptomatology

Table 1:

		SYMPTOMS									
		Abdominal pain, Vomiting	Abdominal pain, Vomiting, Fever	Abdominal distension, Vomiting	Hematochezia, Vomiting	Vomiting	Fever, Vomiting	Abdominal pain	Abdominal pain, Vomiting, Testicular pain	Unable to pass meconium	Abdominal distension, Delayed meconium
DIAGNOSIS	Appendicitis	21	2	0	0	0	0	5	0	0	0
	NEC	10	6	6	0	0	3	0	0	0	0
	Hirschsprung disease	1	0	0	0	0	0	0	0	0	2
	Intussusception	3	2	3	6	0	0	0	0	0	0
	Hemoperitoneum	3	2	2	0	0	0	4	0	0	0
	Mesenteric lymphadenitis	4	3	1	0	0	0	2	0	0	0
	Meconium pseudocyst	0	1	0	0	0	0	0	0	1	0
	Testicular torsion	0	0	0	0	0	0	0	2	0	0
	Hematometocolpos	1	0	0	0	0	0	0	0	0	0
	CHPS	0	0	0	0	1	0	0	0	0	0
	Meckel's diverticulum	1	2	0	0	0	0	0	0	0	0



Figure 8: Acute Appendicitis



Figure 10: Meckel's Diverticulum

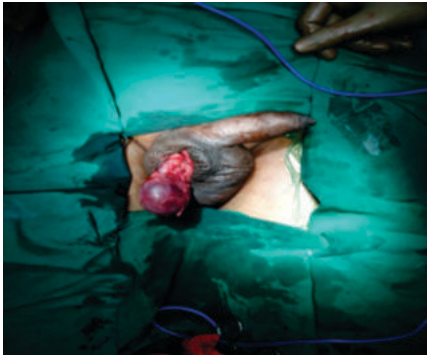


Figure 9: Testicular Torsion



Figure 11: Intussusception



Figure 12: Hirschprung's Disease

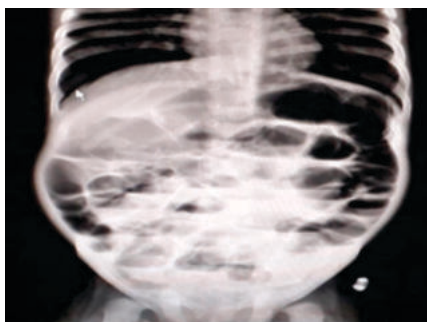


Figure 13: X-ray Showing Multiple Air Fluid Levels, Necrotising Enterocolitis



Figure 14: Splenic Laceration

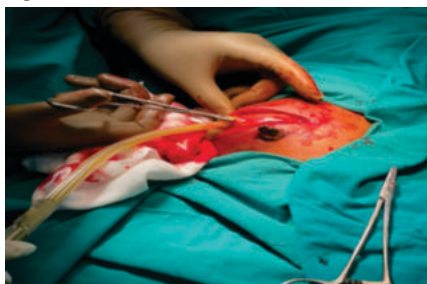


Figure 15: Meconium Pseudocyst

DISCUSSION:

Mason JD studied that pain in the abdomen is one of the most frequent complaints in childhood.^[5] A study by Erkan T et al., showed that although, the majority of the complaints are self-limiting in nature, abdominal pain might evoke a surgical or medical emergency.^[6] This retrospective observational study aimed to help the surgeons to better understand the clinical spectrum of acute abdomen in paediatric age groups, different aetiologies, laboratory test results, also the prevalence of various aetiologies of acute abdomen in different paediatric age groups. In the non-traumatic age group, necrotizing enterocolitis and intussusception were the major causes of acute abdomen in the <1 year age group. Appendicitis was the major cause of acute abdomen in children >1 year of age. Necrotizing enterocolitis is a dangerous necro-inflammatory injury of the distal small bowel and the proximal colon that predominantly affects infants. Holman RC et al., conducted a study that showed that the highest frequency is in very low birth weight infants, and overall Necrotizing mortality remains at 15%

and approaches around 30% for very low birth weight infants.^[7-11]

In the study by Yee WH, Soraisham AS, Shah VS, Aziz K, Yoon W, and Lee SK, Necrotizing enterocolitis was more common in infants (<28 days) with a mean age of 7 days (early onset), and some are delayed to 32 days (delayed onset).^[12] This was similar to the present study, thus Necrotizing enterocolitis was the major cause of acute abdomen in <1 year age, particularly in neonates (<28 days). (Graph 1)



Graph 1: Comparison of most common age group of necrotising enterocolitis in our study and other studies

A study by Maureen MC et al., showed that intussusception occurs most commonly between the ages of 3 months to 5 years, with 60% of the cases occurring in the first year of life and a high incidence at 6 months to 11 months of age.^[13] Our study showed that intussusception was the major cause of acute abdomen after necrotizing enterocolitis in children <1 year of age.

Carty HM observed in their study that acute appendicitis is the most common surgical cause of acute abdomen in children.^[14] Children with appendicitis present with vague, poorly localized, periumbilical pain, within 6 to 48 hours, the pain becomes parietal due to the overlying peritoneal inflammation.^[15] The pain manifests as well-localized pain in the right lower quadrant, particularly the right iliac fossa region. Studies by Fleisher GR et al., have reported a slight male predominance, with a peak incidence at 9 to 12 years of age for acute appendicitis^[16], and an appendicular perforation rate around 30 to 65%.^[17] This was similar to the present study revealing that acute appendicitis was the major cause of acute abdomen >1 year age group particularly from 7 to 15 years of age with abdominal pain and vomiting as the most common symptomatology.

In the traumatic group, the most common indication for surgical intervention was splenic laceration followed by liver laceration, where 11 patients sustained blunt trauma to the abdomen. Amongst them, 7 patients had a splenic laceration and 4 patients had a liver laceration. 3 patients were subjected to splenectomy, 1 patient was subjected to liver laceration repair, and the rest were treated conservatively. Studies show that the spleen is the most commonly injured intra-abdominal organ injured who sustained blunt trauma to the abdomen, and blunt liver trauma was the most common fatal abdominal injury.^[18,19]

CONCLUSION:

The aetiology of acute abdomen varied depending on the different age groups. Acute appendicitis was the most common cause of acute abdomen in the paediatric age group, particularly in > 1 year of age, necrotising enterocolitis followed by intussusception was the most common cause of acute abdomen in < 1 year of age. The other causes of acute abdomen reported in our study were hirschprung's disease, mesenteric lymphadenitis, meconium pseudocyst, torsion testis, hematometocolpos, congenital hypertrophic pyloric stenosis, and Meckel's diverticulum. The splenic laceration was the most common cause of acute abdomen in the traumatic group.

Conflicts of interest:

There are no conflicts of interest

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