

Pattern of intestinal obstruction in infants and children

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ABSTRACT

Objectives: To find out causes of intestinal obstruction in infants & children and their relation to age and sex distribution.

Methodology: This descriptive study was conducted at Paediatric Surgery departments of Peoples University of Medical & Health Science for women Hospital Nawab Shah and Liaquat University of Medical and Health Sciences Hospital Jamshoro, from January 2010 to December 2010. All infants and children presenting with symptoms and signs of intestinal obstruction, and patients having advanced appendicitis with intestinal obstruction, were included in this study. Surgical intervention was carried out, where indicated, otherwise patients were managed conservatively. Patients were divided into two groups: Infants were enlisted in group A, while toddlers and older children were put together in group B. Data was analyzed by using SPSS version 10 for percentage and frequencies

Results: Total 67 patients were included in the study. Among these 44 were Males and 23 Females with M: F ratio of 1.9:1. There were 24 patients in group A, among these, 15(62.5%) cases had intussusception, while other conditions, namely incarcerated inguinal hernia, colonic web, post operative adhesions, ileal web and inflammatory bands constituted 37.5% cases of bowel obstruction. In group B there were 43 patients. These included, post operative adhesions in 6(13.95%) patients, while tuberculosis of intestine in 5(11.63%), Meckel's diverticulum with band 5(11.63%), perforated appendix in 5(11.63%), intussusception in 3(6.97%), Volvulus of small intestine in 3(6.97%) and Inflammatory bands and adhesions in 3(6.97%) patients. Malrotation, Hirschsprung's disease, Trichobezoar and faecal impaction each one occurred in 2(4.65%) patients. Ovarian teratoma, lymphoma, caecal Volvulus, duodenal web and duplication of colon of each one of these conditions occurred in one (0.43%) patient each. Resection of gut and anastomosis was carried out in 18(26.86%) patients (8 from group A and 10 from B). Two patients from group B died.

Conclusion: Pattern of intestinal obstruction varies at different age groups in terms of etiology as well as in relative incidence. Intussusception was the commonest cause in group A, while post operative adhesion had predominance in group B. Outcome depends upon the underlying condition and associated morbidity.

KEY WORDS: Intestinal obstruction, Causes, Pediatric, Pattern, Intussusception, Adhesions.

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INTRODUCTION

Patients with intestinal obstruction can occur at any age in the pediatric population.¹⁻⁴ The causes are different at various age groups of presentation. Beside this racial, environmental and social habits may also play a role in the etiology of intestinal obstruction in pediatric patients Seasonal variations have also been noted with great impact on causes

of bowel obstruction.^{5,6} In newborn babies the congenital anomalies are the commonest, whereas in infants condition a like intussusception are more common. As the child grows a gamut of conditions may be responsible for intestinal obstruction. Because of the serious consequences, early diagnosis and proper management is needed to avoid complications.

In Pakistan intestinal obstruction is a common problem, but there are few studies in paediatric population.⁷⁻⁹ Intussusception in infants and worm infestation in the older children has been reported to be the commonest cause of intestinal obstruction.²

We conducted this study with a view to find out various causes of intestinal obstruction in infants and children in relation to the age of presentation and sex distribution.

METHODOLOGY

This prospective descriptive study was conducted at the departments of Paediatric surgery of Peoples University of Medical & Health Sciences for Women Hospital Nawab Shah (PUMHS) and Liaquat University of Medical and Health Sciences Hospital (LUMHS) Jamshoro, from January 2010 to December 2010. All the patients, beyond neonatal age, who presented with symptoms and signs of intestinal obstruction and diagnosis strengthened by radiological investigations, were included in this study. Those cases of advanced appendicitis that were diagnosed on clinical and radiological examination as intestinal obstruction were also included in the study. The clinical and epidemiological data were collected on a designed proforma.

All the patients were managed according to standard protocols. Radiological evaluation by X-ray abdomen. Other studies like Ultrasonography, CT scan or MRI was performed as per requirement of individual patients. Complete blood count, serum electrolyte and urea level were done. Patients were initially resuscitated and then categorized in to those who needed surgical intervention and those who can safely be treated conservatively. Surgical procedure performed was according to the pathology and condition of the patients assessed by the operating surgeon. Some postoperative patients were managed in intensive care unit while stable patients were managed in ward. All patients were followed on regular basis after discharge from the hospital. Data were analyzed by using SPSS version 10 for percentage and frequencies. For this purpose patients were divided into two groups according to age, Group A, infants and Group B, older children.

In each group the causes were divided into congenital and acquired variety.

RESULTS

There were 67 patients, 27 from PUMHS Hospital and 40 from LUMHS Hospital; their ages range from one month to 14 years. Males were 44 and females 23 with M: F 1.9: 1. Majority of patients from PUMHS were males i.e. 23/27 (85.185%), while from LUMHS males and females were almost equal i.e. 21 and 19 out of 40 respectively.

GROUP-A: This group comprised 24 patients (males 17 and females 7), ages ranging from 1.25 month to 10 months with average of 5.29 months. The commonest cause of intestinal obstruction was intussusception (n=15) while other causes are shown in Table-I. Majority of the cases of Intussusception were ileocolic and none had any lead point. Seven patients had manual reduction of intussusception, while 8 needed resection of gangrenous gut and anastomosis. Complication observed were wound infection in two and dehiscence in one.

The second common cause of intestinal obstruction was incarcerated inguinal hernia in four male patients (right 3, left 1). Exploration showed healthy gut in all, while one had appendix in sac, which was removed. Colonic web was cause of obstruction in two male infants, colotomy and excision of web was carried in both along with Ladd's operation in one who had associated malrotation. No complication was observed in both patients. An eight months old infant who was operated at the age of one month for ileal duplication had post operative adhesion, adhesiolysis was carried out. One 1.5 month old male had ileal web as a cause of obstruction. He had also perforated appendix. Enterotomy with excision of web and appendectomy was done. This patient developed faecal fistula and was managed by creation of ileostomy. In a 6 months old female baby a band at terminal ileum arising from mesentery was a cause of obstruction.

GROUP-B: There were 43 patients in this group. Ages ranged from one year to 14 years, with an average age of 6.68 years. Male predominated in all (n=27) except for cases of tuberculosis, intussusception and Trichobezoar (Rapunzel syndrome) with female predominance. The commonest cause of intestinal obstruction in this group was post operative adhesions (n=6), while tuberculosis of intestine, Meckel's diverticulum with band and perforated appendix were found in five patients each. Other

causes are shown in Table-II. Post operative adhesions were seen in six patients. Of this three patients had surgery for recurrent abdominal pain elsewhere, while one had ileal perforation at age of 15 days, one after closure of colostomy for imperforate anus and one after V.P shunt. Two patients responded to conservative treatment, while 4 (66.66%) needed surgical intervention. Adhesiolysis was done in three patients, while resection and anastomosis in one 10 years old male, who died of faecal fistula and septicemia.

There were five patients with abdominal tuberculosis who presented with bowel obstruction with mean age of 6.2 years. They had stricturoplasty(n-1), adhesiolysis(n-1), resection/anastomosis(n-1) and omental or lymph node biopsy(n-2) followed by anti tuberculous drugs. Meckel's diverticulum with band was seen in 5 patients, causing entrapment of ileum and caecum in three cases, volvulus of ileum in one, and perforation of diverticulum with inter-loop adhesions in one. Wedge diverticulectomy in three and resection of gangrenous gut and ileo-colic anastomosis in two cases was performed. Perforated appendix was observed in five patients with mean age of 9.4 years. All of the patients had clinical and radiological diagnosis of intestinal obstruction. Wound infection was observed in two cases, infection was treated conservatively.

Two patients of Hirschsprung's Disease aged one and five years presented with acute intestinal obstruction. Colostomy and rectal biopsy was carried out. Trichobezoar, filling stomach and extending up to jejunum, causing upper gastrointestinal obstruction was seen in two girls of 7 years. Mass of hair was removed through gastrostomy without any complication. Two male children had faecal impaction as a cause of large bowel obstruction. Both of them presented with absolute constipation and distention of abdomen of 4-5 days duration. One of them (14 years old) had eaten Tamarind few days ago. Both patients responded to digital evacuation of faecal matter

Table-I: Causes of intestinal obstruction in infants.

Disease	No. of patients (%)	Male	Female
Intussusception	15 (62.5%)	9	6
Obstructed Inguinal hernia	4 (16.66%)	4	0
Colonic web	2 (8.33%)	2	0
Post Op. Adhesion	1 (4.166%)	1	0
Ileal web	1 (4.166%)	1	0
Inflammatory band	1 (4.166%)	0	1

and conservative treatment. Scores of Tamarind seeds were removed digitally from rectum of one of the patients. Ovarian teratoma, Non-Hodgkin's lymphoma, volvulus of caecum, duodenal web and cystic duplication of transverse colon were observed as causes of intestinal obstruction in different age group.

DISCUSSION

Intestinal obstruction occurs in all age groups. Several studies on common causes of intestinal obstruction in adults show diversity of patterns in different geographical regions.¹⁰⁻¹⁴ Even within the same localities, differences have been observed among different social setup.^{15,16} This may also be reflected in the children as well. Literature on intestinal obstruction in children from Pakistan is scanty. Few studies are found to have addressed the problem in infants and older children.^{2,17,18}

Intussusception is commonest cause of intestinal obstruction in infants.¹⁷ We had 18 (male 10, Female 8) patients with almost equal sex ratio which is at variance with other studies.^{2,17} Intussusceptions were a major cause of intestinal obstruction in group A and with mean age of 5.83 months. No lead point was seen in any patient. This observation correlates with other studies.^{2,17} Intussusception in older children is relatively less common and often

Table-II: Causes of intestinal obstruction in children (>1 year).

Disease	No. of patents (%)	Male	Female
Postoperative adhesions	6 (13.95%)	5	1
Tuberculosis	5 (11.63%)	2	3
Meckel's diverticulum	5 (11.63%)	3	2
Appendicitis	5 (11.63%)	3	2
Intussusception	3 (6.97%)	1	2
Volvulus of small intestine	3 (6.97%)	3	0
Inflammatory bands and adhesions	3 (6.97%)	3	0
Malrotation	2 (4.65%)	1	1
Hirschsprung's disease	2 (4.65%)	1	1
Trichobezoar	2 (4.65%)	0	2
Faecal Impaction	2 (4.65%)	2	0
Ovarian teratoma	1 (0.43%)	0	1
Lymphoma	1 (0.43%)	1	0
Caecal volvulus	1 (0.43%)	1	0
Duodenal web	1 (0.43%)	0	1
Duplication of colon	1 (0.43%)	1	0

has a lead point. Hussain et al² had 6.89% cases of Intussusception above one year among them 5.1% had lead point, while Mahmood et al¹⁸ had 11% of cases of Intussusception above one year age. We had 3(6.97%) cases of Intussusception above one year and lead point was found in one patient. We are unable to or perform non operative reduction of Intussusception due to lack of facility of paediatric radiological suit and image intensifier. Manual reduction was successful in 50% of our cases while the other half needed resection and anastomosis. This correlates with Hussain et al², while Mahmood et al had 70% bowel resection¹⁷, which is higher than our study.

Post operative adhesion was the second common cause of intestinal obstruction. We had 7 patients of post operative adhesions (Group B; 6 and Group A; 1). In the study by Hussain et al, adhesions constituted the second most common cause of bowel obstruction, while in series from Faisalabad^{17,18} they were the commonest cause in children above one year and second commonest cause in children less than one year of age. Nearly 71% of our patients had surgical intervention as they did not improve with conservative treatment. One patient needed resection of gangrenous gut with anastomosis and in rest of patients adhesiolysis was possible. Two patients responded to conservative treatment. This is in contrast with series of Hussain et al.²

The prevalence of abdominal tuberculosis is also rising in the developing countries. Some of the studies in adults have reported tuberculosis as the commonest cause of intestinal obstruction.^{3,12} Hussain et al² had 3/58 (5.17%) patients with tuberculosis and all of them were females. We had 5/43 (11.63%) patients of tuberculosis, 3 were females and 2 were males, which is about double in percentage. Most of our patients had generalized adhesions of intestine. Interestingly Mahmood et al¹⁸ had no case of abdominal tuberculosis in a series of 200 cases of intestinal obstruction.

Meckel's diverticulum with band was second common cause of intestinal obstruction in older children. There were about 12% patients with this condition who presented with various features of bowel obstruction. All the patients were from group B. Hussain et al² had 5 (8.62%) patients in children >1 year of age, while Mahmood et al¹⁸ had 31 (15.5%) patients in the same age group with Meckel's diverticulum causing bowel obstruction. These observations were at variance with each other. However male and female ratio in our series was comparable with other series.² Two of our patients

had developed gangrene of entrapped gut.

It is not unusual for advanced appendicitis to present with intestinal obstruction. Soomro BA¹⁹ had, in his series of 58 cases of appendicitis in children showed that about 9% patients presented with symptoms and signs of intestinal obstruction or peritonitis. In a 10 year old boy tip of inflamed appendix knotting to terminal ileum with surrounding inflammatory mass and herniation of part of ileum through knotted appendix causing bowel obstruction has been reported.²⁰ In one series of intestinal obstruction perforated appendix caused entrapment of an ileal loop in pelvis with gangrene of gut loop in an 8 year old boy.² We had 5/ 43 (11.63%) patients with mean age of 9.4 years from group B of perforated appendix who presented with symptoms and signs of intestinal obstruction and on exploration inter-loop adhesions and pussy collection were seen.

There were 4 (5.97%) patients with obstructed inguinal hernia. Seventy-five percent of incarceration has been reported to occur during first year of life, with males being affected three times more than females.² In our study all patients were male and under one year comprising nearly 17% of intestinal obstruction in group A. In other study 11 % infants with inguinal hernia presented with incarceration.¹⁷ Gangrene of entrapped loop of gut has been reported in varying percentage of patients. We did not have the gangrene of gut.

Bands and adhesions result in gut obstruction. The bands which do not have any apparent embryologic origin are called anomalous bands.²¹ Abdominal sepsis of any kind such as local or general peritonitis, gastroenteritis may lead to formation of inflammatory bands. We found inflammatory bands and adhesions in 4 patients (3 from group B) causing intestinal obstruction. Same has been observed in other studies in variable number of patients.^{2,17,18}

Volvulus of loop of small intestine without any significant cause was cause of obstruction in 3 (6.97%) patients above one year of age. This condition caused by various reasons has been seen to be the cause of small bowel obstruction in 12 percent of patients above one year.¹⁸ All of three patients in our study needed resection of gangrenous gut.

Trichobezoars are not rare in children and cases of trichobezoar filling stomach extending to ileum (Rapunsel syndrome) has been reported^{22,23} We had two girls of 7 years in whom trichobezoar extending from stomach to jejunum causing proximal

intestinal obstruction was found.

Faecal impaction is a common cause of intestinal symptoms in children. Safir Ullah et al¹⁴ have reported faecal impaction as cause of dynamic intestinal obstruction in 4.17% of patients. Large bowel obstruction from impaction of sand and small stones in rectum in a three year old boy has been reported from Iran.²⁴ We had two patients with faecal impaction presenting with intestinal obstruction. One of them had eaten Tamarind. Both responded to digital evacuation.

Ascariasis as a cause of intestinal obstruction is not uncommon in our region. In a study from Karachi worm infestation has been reported to be the commonest cause of intestinal obstruction occurring in 29.31% of patients above one year of age.² In another local study 2.5% of intestinal obstructions in children were caused by worm infestation.¹⁸ From Kashmir, India 63.2% of intestinal obstruction in children has been reported to be caused by ascaris *Lumbricoides*.²⁵ We did not see any case of intestinal obstruction due to worms. Some of the patients who settled with conservative treatment may have worms infestation furthermore majority of people living in catchments of our hospital use clean drinking water.

Other less common causes of intestinal obstruction in our series more or less resemble with a local series.² Overall mortality was 2.98% (n=2). One patient died as a sequel of meningitis. Resection of gut and anastomosis was carried out in 18(26.86%) patients (8 from group A and 10 from B).

CONCLUSION

Acute intestinal obstruction in children is not uncommon. The cause of intestinal obstruction varies at different ages. Intussusception is the leading cause of bowel obstruction in infancy. In children above one year, predominant cause of bowel obstruction is post operative adhesions, TB of intestine, Meckel's diverticulum with band and appendicitis. Early diagnosis and management can help to decrease the morbidity and mortality associated with this condition.

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