Original Research Article

A prospective study of intestinal obstruction in paediatric age group

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ABSTRACT

Background: Intestinal obstruction can occur at any age in the paediatric population1-4. Bowel obstruction in children differs from that in adults in terms of etiology, presentation and even the management. The aim of the study was to find out various etiologies, clinical features, outcome and mortality of paediatric age groups with intestinal obstruction and their relation to age and sex distribution.

Methods: This is a prospective study of 50 cases of paediatric age group with signs and symptoms of intestinal obstruction which were admitted in Sir Sayajirao Gaekwad Hospital, Vadodara, India during period of December 2004 to November 2006. Surgical intervention was carried out where indicated otherwise patients were managed conservatively. Data was analysed in SPSS version 10 statistical software for percentage and frequencies.

Results: Total 50 patients were included in the study. Among these 30 were males and 20 were females with M: F ratio of 3:2. Majority of them were 25 neonates of age group of 1-7 days (50%), followed by 7 infants of 1 months-1 years (14%) and 18 children aged 1 years-12 years (36%). Out of 50 patients, 41 (82%) patients had congenital causes in which 21(42%) patients had imperforate anus followed by Hirschprung’s disease in 8(16%), Meckel’s diverticulum in 6(12%), jejunal atresia in 4(8%), hypertrophic pyloric stenosis in 2 patients (4%) and 9(18%) patients had acquired causes in which intussusception was in 5(10%) patients, abdominal tuberculosis in 2(4%) and gangrenous appendix in 2(4%) patients. Total mortality was 6 out of 25 neonates and there were no mortality in infants and children groups.

Conclusions: Majority of patients were neonates than infants and children with slight male preponderance with male: female ratio of 3:2. Congenital causes of intestinal obstruction were more common (82%) than the acquired causes (18%). Postoperative septicæmia was more common and overall mortality was exclusively in neonates.

Keywords: Anorectal malformation, Intestinal obstruction, Intussusception, Intestinal atresia, Neonate

INTRODUCTION

Intestinal obstruction can occur at any age in the paediatric population.1-4 Bowel obstruction in children differs from that in adults in terms of etiology, presentation and even the management. It also varies with age in children of different age groups.5,6 Paediatric surgery is a fast expanding branch and in spite of great strides it had made in last 4 decades, mortality and morbidity in children with intestinal obstruction remains apparently high. In last decades, great advances have been made in pre-and postoperative intensive care and anaesthesia. Better understanding of pathophysiology of infants and application of this knowledge to develop proper technique, improvement in diagnostic methods, and availability of better antibiotics have brought.
dramatic reduction in mortality and morbidity in infants with intestinal obstruction. 7

Though these newer methods and sophisticated facilities are available in West, and barring a few centres in our country, most of the children who require surgery are treated by the general surgeon. When a surgeon is facing this challenge, he should be knowledgeable, well prepared and aware of different types of presentation and their physiological responses to management in this age group with intestinal obstruction.

Majority of the paediatric patients with intestinal obstruction present with common symptoms of abdominal distension, constipation or failure to pass meconium, vomiting, fluid and electrolyte imbalance etc. Majority of birth defects present in neonatal age group, but infantile hypertrophic pyloric stenosis commonly occurs around the age of 3 weeks. Intussusception is commonly seen in healthy children of 6-11 months of age. The onset of signs and symptoms of intestinal obstruction also give some idea about the diagnosis.

Various causes of intestinal obstruction in paediatric age group have been described. These causes vary from country to country and region to region. 8 In a series, Belokar et al has mentioned some common causes as intussusception, infantile hypertrophic pyloric stenosis, Hirschsprung’s disease, imperforate anus, meconium ileus, malrotation and volvulus, intestinal atresia, annular pancreas etc. 9 Early diagnosis and treatment is essential in intestinal obstruction in paediatric patients, otherwise it may lead to fluid and electrolyte imbalance, perforation peritonitis, aspiration pneumonitis etc. and ultimately lead to mortality.

METHODS

This was a prospective study carried out in 50 patients at Department of Surgery in Medical College and Sir Sayajirao Gaekwad Hospital, Baroda, Gujarat, India from December 2004 to November 2006. Out of them, 25 patients were neonates (1-7 days), 7 patients were infants (1 months-1 year) and 18 patients were children (1-12 years) who were managed according to standard protocols. Complete blood count, serum electrolyte and urea level were done. Patients were initially resuscitated and once stabilized were treated by the general surgeon. When a surgeon is facing this challenge, he should be knowledgeable, well prepared and aware of different types of presentation and their physiological responses to management in this age group with intestinal obstruction.

Majority of the paediatric patients with intestinal obstruction present with common symptoms of abdominal distension, constipation or failure to pass meconium, vomiting, fluid and electrolyte imbalance etc. Majority of birth defects present in neonatal age group, but infantile hypertrophic pyloric stenosis commonly occurs around the age of 3 weeks. Intussusception is commonly seen in healthy children of 6-11 months of age. The onset of signs and symptoms of intestinal obstruction also give some idea about the diagnosis.

Surgical procedure was performed 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 up on regular basis after discharge from the hospital. Data were analyzed by using SPSS version 10 for percentage and frequencies.

RESULTS

During the study period, total 50 patients were included in the study. Among those 47 patients were operated and 3 were managed conservatively in which 2 patients had tuberculosis and 1 patient of intussusception was treated with hydrostatic reduction.

Table 1 shows highest incidence of intestinal obstruction in 25 neonates (50%) of age group of 1-7days followed by 7 infants of 1 months-1 years (14%) and 18 children of age 1 years -12 years (36%) (Table 1).

Table 1: Age distribution.

| Age                | No. of cases | Percentage |
|--------------------|--------------|------------|
| Neonates (1-7 days) | 25           | 50         |
| Infants (< 1 years) | 07           | 14         |
| Children           | 18           | 36%        |
| Total              | 50           | 100        |

Table 2 shows 30 were males (60%) and 20 females (40%) with M: F ratio of 3:2 was nearly equal in both sexes with slight male preponderance (Table 2).

Table 2: Sex distributions.

| Sex     | No. of cases | Percentage |
|---------|--------------|------------|
| Male    | 30           | 60         |
| Female  | 20           | 40         |
| Total   | 50           | 100        |

Table 3 shows abdominal distension in 38 (61.7%) patients which was found to be a commonest symptom followed by failure to pass meconium in 32 (64%) patients, excessive crying in 30 (60%) patients, abdominal pain in (34%) patients, visible peristalsis in 2 (4%) patients and vomiting in 20 (40%) patients (Table 3).

Table 4 shows distribution of patients according to various causes of intestinal obstruction. Among them 41 (82%) patients had congenital causes in which 21 (41%) patients had imperforate anus followed by Hirschsprung’s disease in 8 (16%) patients, Meckel’s diverticulum in 6 (12%) patients, jejunal atresia in 4 (8%) patients and hypertrophic pyloric stenosis in 2 (4%) patients and...
acquired causes were seen in 9 (18%) patients in which intussusception in 5 (10%) patients, abdominal tuberculosis in 2 (4%) and gangrenous appendix in 2 (4%) patients. (Table 4).

Table 3: Distribution of patients according to various clinical features.

| Clinical features          | No. of cases (n=50) | Percentage |
|----------------------------|---------------------|------------|
| Abdominal distension       | 38                  | 76         |
| Not passing stool/ meconium| 32                  | 64         |
| Excessive crying           | 30                  | 60         |
| Abdominal pain             | 17                  | 34         |
| Visible peristalsis        | 02                  | 4          |
| Vomiting                   | 20                  | 40         |

Table 4: Distributions of patients according to various causes.

| Causes                                      | Type of lesion       | No. of cases | Percentage |
|---------------------------------------------|----------------------|--------------|------------|
| Congenital (n=41) 82%                       | Ichterusone           | 21           | 42         |
|                                             | Hirschprung’s diseases | 08           | 16         |
|                                             | Meckel’s diverticulum | 06           | 12         |
|                                             | Jejunal/ileal atresia | 04           | 8          |
|                                             | Hypertrophic pyloric stenosis | 02 | 4      |
| Acquired (n=09) 18%                        | Intussusception      | 05           | 10         |
|                                             | Abdominal tuberculosis | 02           | 4          |
|                                             | Gangrenous appendicitis | 02           | 4          |

Table 5 shows various overall postoperative complications that occurred in 15 (30%) patients out of 50 in which 6 (40%) patients had septicaemia, 4 (26.66%) patients had excoriation of skin, 3 (20%) patients had wound infection and retraction of colostomy were seen in 2 (13.33%) patients (Table 5).

Table 6 shows overall mortality in 6 (12%) patients out of 50 and highest mortality were seen in 6 (24%) neonates out of 25 patients. Out of 6 patients 2 patients had high variety imperforate anus with tracheo-oesophageal fistula and 4 patients had jejunial atresia.

All patients died due to postoperative septicaemia. There was no mortality in infants and children group. Duration of hospital stay ranged from 5 to 25 days. 44 (88%) patients recovered and were discharged (Table 6).

DISCUSSION

In this study, 50 patients were included during period of December 2004 to November 2006 admitted in Sir Sayajirao Gaekwad Hospital Vadodara, Gujarat, India. Intestinal obstruction is the commonest surgical emergency in children apart from acute appendicitis. It was the most common indication of laparotomy in paediatric patients and also forms an important cause of mortality and morbidity in them. This similar type of study were carried out by Gangopadhyay et al in 765 cases, Park CH and Woo et al in 77 cases and Adeyemi D et al in 211 cases and they found male and female ratio was 2.3:1, 3.2:1 and 3:1 respectively while in present study, M:F ratio was 3:2 with higher female ratio as compared to other studies (Table 7).

Park CH and Woo et al also studied clinical features in their study in 77 paediatric patients with intestinal obstruction. He found abdominal distension as the commonest symptom in 76% of patients followed by not passing stool/meconium in 64%, excessive crying in 60%, visible peristalsis in 34% and vomiting in 4% of patients while present study also found same features ordered in 40.6%, 11.7%, 38.6%, 41.6% and 20% patients respectively. Present study found most common cause of intestinal obstruction to be anorectal anomalies seen in 42% of patients followed by Hirschprung’s disease in 16% of patients, jejunal atresia in 8% and hypertrophic pyloric stenosis in 4% of patients, whereas Gangopadhyay et al, Park CH and Woo et al and Adeyemi D et al found anorectal anomalies in 50.3%, 28.6% and 38% of...
patients, Hirschprung’s disease in 15.7%, 19.5 and 14% of patients, hypertrophic pyloric stenosis in 5.5%, 23.4% and 10% of patients and intestinal atresia in 7.8%, 14% and 29% patients respectively.\textsuperscript{1,16-18} Gangopadhyay et al, Park CH and Woo et al and Adeyemi D et al also studied post-operative complications and mortality in their study and found complications in 26%, 34%, 42% and mortality in 20%, 22%, 35% of patients respectively while compared to present study, in which complications and mortality were in 30 % and 24% of patients respectively.\textsuperscript{16,17}

Postoperative shock, hypothermia, metabolic disturbances, prematurity and others with associated congenital anomalies were common causes of poor survival rate, thus we see that there is no much difference in established pattern of paediatric intestinal obstruction with respect to presentation, etiology, complication and mortality on comparing present study with those of similar studies in recent past.

In developing countries, significant percentage of deliveries is still carried out at home. Early recognition of congenital malformation may not be possible here in absence of adequately trained personnel. These neonates are brought to hospital only when they develop overt symptoms. Delay in surgery only serves to enhance the rate of complications.

The overall mortality rate in paediatric intestinal obstruction has been reducing with time because of increasing awareness, early diagnosis and intervention, improved paediatric anaesthesia, better antibiotics and improvement of post-operative care of paediatric patients.

| Study | Gangopadhyay et al (n=765) | Park CH and Woo et al (n=77) | Adeyemi D et al (N=211) | Present study (n=50) |
|-------|--------------------------|---------------------------|------------------------|---------------------|
| Sex incidence (M:F) | 3.2:1 | 2.3:1 | 3:1 | 3:2 |
| Clinical features | Abdominal distension | - | 76% | - | 40.6% |
| Not passing stool/meconium | - | 64% | - | 11.7% |
| Excessive crying | - | 60% | - | 38.6% |
| Visible peristalsis | - | 34% | - | 41.6% |
| Vomiting | - | 04% | - | 20% |
| Causes | Anorectal anomalies | 50.3% | 28.6% | 38% | 42% |
| Hirschprung’s disease | 15.7% | 19.5% | 14% | 16% |
| Hypertrophic pyloric stenosis | 5.5% | 23.4% | 10% | 4% |
| Intestinal atresia | 7.8% | 14% | 29% | 8% |
| Post-operative complication | 26% | 34% | 42% | 30% |
| Mortality | 20% | 22% | 35% | 24% |

**CONCLUSION**

In this study, there was male preponderance with M:F ratio of 3:2. Among them half of the patients were neonates. Abdominal distension (76%) was the commonest symptom than other clinical features. Congenital anorectal anomalies (42%) were more common etiology than other causes of intestinal obstruction in this study. Postoperative septicaemia (40%) was the leading complication than the others and overall mortality was 12% in patients exclusively of neonatal age.

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**REFERENCES**

1. Ginalewski CA. Other causes of intestinal obstruction. In Grosfeld JA, O’Neil JA Jr, Fonkalsrud EW, Coran AG eds: Pediatric Surgery 6th Ed Philadelphia: Mosby Elsevier, Inc. 2006; 2:1358-68.
2. Hussain I, Akhtar J, Ahmed S, Aziz A. Intestinal obstruction in infants and older children. J Surg Pak. 2002;7(1):2-6.
3. Baloch NA, Babar KM, Mengal MZ and Babar SA. Spectrum of mechanical intestinal obstruction. J Surg Pak 2002;7(1):7-9.
4. Akhtar MS, Shukr I. Analysis of different causes of mechanical intestinal obstruction. Pak Armed Forces Med J. 2009;59(4):455-8.
5. Gangopadhyay AN, Harshwardhan. Intestinal obstruction in children in India. Pediatr surg Int J; 1989;4(2):84-87.
6. Ratan SK, Rattan KN, Pandey RM, Sehgal T, Kumar A, Ratan J. Surgically treated gastrointestinal obstruction in children: causes and complications. Indian J Gastroentero. 2006;25:320-1.

7. Baker JW, Ritter KJ. Complete surgical decompression for late obstruction of the small intestine with reference to a method. Ann Surg. 1963;179:759-69.

8. Saran HS, Dandia SD, Pendse AK. Acute intestinal obstruction: A review of 504 cases. J Ind Med Assoc. 1973; 60(12):455-60.

9. Saran HS, Dandia SD, Pendse AK. Acute intestinal obstruction: A review of 504 cases. J Ind Med Assoc. 1973;60(12):455-60.

10. Maheshwari M, Tanwani R, Patel M, Joshi A, Jain R, Praneeth E. Intestinal Obstruction in Pediatric Age Group: A Clinico-Pathological Study. Ann. Int. Med. Den. Res. 2016;2(6):SG28-30.

11. Chitumalla PK, Vemulapally NK, Reddy SN. Clinical study of bowel obstruction in relation to etiological factors. Int Surg J. 2017;4:485-90.

12. Belokar WK, Subrahmanyam M, Anant KS, Ingole NS, Kolte R. Pediatric acute intestinal obstruction in Central India. Indian J Pediatr. 1978;45(365):201-5.

13. Pujari AA, Methi RN, Khare N. Acute gastrointestinal emergencies requiring surgery in children. Afr J Pediatric Surg. 2008;5(2):61-4.

14. Ghritlaharey RK, Budhwani KS, Shrivastava DK. Exploratory laparotomy for acute intestinal conditions in children: a review of 10 yrs of experience with 334 cases. Afr J Pediatr Surg. 2011;8(1):62-9.

15. Sheikh KA, Baba AA, Ahmed SM, Shera Ah, Patnaik R, Sherwani AY. Mechanical small bowel obstruction in children at a tertiary care centre in Kashmir. Afr J Pediatr Surg. 2010;7 (2):81-5.

16. Gangopahyay AN, Sinha CK. Pediatric intestinal obstruction 10 year surgeon.1996;1:29-32.

17. Park CH, Woo Ho, Youn HS. Clinical study on neonatal obstruction. J. Korean Neonatal.1997;4(2);226-32.

18. Adeyemi D. Paediatrics intestinal obstruction in a developing tropical country; Pattern, problem and prognosis. J. Trop Pediatr.1989;35(2);66-70.

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