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Acute Intestinal Obstruction in Children: Experience in a Tertiary Care Hospital

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Abstract Acute Intestinal Obstruction is one of the commonest surgical emergencies in children. These cases are invariably operated upon by general surgeons as pediatric surgeons are very few in Nepal. Outcome to a great extent depends on prompt clinical diagnosis and treatment. This is prospective study of 51 cases of intestinal obstruction admitted, operated and treated at Manipal Teaching Hospital, a tertiary care hospital in the Western Region of Nepal from January 2011 to September 2015. Aim of the study was to observe the pattern of intestinal obstruction in children and the treatment outcome in the hands of general surgeons. Number of cases in the cohort was 51. Out of that 50 cases were operated upon and 1 case was managed conservatively. Age of the patients' ranged from 1 day to15 years (median age 9 months); There were 33 males and 18 females with a ratio of 1.8:1. Causes of intestinal obstruction were Intussusceptions (33), Meckel's diverticulum (6), obstructed /strangulated hernia(4), imperforate anus(2), Hirschprung's disease(2), Meconium ileus (1), Ladd's band with malrotation of mid gut (1),annular pancreas(1) and Adhesions (1) Base line investigations of CBC, BT, CT, PT and serum electrolytes were done in all the cases. Plain x-ray abdomen erect and supine, ultrasonography (USG) and computed tomography (CT) scan were done in most of the cases and. Contrast study using Diatrizoate Meglumine (Gastrografin) was done wherever necessary. There were 3 mortalities and 2 cases had postoperative complications. Average post operative Hospital stay was 6 days. Early diagnosis and surgical intervention gives favorable outcome, delay increases morbidity and mortality. All these cases were taken up by general surgeons and the results were encouraging and good.

Keywords: *intestinal obstruction, children, general surgeon*

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1. Introduction

Vomiting, pain abdomen and non passage of stool (constipation) or passage of blood mixed mucus are the symptoms of acute small bowel obstruction (SBO). Children in general and neonates in particular, have poor tolerance for dehydration and electrolyte imbalance that are caused by SBO. Non passage of stool in large bowel obstruction in neonates distends the gut. Enterocolitis may ensue causing perforation and peritonitis. The ischemic or gangrenous gut in strangulated hernia or volvulus leads to septicemia. Thus an acute intestinal obstruction in children is a life threatening emergency. It is important for the pediatrician or the emergency medical officer to diagnose it early and refer to the surgeons. New born baby who failed to pass meconium or had an imperforate anus are readily brought to notice by the attending nurse. Finally, the many different causes of intestinal obstruction add up to a sizeable number and load on the general surgeon and merit an analysis.

2. Material and Methods

The hospital based prospective study was conducted in the Department of Surgery, Manipal Teaching Hospital, Pokhara, Nepal, from January 2011 to September 2015.

2.1. Inclusion Criteria

Children below 15 years of age, with intestinal obstruction, diagnosed by physical examination including Digital Rectal Examination (DRE) and validated by investigation like plain x-ray abdomen, USG, CT scan and Barium/ Gastrografin contrast study.

2.2. Exclusion Criteria

Cases of intestinal obstructions due to non surgical causes like septicemia, head injury (birth trauma), hypothyroidism, and post diarrheal ileus.

2.3. Ethical Committee's Clearance

Permission from the institutional ethical committee was taken prior to the study. All operations were performed after written informed consent from the parents.

2.4. Clinical Presentation

Pain abdomen is present in all the cases of intussusceptions with vomiting ,constipation (or bloody mucus discharge per rectum) and a palpable abdominal lump sometimes. Vomiting, pain abdomen, constipation and distension were present in obstructed hernias and Meckel's diverticulum. Meckel's' diverticulum could only be diagnosed after laparotomy.

Diagnosis of Ladd's band with malrotation of mid gut could only be made with the aid of USG, CT scan and Gastrografin study [1,2].

A case of annular pancreas presents persistent bilious vomiting. Abdominal radiograph shows double bubble sign. A case of meconium ileus in new born presents with distended abdomen, fails to pass meconium and DRE realized very sticky meconium. Plain x-ray abdomen has ground glass appearance. Gastrografin eases the sticky meconium out which is the standard practice being followed in uncomplicated cases [3,4].

2.5. Procedures

General measures

Resuscitation with IV fluid, naso/orogastric intubation, IV antibiotic were instituted in all the cases.

Operative measures

Figure 1. Pre Operative Abdominal Xray of Malrotated Gut

All cases were operated under endotracheal general anesthesia. A transverse right upper quadrant supraumbilical incision was made for laparotomy. To add to safety, the abdominal wall can be lifted at the time of incision by the assistant between thumb and forefinger of both hands. Intussusceptions were reduced whenever possible and appendectomy and ileo-cecopexy done. Resection anastomosis was done in all the cases of strangulated hernias, in all cases of Meckel's diverticulum, and in cases of intussusceptions where the gut was gangrenous and in cases the lead point were Meckel's diverticulum. Gut anastomosis was performed by one layer interrupted suture technique. Colostomy was done for imperforate anus and Hirschprung's disease. Ladd's procedure was performed for the malrotation of gut (untwisting of the twisted gut, excision of the band and appendectomy). (Figure 1 & Figure 2). Duodenodudenostomy was done for annular pancreas and adhesionolysis for intraperitoneal adhesion.

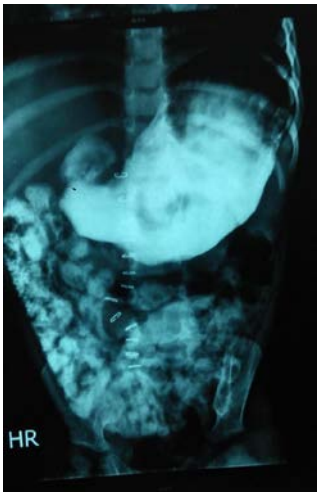

Figure 2. Post Operative Abdominal Xray of Malrotated Gut

Preoperative Xray shows cecal gas shadow on left in Figure 1 which is confirmed in postoperative contrast Xray in Figure 2.

3. Results

The total number of cases in the cohort were 51. Out of that 50 cases were operated and one case was managed conservatively.

Age of the patients ranged from 1 day to 15 years (median age 9 months); Males were 33 and Females 18 with a ratio of 1.8:1. Causes of intestinal obstruction were Intussusceptions 33(64.70%), Meckel's diverticulum 6(11.76%), Obstructed /Strangulated Hernia 4 (7.84%), Imperforate Anus 2 (3.92%), Hirschprung's disease 2(3.92%), Meconium ileus, Ladd's band with malrotation of mid gut, annular pancreas and Adhesions one each (1.96%) respectively (Figure 3)

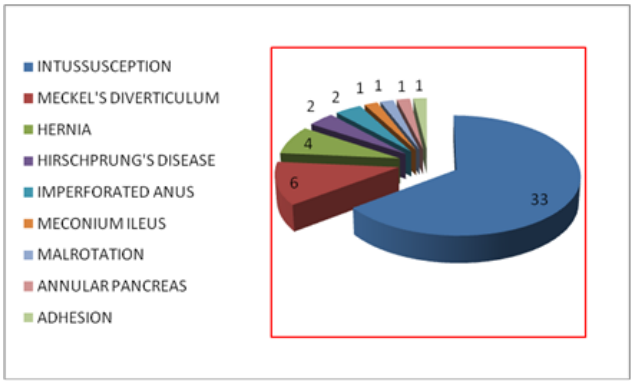

Figure 3. Causes of Intestinal Obstruction

Pain abdomen was present in all the cases of Intussusceptions (33cases), Meckel's diverticulum (6), obstructed/strangulated hernia, malrotation of gut, and adhesion.

Vomiting was present in 46 cases (except in imperforate anus, Hirschprung's disease and meconium ileus).

Constipation was seen in 50 cases. The intussusceptions cases only passed blood mixed mucus (red currant jelly) and in malrotated gut constipation was episodic.

Distension was noticed in Hirschprung's disease, imperforate anus, meconium ileus and all the obstructed hernia cases.

Lumps were seen in all the cases of obstructed hernia and felt in 16 cases of intussusceptions.

Meckel's diverticulum had pain right lower quadrant, vomiting, tenderness and leucocytosis; laparotomy clinched the diagnosis

Obstructed /strangulated hernias – (three inguinal hernia and one umbilical hernia) presented with pain abdomen, vomiting and irreducible swelling.

Imperforate anus (2 cases) were easy to diagnose. Invertogram showed both to be of high variety. Hirschprung's disease (2 cases) presented with non passage of meconium, distension of abdomen. DRE revealed gripping of the finger with passage of stool. Contrast enema with Gastrografin revealed dilatation of descending colon with abrupt termination.

A 2 year female child presented with pain abdomen off and on. Diagnosis of Ladd's band with malrotation of mid gut was made with the aid of USG, CT scan and Gastrografin study.

Single case of annular pancreas, a 14 day old female had persistent bilious vomiting. Abdominal radiograph showed double bubble sign.

In our single case of meconium ileus the new born had distended abdomen, failed to pass meconium and DRE realized very sticky meconium. Plain x-ray abdomen showed ground glass appearance. Gastrografin eased the sticky meconium out which has been the standard practice in uncomplicated cases. Clinical presentations are summarized in Table 1.

Table 1. Clinical Presentations of The Cases

Symptoms	Number	Percentage
Pain Abdomen	45	88.23
Vomiting	46	90.19
Constipation	50	98.03
Distention	9	17.64
Lump	20	39.21

In 29(58%) cases reduction of Intussusceptions was done, resection anastomosis was done in 14 (28%) patients, Colostomy in 4 (8%), Ladd's Procedure, Duodenoduodenostomy and Adhesionolysis were done in 1(2%) patient each Respectively.

Operative procedures are summarized in Table 2.

Table 2. Summary of The Operative Procedures

Operative Procedures	Number	Percentage	Cases
Reduction of Intussusceptions	29	58	intussusceptions
Resection Anastomosis	14	28	Intussusceptions 4 Strangulated hernias 4 Meckel's diverticulum 6
Colostomy	4	8	Imperforate anus 2 Hirschprung's disease 2
Ladd's Procedure	1	2	Malrotated mid gut
Duodenoduodenostomy	1	2	Annular pancreas
Adhesionolysis	1	2	Intraperitoneal adhesions

There were three mortalities in the cohort; one Hirschprung's and one intussusceptions died post operatively. Only one case of intussusception died before the operation could be undertaken.

Post operative complications were, 1 intestinal adhesion and 1 Superficial wound infection,

Average Patient's post operative hospital stay was 6 days. All patients were followed up for 6 months.

In all the cases operative procedures were performed without any blood transfusion.

4. Discussions

There is a male preponderance of intestinal obstruction in children in the cohort (ratio 1.8:1)

Imperforate anus, meconium ileus and Hirschprung's disease can be detected / diagnosed soon after birth. Diversion colostomy is a good procedure for Hirschprung's disease and imperforate anus (high variety). The left iliac colostomy is easier to maintain, stool being less liquid. Out of concern for preservation of continence and erectile functions, these patients with colostomies were referred to specialized centers for care of proctologists/ pediatric surgeons skilled in the field.

Intussusceptions were the major causes of acute intestinal obstruction [5]. Review of world literature on intestinal obstruction confirms this [5,6,7]. Intussusceptions were seen in the weaning period from 5 months onward up to 2 years as the children are breast fed for a longer period in Nepal than elsewhere in the subcontinent. It is also seen during change of season with minor febrile illnesses – possibly of viral pathology which we have made no attempt to establish for want of resources. However, lead point was not readily evident except in two cases where Meckel's diverticulum was the lead point [8]. Mostly it being ileo-colic type hypertrophy of the Peyer's patches can be incriminated. Rotavirus vaccine was not given to any of these infants as they were not available [9]. Reduction of the intussusceptions was not attempted by enema or hydrostatic pressure, rather surgery was preferred to reduce it and prevent recurrence by ileo-cecopexy. In most cases reduction was possible even when the intussusceptions had progressed up the descending colon.

Meckel's diverticulums are invariably diagnosed at laparotomy as preoperative diagnosis is next to impossible. In the largest review of 1476 patients from 1950 to 2002, males were affected three times more and when more than 2 cm long and in children, they were symptomatic [10,11,12]. Annular pancreas is a rare congenital anomaly and duodeno-duodenostomy is the right choice of operation [13].

Delay in diagnosis and delayed surgical intervention adds to morbidity and mortality due to dehydration, electrolyte imbalance, and septicemia. All the patients in

the study received broad spectrum antibiotics plus metronidazole.

There are a myriad of causes for the child to cry and draw attention of the parents. A discerning parent can spot the problem. On an average patient delay has been 36 to 48 hours.

Intestinal obstruction can put the pediatrician and surgeon's clinical experience to anvil and doctor's delay had been 2 to 4 hours including investigation time in the study.

All general surgeons are conversant with creating colostomy, resection and anastomosis which are the cornerstone of effective surgical treatment of intestinal obstruction.

5. Conclusion

Proper diagnosis and timely surgical intervention can save many children's lives. General surgeon with skill in performing colostomy, resection anastomosis can handle most of the cases even in absence of pediatric surgeons.

Abbreviations

CBC: Complete Blood Count
BT: Bleeding Time
CT: Clotting Time
PT: Prothrombin Time
SBO: Small Bowel Obstruction
DRE: Digital Rectal Examination

Declaration of Conflicting Interests

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