

CLINICAL PROFILE OF NON-NEONATAL INTESTINAL OBSTRUCTION IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Intestinal obstruction is one of the commonest emergencies encountered in the pediatric age group. It has been recognized from many years as the principle challenge to the diagnostic acumen of pediatrician and therapeutic skill of surgeon. There was a tendency in past for surgeon to anticipate failure in managing pediatric obstruction specially in neonates but scenario has changed gradually in last few decades with improvement in methods of diagnosis, greater understanding of pathophysiology, availability of trained specialised personnel, safer anaesthesia, better antibiotics and much improved pre and post operative intensive care.

Material and Methods: The present prospective study was conducted on patients admitted with diagnosis of intestinal obstruction in Department of General Surgery, Govt. Medical College Jammu, from Jan. 2015 to Sept. 2016 over a period of 21 months

Summary and Conclusions: Most of the patients (39.7%) were in age group of 1 month to 1 year. 66.7% patients were male with male to female ratio of 2:1. Most common cause was adhesions (20.5%). Out of 78 cases of non-neonatal intestinal obstruction in our study, 60 patients (76.9%) were operated.

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INTRODUCTION

Intestinal obstruction is one of the commonest emergencies encountered in the pediatric age group. [1] It constitutes a major cause of morbidity and financial expenditure in hospitals around the world. [2] Intestinal obstruction belongs to the severe conditions requiring a quick diagnosis as well as an immediate rational and effective therapy. [3] The incidence of intestinal obstruction is approximately 2-3 percent of the total surgical patients. Anderson (1953), Wangenstein (1955), and Jain and Mahendra (1962) gave incidence of intestinal obstruction as 3 percent, 1 percent and 2.44 percent respectively. [4, 5, 6] Most of the studies like Adejuyigbe and Fashakin, [7] Momani et al, [8] and Ogundoyin et al [9] have described Intussusception as the major cause of intestinal obstruction.

Common causes of non-neonatal intestinal obstruction in children are:

Duodenal obstruction

Malrotation
Duodenal stenosis / membrane
Pre-duodenal portal vein
Annular pancreas
Duodenal haematoma.

Small Bowel Obstruction

Intussusception
Midgut volvulus
Post-operative adhesion obstruction
Post-operative Intussusception
Ileal dysgenesis
Meckel's diverticulum
Obstructed hernia (inguinal, femoral or umbilical)
Miscellaneous causes (tubercular strictures, mesenteric cysts, duplications, ingested foreign bodies / milk inspissation)

Large bowel Obstruction

Hirschsprung's disease

Volvulus

Intussusception

Stenosis

Duplication

Adhesion bowel obstruction

Caecal
Sigmoid colon
Transverse colon

Other less common causes of intestinal obstruction include congenital bands and cords, mesenteric defects and tumours. In addition, several medical diseases such as metastatic

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carcinoma, obstruction secondary to radiation enteritis and regional enteritis are associated with obstruction.

The signs and symptoms of intestinal obstruction are basically the same as in adults. Most of these patients present with distension of abdomen, pain and vomiting with fluid & electrolyte imbalance. For diagnosis a detailed history and various factors like age of the patient, rapidity of onset, character of vomitus may give a clue. [10]

Radiological investigations like x-ray flat plate abdomen in erect and supine position demonstrates multiple air fluid levels and dilated loops which are diagnostic of intestinal obstruction. [11] Dye studies like barium meal and barium enema may be used in diagnosis to find out the cause of intestinal obstruction. Ultrasound also plays an important role in diagnosis of intestinal obstruction in doubtful cases e.g. infantile hypertrophic pyloric stenosis. [12] The pyloric tumour and assessment of length of pyloric canal can be made with ultrasound. Similarly ultrasound can also detect the lump in cases of Intussusception. Prenatal ultrasound can also detect various congenital gastrointestinal conditions like duodenal obstruction; small bowel obstruction etc. [13] At present the approach to intestinal obstruction is early diagnosis and surgical intervention. Any patient with crampy, abdominal pain and constipation must be considered to have intestinal obstruction until proven otherwise. Successful treatment of acute intestinal obstruction depends upon judicious combination of several procedures. They include decompression of the intestine by intubation that also prevents aspiration pneumonitis; replacement of water, electrolytes, plasma and blood, and administration of antibiotics and operation that is specific treatment. [14]

MATERIAL AND METHODS

This study was a prospective study conducted from Jan.2015 to Sept. 2016, which included 78 cases of intestinal obstruction treated in Department of Surgery, Govt. Medical College Jammu, over a period of 21 months. All the children presenting with features of intestinal obstruction up to the age of 14 years were included in this study. Neonates, cases of gastric outlet obstruction and those of ano-rectal malformation were excluded from this study.

All the cases were subjected to routine investigations. Specific investigations included abdominal radiographs, Ultrasonography, Contrast study of the upper gastrointestinal tract, Contrast enemas and rectal biopsy (full thickness) in cases of Hirschsprung's disease.

RESULTS

The following observations were made.

Age at Admission

Minimum age at admission was 1 month and maximum age was 14 years. Mean age at admission for all cases was 45.9 months. Most of the patients (31) were in age group of 1 month to 1 year (39.7%) followed by 25 in 2- 4 year age group (32.1%).

Sex at Admission

Out of 78 patients, 52 patients were male (66.7%) and 26 were females (33.3%). The male to female ratio in the present study is 2:1. Males were more in all the age groups except in age group 4-7 and 7-10 where the ratio was equal. (table 1)

Table I Age and Sex Distribution in Non-neonatal Intestinal Obstruction (n = 78)

Age (years)	No. of patients	%age	Male	%age	Female	%age
≤ 1	31	39.7	23	29.5	8	10.3
1 - 4	25	32.1	16	20.5	9	11.5
4 - 7	4	5.1	2	2.6	2	2.6
7 - 10	6	7.7	3	3.8	3	3.8
> 10	12	15.4	8	10.3	4	5.1
Total	78	100	52	66.7	26	33.3

Weight at presentation

Minimum weight in our study was 1.75 kg who was a 2 months old female baby, a case of duodenal stenosis. Maximum weight was 38 kg.

Most of the cases in our study had weight less than the normal weight for their age.

Clinical presentation

Main features of clinical presentation in our study were pain, vomiting, constipation and distention of abdomen. Other features noted were fever, blood in stools, respiratory distress, symptoms and signs of dehydration.

Table II Clinical presentation in Non-neonatal Intestinal Obstruction (n = 78)

S.No	Main clinical features	No. of patients	%age
1	Vomiting	68	87.2
2	Pain	64	82.1
3	Distention of abdomen	64	82.1
4	Constipation	62	79.5
5	Fever	32	41.0
6	Blood in stools	14	17.9



Figure 1 Clinical photograph of patient of Intussusception showing blood stained finger.

Aetiology: Most common causes were adhesions (20.5%), intussusception (15.4%), Hirschsprung's disease (11.5%), Omphalomesenteric duct anomalies (10.3%), worm obstruction (10.3%) comprising approximately 68 percent of cases. Less common causes were obstructed hernias (6.4%), malrotation (5.1%) and others rare causes (20.5%) like bolus obstruction, faecal impaction mesenteric and duplication cysts, caecal volvulus, duodenal stenosis, tuberculosis and two undiagnosed cases.

Table III Aetiology of Non-neonatal Intestinal Obstruction in Children (*n* = 78)

S.No	Final Diagnosis	No. of cases	%age
1	Adhesion obstruction	16	20.5
2	Intussusception	12	15.4
3	Hirschsprung's disease	9	11.5
4	Omphalomesenteric duct anomalies	8	10.3
5	Worm obstruction	8	10.3
6	Obstructed hernia	5	6.4
7	Malrotation	4	5.1
8	Others	16	20.5
	Bolus obstruction	3	100
	Faecal impaction	3	
	Mesenteric cyst	2	
	Duplication cyst	2	
	Tuberculosis	2	
	Caecal volvulus	1	
	Duodenal Stenosis	1	
	Undiagnosed	2	
	Total	78	

Investigations

In the present study plain x-ray abdomen (AXR) in erect supine position were done in all the cases. In seventy patients AXR were suggestive of intestinal obstruction showing distended gut loops with air fluid levels. Seven x-rays were normal and one x-ray was inconclusive.

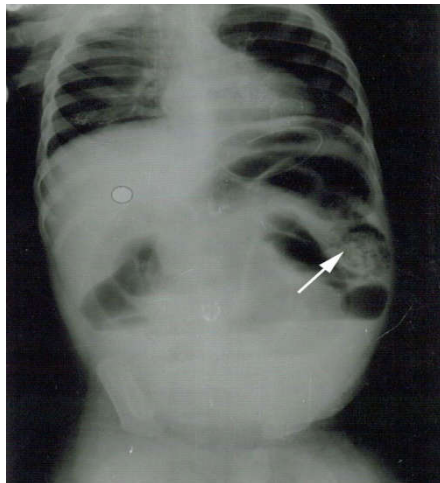


Figure 2 Plain x-ray abdomen (erect film) in a patient of Intussusception showing multiple air fluid levels with soft tissue density in left flank (arrow)

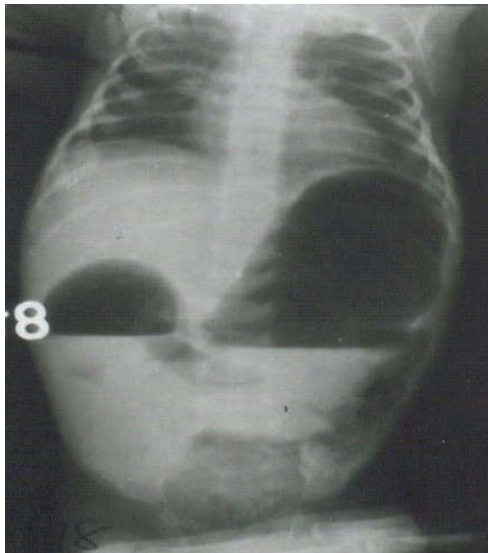


Figure 3 Plain x-ray abdomen showing "double bubble" sign.



Figure 4 Plain x-ray abdomen showing massive pneumoperitoneum in a patient of strangulated umbilical hernia.



Figure 5 Plain x-ray abdomen of a patient of worm obstruction (*Ascaris lumbricoides*) showing worm density in distended gut loops (arrow).

Ultrasonography abdomen was done in 34 cases to confirm the cause of obstruction. In 28 cases it was suggestive of intestinal obstruction and in 6 cases it was reported to be normal Upper gastrointestinal contrast study with thin barium was done in 10 cases and it confirmed the diagnosis made on X-Ray and ultrasound

Barium enema was done in 7 cases out of 9 cases of Hirschsprung's disease. In other 2 cases barium enema could not be done as both the patients presented with acute obstruction and were operated on emergency basis. Diagnosis in both these cases was confirmed by the biopsy of the resected segment. Transition zone was seen in all the 7 cases on barium enema study. In all cases there was retention of barium beyond 24 hours.

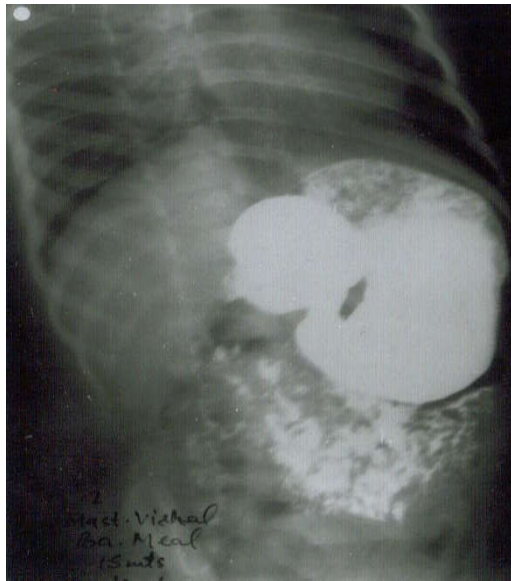


Figure 6 Upper GI contrast study in showing large dilated stomach and duodenum with DJ junction on right side suggestive of malrotation of gut.

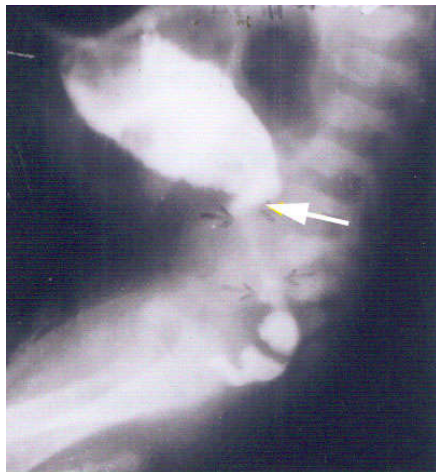


Figure 7 Barium enema study of patient showing narrowed rectum transition zone (arrow) and proximal dilated colon in case of Hirschsprung's disease

CECT abdomen was used to confirm the diagnosis of abdominal lump which was not confirmed by other means. In present study CECT abdomen was done in 2 cases (mesenteric cyst = 1 and enteric duplication cyst = 1).

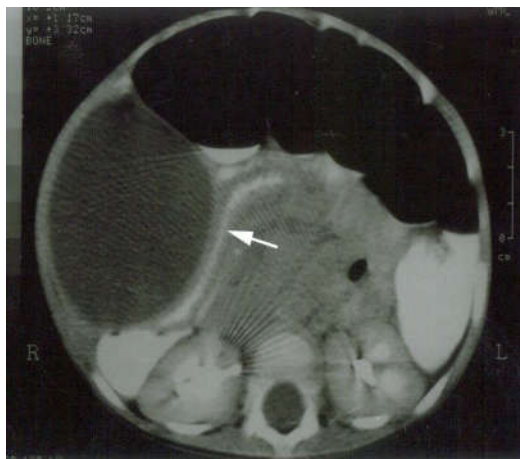


Figure 8 CECT in a patient of duplication cyst of ileum showing a large cystic mass with stretching and displacement of gut (arrow).



Figure 9 CECT abdomen showing a large cystic mass in a patient of mesenteric cyst.

Table V Preoperative Radiological Investigations in Non-neonatal Intestinal Obstruction in Children ($n = 78$)

S.No	Radiological Investigations	No. of cases	%age
1	Plain X-ray abdomen	78	100
2	Ultrasonography abdomen	34	43.6
3	Upper gastro intestinal study	10	12.8
4	Barium enema	8	10.25
5	CECT abdomen	2	2.56

In our study rectal biopsies were done in 5 cases suspected of having Hirschsprung's disease. All the biopsies, showed absence of ganglion cells. Confirming the diagnosis in 100% cases of Hirschsprung's disease where it was done.

Management

Out of 78 cases of non-neonatal intestinal obstruction in our study, 60 patients (76.9%) were operated. Other patients were treated on conservative line of management i.e., drip-suction and bowel wash outs. The treatment done in our study is summarized in table VI and VII.

Table VI Management of non-neonatal intestinal obstruction in Children ($n = 78$)

S. no	Aetiology	No of cases	Conservative %age	Surgery %age		
1	Adhesion obstruction	16	6	37.5	10	62.5
2	Intussusception	12	2	16.7	10	83.3
3	Hirschsprung's disease	9	1	11.1	8	88.9
4	Omphalomesenteric duct anomalies	8	0	0	8	100
5	Worm obstruction	8	2	25	6	75
6	Obstructed hernia	5	0	0	5	100
7	Malrotation	4	0	0	4	100
8	Others	16	7	43.25	9	56.25
	Total	78	18	23.1	60	76.9



Figure 10 Operative photograph of a patient showing ileo-ileal Intussusception.

Table VII Surgical management of non-neonatal intestinal obstruction in Children($n=60$)

S. No.	Aetiology	No of cases		Operative Procedures		
		No of cases	No of operate cases	Resection with anastomosis	Resection with exteriorization	Others
1	Adhesion obstruction	16	10	2	1	Adhesionolysis (7)
2	Intussusception	12	10	5	3	Simple reduction (2)
3	Hirschsprung's disease	9	8	-	-	Hartman's procedure (8)
4	Omphalomesenteric duct anomalies	8	8	4	-	Diverticulectomy with excision of band (4)
5	Worm obstruction	8	6	1	2	Milking of worms (2)
6	Obstructed hernia	5	5	2	-	Enterotomy (1)
7	Malrotation	4	4	-	-	Simple reduction (3)
8	Bolus obstruction	3	3	-	-	Ladd's procedure (2)
9	Mesenteric cysts	2	2	1	-	Ladd's procedure with duodenoduodenostomy (2)
10	Duplication cysts	2	2	2	-	Intraluminal crushing with decompression of gut (3)
11	Caecal volvulus	1	1	-	-	Enucleation (1)
12	Duodenal stenosis	1	1	-	-	Caecopexy (1)
	Total	78	60	17	6	Duodenoduodenostomy (1)
						37



Figure 11 Operative photograph of a patient showing ileo-colic Intussusception.

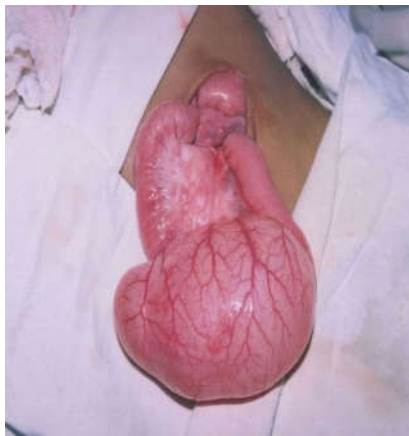


Figure 12-14 Showing operative photograph of patient with large duplication cyst and stretching of small bowel, with resected specimen.

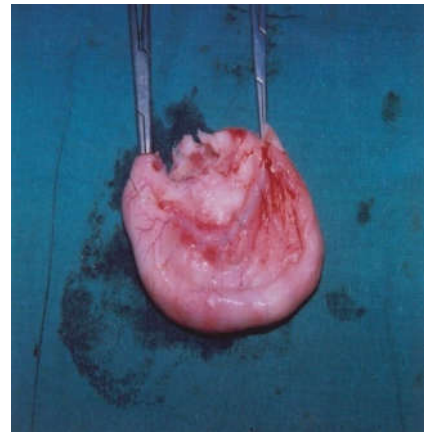


Figure 15, 16 Operative photograph showing large mesenteric cysts with Chylolympathic appearance and resected specimen with compressed and obstructed bowel (arrow).



Figure -17, 18 Showing clinical photograph of two infants with strangulated umbilical and inguinal hernia.



Figure -19, Clinical photograph of a patient of Hirschsprung's disease showing gross abdominal distension, along with Operative photograph of same patient showing grossly dilated sigmoid colon with transition zone (arrow).

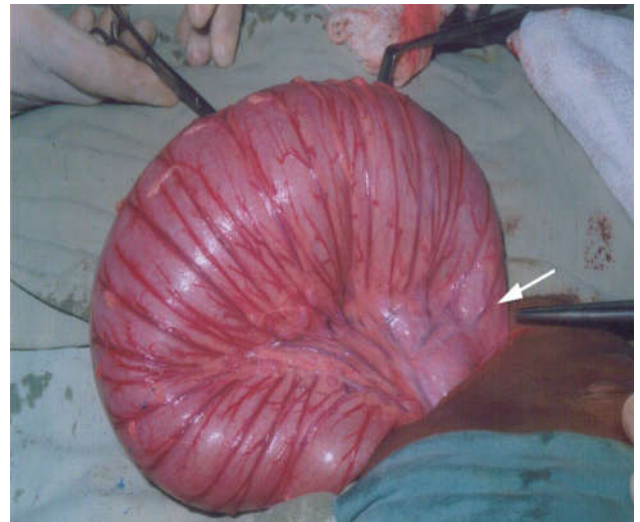


Figure 20 Clinical photograph of a patient of Hirschsprung's disease showing gross abdominal distension, along with Operative photograph of same patient showing grossly dilated sigmoid colon with transition zone (arrow).

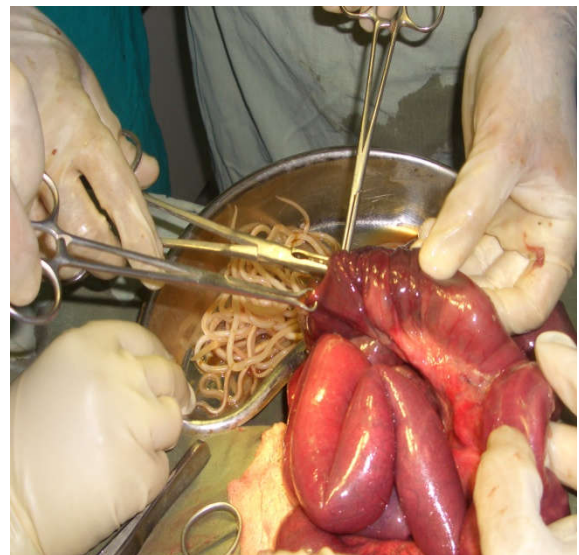


Figure 21 Operative photograph showing retrieval of worms through enterotomy.

Post Operative Complications

In our study the most common complications encountered were postoperative fever, wound infection, chest infection, stomal complications as shown in table VIII.

Table VIII Post operative Complications ($n = 78$)

S.No	Complication	No of cases	%age
1	Post operative fever	18	23.0
2	Wound infection	13	16.7
3	Chest infection/ resp. Distress	11	14.1
4	Stomal complications	7	8.9
5	Septicaemia	4	5.1
6	Abdominal distention	3	3.8
7	Candidiasis mouth	3	3.8
8	Adhesion obstruction	3	3.8
9	Burst abdomen	2	2.5
10	Incisional hernia	1	1.3

Mortality

Out of 78 patients managed in our study, six died. Therefore, overall mortality was 7.7%. Out of 60 operated cases 3 expired. Therefore, operative mortality was 5% in our study. The cause of death in the non-neonatal intestinal obstruction in

children is shown in table IX. Septicaemia was the most common cause of death in our study.

Table IX Cause of death in six cases of Non-neonatal Intestinal Obstruction (n = 78)

S. No	Aetiology	Cause of death	No. of deaths	%age
1	Adhesion obstruction	Septicaemia	1	1.28
2	Intussusception	Septicaemia	1	1.28
3	Hirschsprung's disease	Enterocolitis with Septicaemia	1	1.28
4	Worm obstruction	Septicaemia	1	1.28
5	Tubercular obstruction	Respiratory distress with Septicaemia	1	1.28
6	Undiagnosed	Septicaemia	1	1.28
	Total		6	7.7

DISCUSSION

In the present study, age at admission varied from 1 month to 14 years. This is consistent with observation in the study by Rao *et al.* where maximum cases belonged to the age group of 0-2 years [15]. The mean age at admission for all the cases was 45.9 months in our study where as mean age was 54 months in study by Villamizar *et al.* [16]

We had predominance of male patients in our study with about 67% of our cases were males (52), and male to female ratio was 2:1. This is inconsistent with M Mir *et al* series of 980 patients where 532 (54.29%) were females and 448 (45.71%) were males [17]

As in most of the studies on intestinal obstruction, the incidence of bands and adhesion obstruction was most common cause. Likewise in our study, 20.5% of cases were due to bands and adhesion obstruction. This was also observed by McIver (1932) [18], Becker (1952), [19] Perry *et al* (1955), [20] and Ellis (1974), [21] who had reported an incidence of 30%, 90%, 31% and 44% respectively. Most of the adhesion obstructions seen in our study were due to previous surgery and incidence of these post-operative adhesion obstructions in our study is 62.5%. Ellis (1974) had also found post-operative adhesion to be the commonest cause of adhesion obstruction with an incidence of 88%. [21]

In our study, intussusception was found to be the second largest group with an incidence of 15.4% in contrast to the study done by Rao *et al* (1978) in which they concluded that the intussusception was the most common cause of intestinal obstruction in children contributing 30.7%. [15]

In other series the overall incidence of intussusception reported by Smith *et al* (1955), [22] Jain and Prasad (1962), [6] and Wangenstein (1978) [5] was 2.9%, 5.3% and 12.2% respectively. In our study ileo-colic intussusception was the commonest type of intussusception, making for 80% of operated cases. Other types found were ileo-ileal (10%) and ileo-caecal (10%). This was comparable to the observations made by Rao *et al* (1978), [15] Involvement of small intestine was seen approximately in 83.3% of total operated cases of obstructions. The incidence in our study is comparative to the reported incidence by Perry *et al* (1955) 88.4%. [20] The diagnosis of intestinal obstruction depends upon clinical features, and investigations including Chest X-ray, Ultrasound, Contrast studies and sometimes Contrast Enhanced CT Abdomen. In our study, out of 78 plain Abdominal X-Rays, 70 (89.7%) were suggestive of intestinal obstruction, 7 were normal and 1 was inconclusive. Therefore, Abdominal X-Rays in most of cases of intestinal obstruction were suggestive of intestinal obstruction which is consistent with the literature.

In our study ultrasonography (USG) was done in cases suspected to have intussusception, preferably in cases not having abdominal lump or mass palpable per rectum. USG was done in 8 cases. In 7 cases, it was suggestive of intussusception and 1 case that reduced spontaneously was reported to be normal. Thus the accuracy of USG was 100% in diagnosing intussusception and this was comparable to the 100% specificity and sensitivity in detection of intussusception observed by Lim, Bae, Lee *et al* (1994). [23]

The surgical management of non-neonatal intestinal obstruction in children is guided by aetiological factor, the site of obstruction, type of obstruction (whether simple or strangulated), general condition of the patient and above all the personal judgement and experience of the attending surgeon. Conservative measures were tried in all cases except in those where there was suspicion of strangulation or concomitant peritonitis. In patients having adhesion and band obstruction, 6 cases (37.5%) out of total 16 were managed conservatively which included those with previous surgery, multiple surgeries and recurrent attacks of adhesion obstructions. In cases who were operated, attempt was made to break all the obstructing adhesions by sharp dissection and those found non-obstructing were left as such. Three cases in our study had strangulation of gut and two were managed with resection and end to end anastomosis, where as one was managed by resection with exteriorization of stomas. One of these patients died on second post-operative day (33%). Rao *et al* (1978) had reported a similar experience where out of 37 patients, 16 patients needed resection of segment with anastomosis and there were 7 deaths in total (43.7%). [15]

In case of intussusception, out of 12, 10 cases were treated by surgical intervention. One case reduced spontaneously and another case died pre-operatively despite all resuscitative measures. Hydrostatic and pneumostatic reduction was attempted in none of cases in our study as we do not have much experience of this. However, Hydrostatic and pneumostatic reduction is an effective method of reduction in context to the available literature. Reduction of intussusception with barium enema was as high as 81% (Gierup, Jorulf, Livaditis 1972) [24] and with air pressure enema more than 94% (Guo *et al* 1986). [25] We were able to reduce the intussusception in 2 cases with viable gut, using Cope's manoeuvre. In rest of the cases where the gut was compromised with strangulation gangrene, 5 underwent resection with primary anastomosis and other 3 cases underwent resection with exteriorization of stomas. Whereas Pollet (1980) performed 70 laparotomies out of total 77 cases and simple manual reduction was achieved in 60 cases (85%). [26] Raudkivi *et al* (1981) analysed 98 cases of intussusception and reported that simple reduction on laparotomy was done in 70% cases and resection was needed in up to 28% of cases. [27] In our study main complications in non neonatal obstruction reported were post-operative fever (23%), wound infection (16.7%), chest infections (14.1%) and stomal complications (8.9%). Other complications were septicaemia (5.1%), post-operative abdominal distension, candidiasis mouth, adhesion obstruction 3.8% each. This is in consistent to reports of Belokar (1978) who reported an incidence of post-operative complications in intestinal obstruction as wound infection (23.8%), respiratory complications (19.4%), electrolyte imbalance (14.9%), peritonitis (11.8%) and septicaemia (4.4%). [28]

Overall mortality rate in non-neonatal obstruction in our study was 7.7% and operative mortality was 5%. However, Rao *et al* (1978) and Belokar (1978) reported a mortality rate of 22.2% and 23.8% respectively. [15,28]

CONCLUSIONS

Non neonatal intestinal obstruction presents a great clinical challenge because of varied presentation, and diverse clinical pathologies. It is a challenge for the operating surgeon as it is difficult to elicit different clinical signs in pediatric age group. In our study also there were diverse clinical pathologies. Our study mostly consisted of the patients (39.7%) in age group of 1 month to 1 year. 66.7% patients were male with male to female ratio of 2:1. Most common cause was adhesions (20.5%). Out of 78 cases of non-neonatal intestinal obstruction in our study, 60 patients (76.9%) were operated.

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