

Childhood intestinal obstruction in Northwestern Nigeria

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Summary

Background: Intestinal obstruction is a common cause of childhood surgical emergency in the tropics. The aim of this paper was to assess the pattern and the outcome of management of intestinal obstruction in Nigerian children.

Study design: The clinical records of all the cases of childhood intestinal obstructions managed at a teaching hospital in northwestern Nigeria between 1999 and 2003 were retrospectively reviewed.

Results: There were 54 children, 44(81.5%) were boys and 10 (8.5%) were girls (m:f=4.4:1). Fifteen (27.8%) and 22 (46.2%) were neonates and infants, respectively. The causes of the intestinal obstruction were intussusception 16(29.6%), Hirschprung's disease 14(25.9%), anorectal anomaly 12 (22.2%), external hernias 6(11.1%), atresia 5(9.3%) and congenital bands 1(1.9%). The clinical features were consistent with those reported from other parts of the world, except that many patients with intussusception presented late with gangrenous intestines. The overall mortality was 6(11.1%); the mortality in the neonates was 5(33.3%).

Conclusion: Apart from the obvious absence of worm infestation, the aetiological pattern and the clinical presentation of childhood intestinal obstruction in this study agrees with those reported from other parts of the country. Their management is associated with high mortality in our environment, especially when there are associated anomalies or the presentation is late.

Keywords: *Intestinal obstruction, Children, Nigeria.*

Résumé

Introduction: L'oblitération de l'intestin est souvent la cause de la chirurgie d'urgence d'enfance dans la tropiques. L'objet de cette étude était d'évaluer la tendance et le résultat de la prise en charge d'oblitération de l'intestin chez des enfants Nigériens.

Plan d'étude: Les dossier cliniques de tous les cas des oblitérations intestinales d'enfance soignées dans un centre hospitalier universitaire dans le nord ouest du Nigeria entre 1999 et 2003 ont été rétrospectivement passé en revue.

Resultats: Il y avait 54 enfants. 44 soit 81.5% garçons et

10 soit 8,5% étaient filles. (m:f=4,4:1) Quinze soit 27,8% et 22 soit 46,2% étaient des néonates et enfants respectivement. Les causes d'oblitération intestinale étaient les suivantes: intussusception 16 soit 29,6%, la maladie de Hirschprung 14 soit 25,9% anomalie anorectale 12 soit 22,2% hernie externe 6 soit 11,1%, atrésie 5 soit 9,3% et bandes congénitales 1 soit 1,9%. Les traits cliniques étaient uniforme avec ceux rapportés dans le monde entier, sauf que beaucoup de patients avec l'intussusception s'étaient présentés tard atteints d'intestin gangrené. Dans l'ensemble, la mortalité était 6 soit 11,1%, la mortalité chez des néonates était 5 soit 33,3%. **Conclusion:** Indépendamment du fait qu'il y avait une absence de l'infestation de ver, la tendance étiologique et la présentation clinique d'oblitération intestinale d'enfance de cette étude convient aux ceux rapportés d'autre partie du pays. Leur prise en charge est lié avec un taux élevé de la mortalité dans notre milieu, en particulier quand il y a des anomalies liées ou la présentation est trop tard.

Introduction

Intestinal obstruction is a leading cause of paediatric surgical emergency in the tropics¹⁻⁹. Until recently, the data on the pattern of childhood intestinal obstruction in the tropics had been buried within the much wider spectrum of intestinal obstruction in all ages. Hence the peculiar problems of the child with intestinal obstruction have not been adequately addressed. Although there are reports on intestinal obstruction in children in some parts of Nigeria^{5,8-9}, none has focused comprehensively on children from the Northwestern Nigeria which has different socio-economic, cultural and geographical background.

This is a review of our experience with intestinal obstruction in children at the Aminu Kano Teaching Hospital, Kano, a major referral centre in northwestern Nigeria.

Patients and methods

The clinical and operation records of all children, aged 15 years or below with a diagnosis of intestinal obstruction managed at the Aminu Kano Teaching Hospital, Kano, between 1999 and 2003 have been retrospectively reviewed. The data were analysed for age and sex incidence, aetiology, presentation, treatment and outcome of

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treatment. Other forms of intestinal obstruction like ileus and necrotizing enterocolitis are excluded.

Results

Fifty-four children were managed within the study period. Forty-four (81.5%) were boys, 10 (8.5%) were girls (M:F = 4.4:1) table 1. Their ages ranged from 1 day to 10 years - table 2. Fifteen (27.8%) of the children were neonates (aged 28 days or below), while 22 (46.2%) were infants.

Table 1 Distribution of sex and causes of intestinal obstruction among children at Aminu Kano Teaching Hospital, Kano (1999 – 2003).

Aetiology	Male	Female	Total	%
Hirschprung's disease	12	2	14	25.9
Anorectal anomaly	9	3	12	22.2
Intussusception	13	3	16	29.6
Hernias				
(a) Inguinal	5	–	5	9.2
(b) Umbilical	–	1	1	1.9
Atresias/stenosis				
(a) Duodenal	2	–	2	3.7
(b) Jejunal	1	–	1	1.9
(c) Ileal	1	1	2	3.7
Congenital bands	1	–	1	1.9
Total	44	10	54	
%	81.5	8.5	100.0	100.0

Aetiology

Table 2 shows the distribution of the various causes.

Intussusception

This accounted for 29%.6%) of all causes of childhood intestinal obstruction. Thirteen were males and 3 were females. Their ages ranged from 3 months to 10 years (median: 6 months). Major symptoms were vomiting in 12 (75%), bloody and/or mucoid stools in 8 (50%), abdominal distension in 7(43.8%), and fever in another 7(43.8%). Other features included abdominal pain in 5(31.3%), refusals of feeds 9(47.4%) and convulsions in 1(6.3%). Four

(25%) patients had palpable mass in the right iliac fossa. Diagnosis was based on clinical features, supplemented with plain abdominal radiographs. The plain abdominal x-rays revealed air under the diaphragm or free intraperitoneal air in 8 patients. All the patients had a laparotomy through a transverse abdominal incision. Twelve of the 16 intussusceptions were resected, either because of gangrene in 10 or irreducibility in 2 patients. Manual reduction was possible in 4 patients. The types of intussusception encountered were ileocaeco-colic in 10, colo-colic in 4 and jejuno-ileal in 2 patients. One patient, who had right hemicolectomy for gangrenous bowel, died a day after operation from severe hypokalaemia.

Hirschprung's disease

This was responsible for 25.9% of all the causes of the childhood intestinal obstructions. Twelve were males while 2 were females, with age range of 36 hours to 4 years (median 4.5 months) at presentation. Five of the children were infants, one was a neonate while the rest were above one year old. The symptoms included delayed passage of meconium beyond 48 hours of life in 35.7%, chronic and recurrent constipation in 43%, recurrent diarrhoea in 16%, abdominal distention in 78% and vomiting in 10% of patients. The anal sphincters were tight (gripping the examining finger) in 10 patients and in 7, there was explosive passage of stools and/or gas on withdrawal of the examining finger from the rectum. Plain abdominal x-rays, barium enema and full thickness rectal biopsy were the main diagnostic investigations.

All the patients had initial right transverse loop colostomy. One neonate died shortly after colostomy. Six patients had definitive Swenson's pull through operation, with satisfactory continence of faeces. Seven patients on colostomy are yet to show up for definitive surgery. One patient developed a rectoperineal fistula after the pull through, but the fistula closed spontaneously with establishment of a colostomy.

Anorectal anomaly

Twelve of our patients had anorectal malformations. Nine were males and 3 were females (M:F - 3:1). The median age at presentation was 3 days (range 1 day to 10

Table 2 Distribution of aetiology according to age group in children with intestinal obstruction at Aminu Kano Teaching Hospital, Kano (1999 – 2003)

Age	Hd.	Arm	Int.	Ha	At	B	Total	%
0 – 28 days	1	7	2	2	2	1	15	27.8
1-12 month	5	3	12	2	3	–	25	46.2
1-5 years	8	2	–	1	–	–	11	20.4
5-10 years	–	–	2	1	–	–	3	5.6
10-15 years	–	–	–	–	–	–	–	–
Total	14	12	16	6	5	1	54	100
%	25.9	22.2	29.6	11.1	9.3	1.9	100	

Hd= Hirschprung's disease, Arm - Anorectal anomaly, Int = Intussusception, Ha = hernia, At = atresia, B = Band

months). The main presenting features were absence of the anal opening in 74%, progressive abdominal distention 68%, passage of stools from urethral or perineal fistulae in 12%, and vomiting 24% of patients. The main diagnostic investigation was the Wangesteen – Rice’s (lateral) invertogram¹⁰. Two-dimensional echocardiogram, abdominal ultrasonography and intravenous urogram were occasionally done, using the Stephen’s classification¹¹. 10 patients (8 boys and 2 girls) had high or intermediate anomalies while 1 male and female each had a low anomaly. Associated anomalies included recto-urethral fistula in 4, rectovesical fistula, penoscrotal hypospadias, and oesophageal atresia with distal tracheo-oesophageal fistula (TOF) in 1 each. All associated anomalies occurred in the male that had high/intermediate malformations. The child with TOF had history of maternal polyhydramnios and excessive frothy salivation. The children were treated conventionally namely, the low anomalies were repaired primarily while an initial colostomy preceded the definite pull through operations in the high malformations. Two boys defaulted from definitive treatment after the initial colostomy.

Obstructed/strangulated external hernias

There were 7(13%) patients with obstructed hernias. Six of these hernias were inguinal and one was umbilical. All the 6 patients with obstructed inguinal hernias were males and the hernias were all on the right side. The only girl in this group had umbilical hernia. The common presenting features in these children were tender irreducible inguinal or umbilical swelling, abdominal distention, vomiting, excessive crying, abdominal pain, constipation, reddening of the inguinal hernia from previous manipulation. The duration of the symptoms ranged from 24 hours to 2 weeks. The patients’ ages varied from 3 days to 10 years. All the patients had operation. For the umbilical hernia, the content was reduced and the defect in the rectus

was viable, and resection of the gangrenous part in the case of the strangulated hernia, with primary anastomosis. The testicles were all viable. There were no associated abnormalities observed in these patients. One patient died, with a mortality of 14.3%.

Atresias/stenosis

These accounted for 9.3% (5) all the causes of the childhood intestinal obstruction. There were 4 males and 1 female. Their ages ranged from 3 days to 3 months. The period of their symptoms also varied from 3 days to 3 months. The main features included bilious projectile vomiting, abdominal distension with visible peristalsis, recurrent abdominal pain and constipation. Two neonates had not passed meconium on admission since birth. Plain abdominal x-rays showed double bubble shadows in 1 patient (Fig. 1) and multiple air-fluid levels in another. In the rest, the x-ray findings were not specific. At surgery, 2 patients had stenosis at the second and third parts of the duodenum. The latter also had congenital bands of Ladd. Two patients had ileal atresia, one of whom died shortly after surgery. The remaining patient with atresia of the jejunum developed sepsis and died a few days after surgery. The total mortality in this group was therefore 40%.

Bands

Congenital bands were responsible for the intestinal

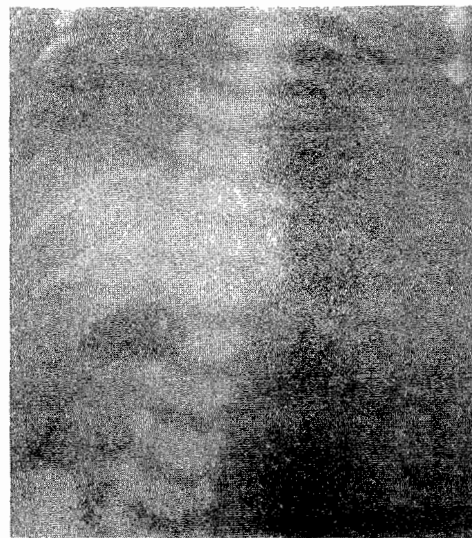


Fig. 1 Plain abdominal x-rays of a neonate with jejunal atresia showing double bubble gas shadows

obstruction in 1 patient. The patient aged 3 months, presented with partial intestinal obstruction. The main features were recurrent colicky abdominal pain, recurrent vomiting and failure to thrive. This patient also had stenosis of the third part of the duodenum. The patient had adhesiolysis with duodenoduodenostomy and is presently well.

There were a total of 6 (11.1%) deaths, 5 were neonates and 1 was an infant. Thus the overall mortality rate in the neonates was 33.3% and 4.5% in the infants. The primary pathology in these children included atresia in 2

Table 3 Distribution of symptoms in children with intussusception at Aminu Kano Teaching Hospital, Kano (1999 – 2003)

Clinical features	No. of children	%
Vomiting	12	75.0
Bloody mucoid stools	8	50.0
Constipation	7	43.8
Abdominal pains	5	31.3
Abdominal distention	7	43.8
Palpable abdominal mass	4	25.9
Excessive crying	6	37.5
Fever	7	43.8%

sheath was closed with polyglycolic (vicryl) sutures. The surgery for the inguinal hernia involved reduction of the entrapped intestine and excision of the sac if the intestine

and 1 each of Hirschprung's disease, anorectal anomaly, hernia and intussusception. No postmortem examinations were done.

Discussion

Majority (70.0%) of our patients were aged 12 months or below. This finding is similar to those in earlier reports^{8, 12}. In this study, the causes of the childhood intestinal obstruction were mainly congenital (59.3%). This finding is at variance with those of Adejuyigbe⁸ and Archibong¹² who reported the preponderance of acquired aetiological factors.

Hirschprung's disease was the most common cause of intestinal obstruction in the disease was the most common cause of intestinal obstruction in the neonates in our series. It is also second only to intussusception of all the causes of intestinal obstruction in the children. Anorectal anomaly was the second most common cause of neonatal intestinal obstruction in this study. Our experience is at variance with the report by Archibong⁹ in which the incidence of anorectal anomaly was far more than that of Hirschprung's diseases.

Another important congenital cause of childhood intestinal obstruction was atresia. The absence of other congenital aetiological causes of intestinal obstruction such as malrotation and or volvulus, meconium plug and meconium ileus is remarkable. Previous¹³ authors have reported the rarity of the last 2 entities in the children of black race, unlike in the whites. The reason for this racial difference is unknown, though the rarity of cystic fibrosis in the Blacks¹⁴ may be a factor.

The single most common cause of intestinal obstruction in our services as in that of Adejuyigbe⁸ is intussusception. This contrasts with the helminthes reported among southeastern Nigerian children¹² and peritoneal adhesions reported from the developed countries of Europe and USA¹⁵⁻¹⁷. The predominance of intussusception in the males and its ileo-colic preponderance in this study agrees with worldwide experience^{8, 17-18}. Our result agrees with most authors that childhood intussusception occurs most commonly within the first year of life, however, the peak age bracket of 6-9 months in our series contrasts with the 3-6 months reported from southwestern Nigeria⁸.

Obstructed external hernias accounted for 11.1% of all the causes, or the 5th most common cause of intestinal obstruction in this study. This concurs with the reports from the southwestern⁸ and southeastern Nigeria¹². The low incidence of obstructed external hernia in our series contrasts with the situation in adult Nigeria, in whom hernia constitutes the most frequent cause of obstruction^{1, 19}. Whereas there is predominance of umbilical over inguinal hernia in Archibong's series¹², the reverse was our experience.

It is interesting to note the absence of worms (helminthes) in the aetiology of obstruction in our series, unlike reports from the southwestern⁸ and southeastern Nigeria¹². This difference may be due in part to the childhood deworming program being widely practiced in many

parts of the country.

The clinical features with respect to the various congenital aetiological lesions in our study are in conformity with those reported from other parts of the world^{2, 4, 5, 20-21}. The effects of these congenital aetiological factors usually manifest early in life. It is established that the triad of vomiting, delayed or non-passage of meconium and progressive abdominal distension connotes intestinal obstruction¹³. The relative severity of any of these depends on the particular lesion. For instance, babies with low (colonic) obstructions (from Hirschprung's disease or anorectal anomaly) may present with delayed passage of meconium and progressive abdominal distention on one hand. On the other hand, obstructions of the duodenum, jejunum or ileum (e.g. from atresia or bands) manifest early with vomiting which is usually bilious and may be projectile in nature. In our experience, these clinical manifestations are invaluable diagnostic features, compared to plain abdominal x-rays, which may show non-specific signs.

The clinical features of intussusception in the present series agree in essential details with those of previous studies^{5, 8, 12}. In only 4(25%) patients was the usual abdominal mass palpated, other authors²² have reported a similar low incidence of palpable abdominal mass. This may be due to late presentation when intestinal gangrene or perforation and features of peritonitis especially abdominal distension muscle guarding and rigidity would render an intra-abdominal mass impalpable.

The management of children with intestinal obstruction in Nigeria and other developing countries is faced with special problems of diagnosis and complications, including sepsis and biochemical derangement^{5, 13}. The prompt diagnosis and vigorous resuscitation required by these children are very often hampered in countries with a dearth of adequate laboratory and other supportive facilities. This situation puts the paediatric surgeon working in such countries in a difficult situation and a state of sub-optimal efficiency.

Late presentation and poor clinical condition necessitated primary surgery (rather than non-operative reduction using enema or air) in all the cases of intussusception. Non-operative hydrostatic or aero-reduction of intussusception is not popular in our environment not only because of late presentation, but also because of scarcity of experienced radiologists, adequate radio-diagnostic and radio-monitoring facilities necessary for this mode of treatment²². The 87.5% intestinal resection rate in this study justified primary surgical approach in our patients. Except for the reasons stated above, the only 2 patients in this group with non-gangrenous reducible intussusception would have benefited from attempted non-operative reduction technique.

Colostomy usually precedes the definitive management of Hirschprung's disease and high or intermediate anorectal anomaly. Seven of our patients absconded from further treatment after the initial colostomy. Previous authors²³⁻²⁵ had reported this high default rate after colostomy formation from Nigeria. The default rate is high in

spite of the high social stigma associated with colostomy in our community²³.

Our result and others^{5,8,12,13,22} show that childhood intestinal obstruction is associated with a high mortality in our environment. This is more so in the neonates. A number of factors may be responsible for this trend. Most of these children presented late and many were already in poor clinical states, with significant fluid and electrolyte deficit. Delayed presentation and inadequate resuscitation are detrimental to a successful outcome especially in neonatal surgery^{5,20}. Urinary output of 2ml/kg body weight/24 hours is the singular most important indication of adequate resuscitation in children⁵. Many of these neonates had associated congenital anomalies (e.g. TOF), or gangrenous intestine with sepsis, and may be unable to eat for days. It is possible that any of these acting alone or in combination with other deleterious factors like biochemical derangement may account for the high mortality in this study.

Apart from the obvious absence of worm infestation, the aetiological pattern and the clinical presentation of childhood intestinal obstruction in this study agrees with those reported^{5,8-9, 12-13} from other parts of the country. Mortality from childhood intestinal obstruction is still high in our environment.

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