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Complicated childhood inguinal hernias in UITH, Ilorin

Kayode T. Bamigbola, Abdulrasheed A. Nasir, Lukman O. Abdur-Rahman, James O. Adeniran

ABSTRACT

Background: Complicated inguinal hernias pose a threat to the life of the child as well as increase the morbidity associated with management of an otherwise straightforward condition. The aim of this study was to determine the presentation, treatment and management outcome of complicated inguinal hernias in children. **Materials and Methods:** A retrospective study of all children 15 years and less managed for complicated inguinal hernia between 2002 and 2010. Data obtained included demographic characteristics, presentation, operative findings and outcome. **Results:** Complicated hernia rate was 13.9%.There were 41 children, 38 boys (92.7%) and 3 girls. Ages ranged between 4 days and 15 years (Median = 90days). Most were infants (48.8%, *n* = 20) and neonates accounted for 19.5% (*n* = 8). Median duration of symptoms prior to presentation was 18 h (range = 2–96 h). Seven patients had been scheduled for elective surgery. Hernia was right sided in 68.3% (*n* = 28). Symptoms included vomiting (68.3%), abdominal distension (34.1%) and constipation (4.9%); one patient presented with seizures. In 19 (46.3%) patients hernia was reducible while 22(53.7%) had emergency surgery. Associated anomalies included undescended testis (12.2%), umbilical hernia (14.6%). Intestinal resection rate was 7.3% and testicular gangrene occurred in 14.6%. Mean duration of surgery was 60.3 ± 26.7 min. Wound infection occurred in six patients (14.6%). Overall complication rate was 24.4%, 30% in infants. The mortality rate was 2.4% (*n* = 1). **Conclusions:** Morbidity associated with complicated inguinal hernia is high in neonates and infants. Delayed presentation is common in our setting. Educating the parents as well as primary care physicians on the need for early presentation is necessary.

Key words: Bowel gangrene, complicated hernia, incarcerated hernia, testicular infarction

Department of Surgery, Paediatric Surgery Unit, University of Ilorin Teaching Hospital, Ilorin, Nigeria

Address for correspondence:
Bamigbola Toyosi Kayode,
Department of Surgery, University of Ilorin Teaching Hospital, Ilorin, Nigeria.
E-mail: kayode.bamigbola@gmail.com

INTRODUCTION

Consultations for inguinal hernia are among the most frequent reasons for a paediatric surgery referral and 0.8–4.4% of all children will develop inguinal hernia.[1,2] Most hernias will present with a groin bulge on straining, discovered by the parents or a paediatrician and undergo elective repair in trained hands achieving good results with minimal complications.[1,2] However, presentation may also be complicated.

Complicated inguinal hernias present as emergencies usually with incarceration of the herniating abdominal viscera, with or without features of intestinal obstruction. Strangulation predominates if not attended to early. These pose a threat to the life of the child, and increase the morbidity associated with management of an otherwise straightforward condition.[3,4] The risk of incarceration in inguinal hernias is unfortunately higher in infants, particularly those under 6 months and the premature.[5,6] This is because they have a smaller and tighter internal ring and inguinal canal which easily traps the herniating loops of bowel.

We aim to determine the presentation, treatment and outcome of management of complicated inguinal hernia in children presenting to our centre.

MATERIALS AND METHODS

All patients with complicated inguinal hernia from 2002 to 2010 were identified and their case notes retrieved.

Data included demographic characteristics, presentation, operative findings and outcome. Statistical analysis was done with SPSS 13.0 software, Fischer's exact test and *t*-test were used where appropriate and *P* value of < 0.05 was considered significant.

Diagnosis was mainly clinical, all patients were resuscitated with intravenous fluids at admission, had bowel decompression with nasogastric tube where

necessary and intravenous broad spectrum antibiotics. Manual reduction by taxis under sedation was attempted except where presentation was significantly delayed (>24 h); then herniotomy was done before patient was discharged. Where manual reduction was unsuccessful, the patient had emergency herniotomy.

RESULTS

Forty-one children presented with complicated inguinal hernia out of the two hundred and ninety-six children managed for inguinal hernia during the period under review giving a complicated inguinal hernia rate of 13.9%. Male:Female ratio was 12.7:1 and ages ranged between 4 days and15 years (median = 3 months). Infants accounted for 48.8% (n = 20) of patients and neonates were eight (19.5%); together making up two-thirds of the children managed for complicated inguinal hernia [Table 1]. Hernia was right sided in 28 (68.3%) children and left sided in 13 (31.7%).

The median duration of symptoms prior to presentation was 18 h (range = 2–96 h) and 16 (39%) children presented after 24 h. In 30 (73.2%) patients a groin swelling had been noticed by the parents prior to the development of symptoms. The median duration of groin swelling prior to symptoms was 38.5 days (range = 1 day to 5 years). Seven (17.1%) of the children had earlier been scheduled for elective herniotomy. Twenty-eight (68.3%) children presented with vomiting, fourteen (34.1%) had abdominal distension and in two (4.9%) children constipation was present. One infant presenting after 48 h had generalised seizures from electrolyte imbalance due to vomiting. Five (12.2%) children had associated undescended testis (bilateral in one child) while six others (14.6%) had umbilical hernia.

Nineteen (46.3%) patients had successful manual reduction by taxis under sedation and subsequently had elective herniotomy while twenty-two (53.7 %) had emergency surgery. Mean duration of surgery was 60.3 ± 26.7 min (range = 20–120 min) and there was no significant difference between duration for elective and emergency surgery (P = 0.085).

Three children had resection of gangrenous bowel giving an intestinal resection rate of 7.3%. Two of them were under 1 year of age. However, the difference between intestinal resection rates among the age groups was of no statistical significance [Table 1]. The mean duration of obstruction among children who had bowel gangrene at surgery was longer than those without gangrene (32 ± 13.9 h *vs* 23.5 ± 24.8 h) (P > 0.05).

Testicular gangrene occurred in six patients giving a testicular infarction rate of 14.6%. These patients had orchidectomy. Neonates had a higher testicular infarction rate (50%, n = 4) than other age groups and this was statistically significant (P = 0.04) [Table 1]. Mean duration of obstruction in patients with testicular infarction was not significantly different from those without infarction.

Overall post operative complication rate was 24.4%, higher among neonates and infants than in any other age group [Table 2]. Wound infection in six children (14.6%) was the commonest complication. Mortality rate was 2.4% (n = 1).

DISCUSSION

The rate of incarceration in inguinal hernias has been variably reported between 3 and 18% with higher incidence among infants.[2,5-8] This is due to a smaller internal ring and inguinal canal which easily traps the herniating loops of bowel. In our study, 13.9% of patients managed for inguinal hernia presented with complicated hernias and about two-thirds (68.3%) were infants.

Most inguinal hernias are reducible.[1] They however become complicated when incarceration occurs and this may progress to intestinal obstruction. Here the contents of the hernia, usually loops of bowel are trapped at the neck of the sac initially without interference to the blood supply. Because of the obstruction, venous congestion and oedema of the wall occurs, progressing if not reduced to bowel ischemia, infarction and gangrene termed strangulation.[9]

Table 1: Intestinal resection rate and testicular infarction rate according to age group

Age group	Frequency (%)	Intestinal resection rate (*n*)	Testicular infarction rate (*n*)
<=28 days	8 (19.5%)	14.3% (1)	50% (4)
1month-1 year	20 (48.8%)	5.6% (1)	5.6% (1)
1–4 years	6 (14.6%)	0 (0)	0 (0)
4–9 years	5 (12.2%)	25 (1)	25% (1)
>=10 years	2 (4.9%)	0 (0)	0 (0)
Total	41 (100%)	*P* value >0.05	*P* value = 0.04

Table 2: Distribution of complications according to age group

Age group	Wound infection	Complications			No complication	Total	%
		Recurrence	Peritonitis	Bleeding			
<= 28 days	3	0	0	0	5	8	37.5
1month-1 year	3	1	0	2	14	20	30
1–4 years	0	0	0	0	6	6	0
4–9 years	0	0	1	0	4	5	20
>= 10 years	0	0	0	0	2	2	0
Total	6	1	1	2	31	41	24.4

Studies have shown that the risk of developing incarceration can be reduced by prompt referral as well as reduced waiting time between diagnosis of hernia and surgery.[4,5,7,10,11] A study by Zamakhshary found that waiting for surgery for more than 14 days doubled the risk of incarceration and recommended that inguinal hernias in infants and young children be repaired within 14 days of diagnosis.[7] This is not obtainable in our setting with large Patient-Doctor ratio and few operating theatre spaces causing long waiting lists.

In this study, majority (82.9%) of our patients presented for the first time with complicated inguinal hernias. This is in spite of the fact that in 73.2% of these patients, the parents had noticed the groin swelling for lengths of period ranging from 1 day to 5 years. Only seven (17.1%) patients developed incarceration while awaiting scheduled surgery. These seven presented within a range of 5 days and 6 months after initial paediatric surgical consultation. This study identified a different problem in our environment. Children were not brought to the hospital until complications had set in. Sixteen (39%) patients presented after 24 h of developing features of intestinal obstruction including an infant who presented after 48 h and had developed generalised seizures due to electrolyte imbalance from vomiting. He accounted for the single mortality recorded. In contrast a report from Zaria (North West Nigeria) identified a shifting trend towards early presentation as responsible for the reduction in incarceration rate as well as resection rate and complications after herniotomy.[6]

Conventional approach to management of incarcerated inguinal hernia is manual reduction by taxis under sedation followed by elective herniotomy 24–48 h later and this is reportedly successful in up to 85–95% of cases.[2,4,5,12] The aim of delaying surgery by 24–48 h is to allow oedema resolve and reduce the technical difficulty associated with ill defined tissue planes and friable tissues as well as increased morbidity. This study demonstrated a lower rate of success (46.3%) with manual reduction possibly from congestion and tightness around the deep inguinal ring and canal due to oedema. This is as a result of the high rate of delayed presentation. Reduction under caudal epidural analgesia has also been successful especially in patients in whom opiates need to be avoided.[13] If reduction fails then emergency herniotomy must be done, this has a high rate of complications including injury to the vas deferens.[3,5]

An alternative approach to management is the laparoscopic approach which has advantages over the open approach. These include the ability to visualise and inspect the involved bowel, easy reduction after carbondioxide insufflation has widened the internal ring, avoidance of the oedematous groin hence removing the need to delay surgery, ability to explore the contralateral inguinal canal without creating another wound and shorter hospital stay.[3,5,12]

A grievous sequelae of complicated inguinal hernias in children is infarction of the testes [Figure 1] as a result of compression of its blood supply within the inguinal canal and this may occur in up to 30% of boys with incarcerated inguinal hernia.[7,8,14] This risk remains even after successful reduction. Testicular pain and swelling even in the absence of ultrasound evidence of infarction has also been reported.[2] This study reported testicular infarction rate of 14.6% (n = 6). This is comparable with 11 and 18% reported in Zaria (North West Nigeria).[6,15] This study revealed that neonates are at greater risk of developing testicular infarction following complicated hernia. This may be explained by the higher pressures generated within the smaller volume of their inguinal canal by the herniating bowel easily compressing the testicular vessels. It is noteworthy that in the studies by Ameh in Zaria, the patients with testicular infarction were all neonates (n = 4).[6,15] Duration of incarceration had no significant impact on testicular infarction rate.

Bowel gangrene accounts for significant morbidity in patients with complicated inguinal hernias.[5,15] Neonates and infants are believed to have a higher risk



Figure 1: Dusky testis seen after return of trapped bowel loop during herniotomy for complicated inguinal hernia

of bowel compromise requiring intestinal resection and a study by Ameh among newborns reported intestinal resection rate of 36%.[15] This present study reports a similar trend. Delayed presentation which is common in our setting, may also increase the risk of bowel compromise.

Complication rate reported in this study was 24.4%. This is comparable with reports in literature between 11 and 31%.[2,8,10,15] This morbidity is higher in newborns and when emergency surgery is performed.[2,8,10,15] Neonates and infants had higher complication rates of 37.5 and 30%, respectively, than other age groups. Death is rare following management of complicated inguinal hernia however in this study one infant died after delayed presentation with generalised seizures from electrolyte imbalance.

In conclusion, the morbidity associated with complicated inguinal hernia is high particularly in the vulnerable neonates and infants. Delayed presentation is common in our environment and may lead to bowel compromise and testicular infarction. Neonates should have their testes inspected at surgery without fail, as they have a greater likelihood of testicular infarction. A strategy of educating the parents as well as primary care physicians on the need for early presentation is necessary.

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REFERENCES

1. Snyder CL. Inguinal hernias and hydroceles. In: Holcomb III GW, Murphy JP, editors. Ashcraft's Pediatric Surgery. Philadelphia: Saunders; 2010. p. 669-75.
2. Niedzielski J, Krol R, Gawlowska A. Could incarceration of inguinal hernia in children be prevented? Med Sci Monit 2003;9:16-8.
3. Nah SA, Giacomello L, Eaton S, de Coppi P, Curry JI, Drake DR, *et al*. Surgical repair of incarecerated inguinal hernia: Laparoscopic or open? Eur J Pediatr Surg 2011;21:8-11.
4. Stylianos S, Jacir NN, Harris BH. Incarceration of inguinal hernia in infants prior to elective repair. J Pediatr Surg 1993;28:582-3.
5. Lau ST, Lee YH, Caty MG. Current management of hernias and hydrocoeles. Semin Pediatr Surg 2007;16:50-7.
6. Ameh EA. Incacerated and strangulated inguinal hernias in children in Zaria, Nigeria. East Afr Med J 1999;96:499-501.
7. Zamakhshary M, To T, Guan J, Langer JC. Risk of incarceration of inguinal hernia among infants and young children awaiting elective surgery. CMAJ 2008;179:1001-5.
8. Meier AH, Ricketts RR. Surgical complications of inguinal and abdominal wall hernias. Semin Pediatr Surg 2003;12:83-6.
9. Parmar G, Dabhoiwala T, Hathila VP. Uncommon presentation of inguinal hernia: Burst obstructed inguinal hernia with ileo-ileal intussusception. Internet J Surg Vol 15, 2008.
10. Chen LE, Zamakhshary M, Foglia RP, Coplen DE, Langer JC. Impact of wait time on outcome for inguinal hernia repair in infants. Pediatr Surg Int 2009;25:223-7.
11. Gholoum S, Baird R, Laberge JM, Puligandla PS. Incarceration rates in pediatric inguinal hernias: Do not trust the coding. J Pediatr Surg 2010;45:1007-11.
12. Kaya M, Hückstedt T, Schier F. Laparoscopic approach to incarcerated inguinal hernia in children. J Pediatr Surg 2006;41:567-9.
13. Brindley N, Taylor R, Brown S. Reduction of incarcerated inguinal hernia in infants using caudal epidural anaesthesia. Pediatr Surg Int 2005;21:715-7.
14. Waseem M, Pinkert H, Devas G. Testicular infarction becoming apparent after hernia reduction. J Emerg Med 2010;38:460-2.
15. Ameh EA. Morbidity and mortality of inguinal hernia in the newborn. Niger Postgrad Med J 2002;9:233-4.

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