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Original Article

Outcome of complicated hernia in a tertiary care hospital

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ABSTRACT

Background: Complications of hernias, particularly strangulation and incarceration, are relatively frequent and constitute diagnostic and therapeutic emergencies. This study aimed to describe the diagnostic and prognostic aspects of complicated hernias in children.

Methods: This was a retrospective study conducted over a 5-year period (January 2015–December 2019). All cases of complicated hernias managed during this period were included.

Results: During the study period, 1,446 patients were hospitalized, including 93 cases of complicated hernias, representing a hospital frequency of 6.43%. The mean age was 23.79 months, with a male-to-female ratio of 2.72. Infants accounted for 61.29% (n = 57) of cases. The main reason for consultation was painful umbilical swelling in 74% (n = 71) and inguinal swelling in 21.88% (n = 21). The mean duration of symptoms before presentation was 28.16 hours. The swelling was irreducible in 59.13% (n = 55) of patients. The average time to treatment was 16 hours. Surgical management was performed in all cases. Exploration revealed viable hernia contents in 91% (n = 85), with a mean neck diameter of 1.5 cm. Necrosis was observed in 9% of cases (n = 8), two-thirds of which (n = 5) involved inguinal hernias. Simple reduction with closure of the hernia defect was performed in 95.6% (n = 89) of patients, while resection with anastomosis was required in 4.3%. After a mean follow-up of 15 months, no recurrence or mortality was reported.

Conclusion: Strangulation remains a frequent complication of hernias in children. In this study, the type of hernia and patient sex were identified as prognostic factors.

Keywords: Hernia, Complications, Strangulation, Incarceration.

INTRODUCTION

Abdominal hernia is defined as the protrusion of viscera covered by a peritoneal sac through a congenital weak point in the abdominal wall in children. It may be complicated by incarceration, which refers to a hernia that is difficult to reduce and may be more or less painful without signs of obstruction, or by strangulation, which is characterized by sudden, tight, and permanent irreducible constriction of a viscus and/or its mesentery within the hernia sac [1,2]. These relatively common and serious complications of simple hernia constitute diagnostic and therapeutic emergencies [1–3]. The objective of this study was to describe the diagnostic and prognostic aspects of complicated hernias in children.

METHODS

This was a retrospective and descriptive study conducted at the Department of Pediatric Surgery of the National Hospital of Zinder over a 5-year period (January 2015–December 2019). The study included all patients aged 0 to 5 years who were managed for complicated hernias during this period. Hernia strangulation was defined as a hernia that suddenly became painful, irreducible for several hours, and associated with signs of intestinal

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obstruction, whereas incarceration was defined as a strangulated hernia that became spontaneously reducible after taxis or anesthetic induction.

Diagnostic variables analyzed included the reason for consultation, medical history, clinical findings, hernia site, duration of symptoms (time elapsed between hernia strangulation and consultation), and time to treatment. Prognostic variables were also evaluated. Data were collected, recorded, and analyzed using Microsoft Excel and Epi Info™ version 7 software. Fisher's exact test was used to assess associations between qualitative variables, with a level of statistical significance set at $p < 0.05$.

RESULTS

Ninety-three cases of complicated hernia in children were recorded, corresponding to an annual frequency of 18.6 cases per year and a hospital frequency of 6.43% among 1,446 hospitalized patients. Complicated hernias accounted for 9.09% of all pediatric surgical procedures. The umbilical location predominated, representing 77.41% (n = 72) of cases, compared with 22.59% (n = 21) for the inguinal site.

The mean age was 23.79 months (range: 28 days to 4 years 10 months), with a predominance of children aged 12 to 24 months, accounting for 61.29% (n = 57) of cases. Seven patients had a history of hernia incarceration, and no associated congenital anomalies were reported.

Table 1: Prognostic Factors for the Occurrence of Necrosis

Variables	***Necrosis***			***OR IC95% [Extremes]***	***p***
		Yes	***No***		
Umbilical collar diameter	<1cm	3	36	-	*0.24*
	>1cm	0	33		
Anatomical localization	Inguinal	5	16	7.2 [1.5-33.2]	***0.01***
	Umbilical	3	69		
Sex	F	3	65	5.4 [1.2-17.6]	***0.03***
	M	5	20		
Age group	0-12Months	1	35	4.9 [0.6-41.6]	*0.14*
	>12 Months	7	50		
Evolution time	<24 hours	0	12	-	*0.6*
	>24 hours	8	73		

The main reason for consultation was painful swelling in all cases (100%). The hernia was umbilical in 77.42% (n = 72), inguinoscrotal in 15.05% (n = 14), and multiple in 7.53% (n = 7). The mean duration of symptoms before presentation was 28.16 hours in 88% of patients (n = 81). Functional signs were dominated by pain and vomiting in 83.43% (n = 78), while a complete intestinal obstruction was observed in 16.57% (n = 15). Clinical signs of hernia strangulation were present in 67.74% of patients (n = 63). The mean time to surgical management was 16 hours (range: 6–36 hours).

All patients underwent surgical treatment. Intraoperative findings revealed variable hernia contents, with a predominance of intestinal loops in 72% (n = 67), followed by omentum in 18% (n = 16), other organs in 7.5% (n = 7), and an empty sac in 2.5% (n = 3). The hernia contents were viable in 91% of cases (n = 85). For umbilical hernias, the mean neck diameter was 1.5 cm (range: 0.5–3 cm), and it was small (< 1 cm) in 36.27% of cases (n = 39).

Necrosis was observed in 9% of cases (n = 8), predominantly in inguinal hernias, accounting for two-thirds of cases (n = 5). Factors significantly associated with necrosis were male sex (odds ratio [OR]: 5.4; p = 0.03) and anatomical location (OR: 7.2; p = 0.01) (Table I).

Simple reduction with closure of the hernia defect was performed in 95.6% of patients (n = 89), while bowel resection with anastomosis was required in 4.3% of cases.

Postoperative morbidity was low, with surgical site infection observed in 1.35% of cases (n = 1). After a follow-up period of 15 months, no recurrence was observed, and there was no mortality in this series.

DISCUSSION

Abdominal wall hernia is the most common surgical pathology in children, most frequently involving the umbilical and groin regions [1]. The incidence of simple umbilical hernia is high at birth (18.5% in Caucasian neonates versus 42.3% in Black neonates), with a strong tendency toward spontaneous closure during the first two years of life [1,4,5]. In contrast to inguinal hernias, umbilical hernias are more common in girls and are more frequently complicated by strangulation. Several series have reported higher strangulation rates for umbilical hernias (44.2–45.9%) compared with inguinal hernias (13.5–15.58%) [6–8].

In our series, umbilical hernias predominated (77.41%). This may be explained by the early closure of the processus vaginalis, unlike the umbilical ring, which may persist into adulthood [9–11]. A male predominance was observed (sex ratio 2.72), consistent with other studies reporting ratios between 1.35 and 2.12 [9,12]. This may be related to the higher prevalence of congenital anomalies in boys [5].

The mean age was 23.79 months (range: 28 days to 4 years 10 months), with the 12–24-month age group most affected. This susceptibility may be explained by factors increasing intra-abdominal pressure at this age, such as infantile colic, respiratory infections, and malnutrition, which are known to favor strangulation, particularly at the umbilical site [13–15].

A history of hernia incarceration was found in 7.52% of cases, which may delay consultation and increase the risk of adhesions, especially in narrow-neck hernias [16]. The diagnosis of complicated hernia is essentially clinical, based on painful and irreducible swelling. Pain and vomiting were the predominant functional signs, while

occlusive syndrome was observed in 16.13% of cases. Strangulated hernia remains a leading cause of acute intestinal obstruction in children [1,6].

Consultation delays, often exceeding 24 hours, are common and are influenced by socioeconomic factors, under-medicalization, and delayed referral [6,9,17]. Prolonged strangulation increases the risk of ischemia and necrosis [4,9,18]. Although no statistically significant association was found between strangulation duration and necrosis in our study (p = 0.6), necrosis was only observed when strangulation exceeded 24 hours.

The diameter of the hernia neck is a key prognostic factor, with higher strangulation risk in narrow-neck hernias (0.5–1 cm) [8,19]. In our study, small umbilical necks (< 1 cm) accounted for 42% of cases. Despite the possibility of spontaneous closure of umbilical hernias before four years of age, the risk of strangulation persists, particularly in the presence of comorbidities [5,9,14].

Early surgical management is recommended due to the unpredictable course and risk of complications, especially for inguinal hernias [2,3]. Although laparoscopy offers several advantages [7,15,20], it remains limited in developing countries; thus, open surgery was the standard approach in our series. Intraoperative findings showed a predominance of digestive loops (72%) and omentum (18%) as hernia contents, likely related to narrow necks and prolonged strangulation duration.

Postoperative outcomes were favorable, with low morbidity limited to surgical site infection (1.35%). No recurrence or mortality was observed, in line with findings from other studies [6,20], reflecting improved surgical techniques and perioperative care [1,6,20].

CONCLUSION

Hernia strangulation is a frequent and serious complication of childhood hernias, particularly at the umbilical site. In this series, hernia type and patient sex were significant prognostic factors.

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