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Clinical case

Strangulated Transmesenteric Internal Hernia Complicated by Ileal Necrosis and Perforation in a Child: A Case Report

Hernie interne étranglée transmésentérique compliquée de nécrose et de perforation iléale chez l'enfant : à propos d'un cas

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Résumé

Introduction : Les hernies internes transmésentériques sont des causes rares d'occlusion intestinale aiguë chez l'enfant, mais elles exposent à un risque élevé de strangulation, de nécrose et de perforation intestinale. Leur diagnostic préopératoire demeure difficile en raison d'une symptomatologie peu spécifique, surtout dans les contextes à ressources limitées où l'accès à la tomodensitométrie est restreint. Nous rapportons un cas de hernie interne transmésentérique étranglée compliquée de perforation iléale chez un enfant pris en charge au Centre Hospitalier Régional de Ziniaré au Burkina Faso.

Cas clinique : Il s'agissait d'un garçon de 11 ans admis pour douleurs abdominales diffuses, vomissements alimentaires, arrêt des matières et des gaz évoluant depuis cinq jours dans un contexte fébrile. L'examen clinique retrouvait une distension abdominale importante avec défense généralisée évoquant une péritonite aiguë généralisée. Le bilan biologique montrait une hyperleucocytose inflammatoire. La radiographie abdominale objectivait des niveaux hydroaériques grêliques. La tomodensitométrie n'étant pas disponible en urgence, une laparotomie exploratrice a été réalisée. Elle a mis en évidence une hernie interne étranglée transmésentérique congénitale compliquée d'une nécrose iléale avec perforation. Le traitement chirurgical a consisté en une résection de 20 cm d'iléon avec anastomose iléo-iléale termino-terminale et fermeture du défect mésentérique. L'évolution postopératoire a été favorable malgré une suppuration pariétale traitée médicalement.

Discussion : Les hernies internes congénitales restent exceptionnelles en chirurgie pédiatrique. Leur tableau clinique polymorphe entraîne fréquemment un retard diagnostique favorisant l'ischémie mésentérique et les complications digestives graves. La TDM abdominale constitue l'examen de référence, mais son accessibilité demeure limitée dans plusieurs pays africains. Dans ces contextes, le diagnostic est

souvent peropératoire et la prise en charge repose principalement sur l'évaluation clinique et la chirurgie d'urgence.

Conclusion : La hernie interne transmésentérique doit être évoquée devant toute occlusion intestinale aiguë chez l'enfant sans antécédent chirurgical. Un diagnostic précoce et une prise en charge chirurgicale rapide sont essentiels afin de réduire la morbi-mortalité liée aux complications ischémiques intestinales.

Mots-clés : Hernie interne transmésentérique, Occlusion intestinale aiguë, Enfant, Perforation iléale, Péritonite, Chirurgie d'urgence, Cas clinique.

Abstract

Introduction: Transmesenteric internal hernias are rare causes of acute intestinal obstruction in children, but they carry a high risk of strangulation, bowel necrosis, and perforation. Their preoperative diagnosis remains challenging because of nonspecific clinical manifestations, particularly in resource-limited settings where access to computed tomography is restricted. We report a case of strangulated congenital transmesenteric internal hernia complicated by ileal perforation in a child managed at the Regional Hospital Center of Ziniaré, Burkina Faso.

Clinical case: An 11-year-old boy was admitted for diffuse abdominal pain, food-stained vomiting, and cessation of stool and gas passage evolving over five days in a febrile context. Physical examination revealed marked abdominal distension with generalized guarding suggestive of generalized acute peritonitis. Laboratory investigations showed inflammatory leukocytosis. Abdominal radiography demonstrated small-bowel air-fluid levels. As computed tomography was not available on an emergency basis, an exploratory laparotomy was performed. It revealed a congenital transmesenteric internal hernia complicated by ileal necrosis with perforation. Surgical treatment consisted of resection of 20 cm of ileum with end-to-end ileo-ileal anastomosis and closure of the mesenteric defect. Postoperative outcome was favorable despite a superficial surgical site infection managed medically.

Discussion: Congenital internal hernias remain exceptional in pediatric surgery. Their polymorphic clinical presentation frequently results in delayed diagnosis, promoting mesenteric ischemia and severe gastrointestinal complications. Abdominal CT scan is considered the gold standard diagnostic imaging modality; however, its availability remains limited in several African countries. In such settings, diagnosis is often made intraoperatively, and management relies mainly on clinical assessment and emergency surgery.

Conclusion: Transmesenteric internal hernia should be considered in any child presenting with acute intestinal obstruction without prior surgical history. Early diagnosis and prompt surgical management are essential to reduce morbidity and mortality related to intestinal ischemic complications.

Keywords: Transmesenteric internal hernia, Acute intestinal obstruction, Child, Ileal perforation,Peritonitis, Emergency surgery, Case report.

Introduction

Internal hernia is defined as the protrusion of an intestinal segment or an abdominal viscus through a normal or pathological intra-abdominal orifice, located within the peritoneal cavity [2]. It is said to be strangulated when it is accompanied by compression of the vascular pedicle leading to ischemic suffering of the herniated loops, necrosis, and then intestinal perforation [3]. The prevalence of internal hernias is between 0.2% and 0.9% of all abdominal hernias, with a frequency between 0.5 and 5.8% of acute intestinal obstructions [1,4]. They may be congenital or acquired. There are several types of congenital internal hernias, including paraduodenal hernia, transmesenteric hernia, transmesocolic hernia, etc. [2,5]. Transmesenteric hernia is the most common form in children, with a high risk of strangulation and intestinal necrosis [3,5]. Despite this, they remain exceptional in pediatric surgery and are responsible for less than 1% of acute intestinal obstructions [4].

They result from the passage of intestinal loops through a congenital defect of the mesentery, most often located at the level of the ileal mesentery.

The clinical symptomatology is not specific and is dominated by an acute occlusive syndrome that can rapidly evolve toward severe intestinal suffering. The clinical picture is varied in children, dominated by intermittent episodes of abdominal pain that resolve spontaneously, reflecting transient phenomena of incarceration-reduction of the digestive loops [5,6]. The diagnosis can be aided by medical imaging and computed tomography (CT), which is the reference examination [7,8]. The definitive diagnosis is often made intraoperatively during an exploratory laparotomy or laparoscopy performed for a complicated acute occlusive syndrome or peritonitis. In the absence of early management, serious complications such as intestinal necrosis, digestive perforation, and generalized peritonitis may occur, threatening the vital prognosis. In case of complication, treatment consists of reduction of the hernia associated with resection of non-viable segments and closure of the mesenteric defect [2].

We report the case of an adolescent managed at the Regional Hospital Center of Ziniaré for a strangulated transmesenteric internal hernia complicated by ileal necrosis and perforation, revealed by a picture of generalized acute peritonitis. Through this observation, we discuss the diagnostic difficulties as well as the therapeutic aspects of this rare condition in resource-limited African settings.

Clinical case

This was an 11-year-old boy admitted to the medico-surgical emergency department of the CHR of Ziniaré in Burkina Faso for diffuse abdominal pain associated with food-stained vomiting and cessation of stool and gas passage. This symptomatology had been evolving for five days in a context of fever.

The interview noted the regular occurrence of similar crises that had resolved after a few hours. No particular pathological history was found.

On physical examination, the general condition was preserved with normal consciousness. Vital parameters noted tachycardia at 120 bpm, a temperature of 38.5°C, and oxygen saturation of 97% on room air. The physical examination confirmed the presence of a peritoneal irritation syndrome consisting of generalized abdominal guarding, an «umbilical cry,» and marked abdominal distension. The parietal hernial orifices were free. The rest of the physical examination was normal.

The biological workup revealed leukocytosis at 16,880/mm³ with neutrophilia at 12,190/mm³. Hemoglobin was at 11.2 g/dl and CRP at 60 mg/L. The blood ionogram showed moderate hypokalemia at 3.19 mmol/l. The plain abdominal radiograph (Figure 1) showed small-bowel air-fluid levels without any image of pneumoperitoneum. Computed tomography (CT) was not available on an emergency basis. The diagnostic hypotheses of generalized acute peritonitis by hollow organ perforation, of typhoid origin or appendicular origin, were raised. An emergency laparotomy was indicated. The patient benefited from preoperative resuscitation before being taken to the operating room.

The incision was a supra- and infra-umbilical midline incision. Intraoperatively (Figure 2), we found a herniary incarceration of ileal loops (congenital transmesenteric hernia) through a defect of approximately 5 cm in length, located in the mesentery about 60 cm from the ileocecal junction. The incarcerated ileum was partially necrotic with a large perforation of approximately 2 cm in its greatest axis located on the anti-mesenteric border. The surgical procedure consisted of resection of 20 cm of ileum including the herniated zone, followed by an end-to-end ileo-ileal anastomosis and closure of the mesenteric breach. Exploration of the rest of the peritoneal cavity was of normal appearance.

The postoperative course was marked by a parietal suppuration on the fourth day that evolved favorably under probabilistic antibiotic therapy and local care. Hospital discharge was authorized on the tenth day. At 3 months postoperatively, the examination noted

good intestinal transit, apyrexia, and a completely healed wound without any sign of eventration. The chronology of the patient's management (timeline) is represented in the table below.

Table I: Chronology of clinical evolution and management. A delay of approximately 5 days elapsed between the onset of symptoms and surgical intervention, a period during which intestinal necrosis likely developed

Time	Clinical events and management
Day -5	Onset of symptomatology (abdominal pain, food-stained vomiting, cessation of stool and gas) in a febrile context. History of similar spontaneously resolving painful abdominal crises
Day 0	Admission to the medico-surgical emergency department of the CHR of Ziniaré. Clinical examination in favor of acute intestinal obstruction. Biological workup showing hyperleukocytosis. Plain abdominal radiograph performed. Abdominal CT not available. Preoperative resuscitation (hydroelectrolytic rebalancing, nasogastric tube, antibiotic therapy) followed by emergency laparotomy revealing a strangulated transmesenteric internal hernia complicated by ileal necrosis. Resection of approximately 20 cm of necrotic ileum, end-to-end ileo-ileal anastomosis and closure of the mesenteric defect.
Day 4	Superficial parietal suppuration treated successfully with local care and antibiotic therapy
Day 10	Hospital discharge with favorable clinical evolution
3 months	Satisfactory clinical follow-up: good intestinal transit, absence of fever, complete parietal healing, absence of eventration

Table II: Summary table of internal hernia cases reported in the literature [3,11-13]

Authors (year)	Country	Age and sex	Diagnostic delay	Clinical presentation	Preop imaging	Type of hernia	Resection length	Surgical procedure	Postop complications	Outcome
Willems et al. (2018)	Belgium	11 years / F	Not specified	Acute abdominal pain, small-bowel gangrene	Abdominal X-ray + imaging	Congenital - mesenteric defect	Not specified	Laparotomy + small-bowel resection	Not specified	Favorable
Sekmenli et al. (2020)	Turkey	6 years / F	Not specified	Acute occlusive syndrome (ileus)	CT scan	Congenital - terminal ileum	Not specified	Exploratory laparotomy + defect closure	None	Favorable
Sankar et al. (2021)	USA	2 years / F	41 days (case 1)	Acute distress, abdominal rigidity, pallor; distension, vomiting	Small-bowel dilatation, uncertain etiology	Congenital - mesenteric defect	25 cm necrotic	Laparotomy + reduction + anastomosis T-T + defect closure (laparoscopy)	None reported (case 1)	Favorable
Elmadi et al. (2014)	Morocco	Not specified; newborn (case 2)	2 days (case 1)	Bilious vomiting, fever; intestinal obstruction	X-ray + abdominal ultrasound	Congenital - ileal defect (viable loop case 1)	20 cm; (case 2: resection + stoma)	Laparotomy, ileal resection + ileo-ileal anastomosis; stoma closed (case 2)	Suppuration (2 cases)	Favorable
Our case	Burkina Faso	11 years / M	5 days	Diffuse abdominal pain, food-stained vomiting, cessation of stool and gas, fever	Plain abdominal radiograph (small-bowel air-fluid levels), CT not available	Congenital - mesenteric defect	20 cm	Laparotomy, ileal resection + end-to-end ileo-ileal anastomosis + mesenteric defect closure	Superficial parietal suppuration	Favorable



Figure 1: Upright plain abdominal radiograph including the diaphragmatic domes.

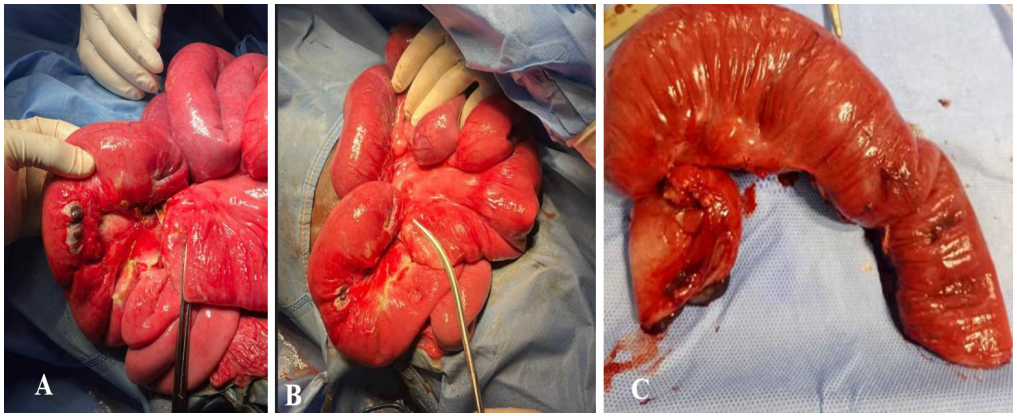


Figure 2: Intraoperative images of the transmesenteric internal hernia: A: congenital mesenteric defect (approximately 5 cm) through which the ileal loop was incarcerated; B: necrotic and perforated ileal loop before resection; C: appearance after 20 cm ileal resection and end-to-end ileo-ileal anastomosis.

Discussion

Internal hernias represent a rare cause of intestinal obstruction, most often unrecognized preoperatively. In children, congenital internal hernias remain exceptional, which contributes to delayed diagnosis and the high risk of ischemic complications [9].

The diagnosis of an internal hernia remains difficult due to a polymorphic and nonspecific symptomatology [10]. Abdominal pain, vomiting, cessation of stool and gas, and abdominal distension may suggest several etiologies of digestive obstruction. In our observation, the clinical picture associated acute abdominal pain, an occlusive syndrome, and signs of peritonitis, strongly suggesting a typhoid ileal perforation, which is a common condition in our tropical endemic context [11]. The clinical signs are similar, which constitutes a frequent source of diagnostic wandering. However, the association of a frank occlusive syndrome with diffuse abdominal guarding should raise suspicion of complicated intestinal strangulation, requiring urgent surgical management.

The diagnostic delay could be explained by the rarity of this condition, its often intermittent and nonspecific initial clinical picture, confusion with other frequent febrile abdominal emergencies in tropical settings, particularly typhoid ileal perforations, as well as the absence of emergency CT. Added to this are factors related to the healthcare system such as delayed consultation, distance from referral centers, and the cost of complementary examinations.

The prognosis depends essentially on the diagnostic delay. Several authors report that delayed diagnosis rapidly promotes mesenteric ischemia, intestinal necrosis, and then digestive perforation, particularly in transmesenteric hernias where the absence of a hernial sac favors tight strangulation of the loops [3,5]. In our case, the evolution before intervention had already led to necrosis with ileal perforation and fecal peritonitis. This finding is consistent with literature data according to which transmesenteric hernias present a high risk of early intestinal

gangrene with mortality that can be significant in case of therapeutic delay [5].

Internal hernias can be congenital or acquired. Acquired forms most often occur after abdominal surgery, trauma, or peritoneal inflammation [2]. In our observation, there was a mesenteric defect located approximately 60 cm from the ileocecal junction, through which a necrotic and perforated ileal loop had become incarcerated, compatible with a congenital transmesenteric hernia.

Abdominal computed tomography is the reference examination in the preoperative diagnosis of internal hernias. It allows orientation of the diagnosis in the presence of suggestive signs such as clustering of small-bowel loops, upstream intestinal distension, convergence or torsion of mesenteric vessels («whirl sign»), unusual displacement of the mesentery, or signs of digestive ischemia [7,8]. In our case, CT was not available on an emergency basis, but these signs could have oriented the diagnosis if the examination had been feasible. However, despite its performance, CT may remain poorly contributive when signs are subtle or in case of rapid evolution toward necrosis. In our practice setting, we encounter numerous obstacles to performing this examination preoperatively due to limited access to emergency imaging, financial cost that is sometimes beyond the reach of the population, and finally hemodynamic instability of patients. Thus, the operative decision still relies largely on clinical data and the evolution of the abdominal picture. A comparison of our case with similar cases reported in the literature was made. This is represented in the table above.

The comparison of our observation with the cases reported in the table above reveals several similarities: in the majority of cases, a congenital transmesenteric hernia affecting a child was found, discovered in the context of an occlusive syndrome and managed by laparotomy with ileal resection and restoration of digestive continuity, most often with favorable clinical evolution. Notable differences appear, however: the diagnostic delay of 5 days in our case contrasts with the earlier presentations described by Sankar et al. [12]; also, the availability of cross-sectional imaging varies according to context, CT having oriented the diagnosis in Sekmenli et al. [3] whereas it was not available in our observation. This underlines the importance of surgical exploration in resource-limited settings; finally, the extent of intestinal resection and the occasional use of stoma or laparoscopy illustrate the heterogeneity of practices according to the available technical platform.

The treatment of complicated internal hernias relies exclusively on emergency surgery. Exploratory laparotomy remains the most used technique in digestive emergency contexts, particularly in resource-limited countries. It allows the definitive diagnosis to be made by assessing the state of intestinal viability. Surgical management consists of reduction of the hernia, resection of necrotic segments, and closure of the mesenteric defect to prevent recurrences [2,5]. In some specialized centers, laparoscopy is proposed for diagnostic and therapeutic purposes as first-line treatment when the patient's hemodynamic status allows and in the absence of major distension and necrosis. But it is more often converted to laparotomy [15-16]. In our case, laparotomy allowed us to confirm the diagnosis and perform all necessary therapeutic procedures.

The postoperative course was marked by a parietal suppuration on Day 4, a classic complication after surgery for fecal peritonitis with significant peritoneal contamination [14,17]. This evolution remains comparable to African literature data, where postoperative infectious complications remain frequent due to diagnostic delay, the advanced stage of lesions at the time of management, and technical constraints related to the resource-limited context.

Conclusion

Transmesenteric internal hernias constitute a rare but serious cause of acute intestinal obstruction in children. Their preoperative diagnosis remains difficult due to a clinical presentation that is often nonspecific, capable of simulating other frequent abdominal emergencies

in tropical countries, particularly typhoid ileal perforations. Diagnostic delay rapidly exposes to the risk of intestinal ischemia, necrosis, and digestive perforation, thus worsening the prognosis. In resource-limited settings, management still relies largely on clinical examination and surgical exploration. Improving access to abdominal computed tomography and early surgical management could contribute to reducing the morbidity and mortality related to this rare condition. Furthermore, strengthening surgical skills in rural contexts and making available registries of rare pediatric cases in sub-Saharan Africa can help to better know these pathologies and manage them more effectively.

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