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Claudius Amyand Hernia: About 2 Clinical Cases in Pediatric Surgical Environment in Guinea

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Abstract

This article reports two pediatric cases of Claudius Amyand hernia (CAH) discovered during surgery for incarcerated right inguinal scrotal hernia in Guinea. The authors present two clinical observations of male children (aged 4 years and 2 months) with incarcerated right inguinal scrotal hernia. In both cases, the appendix was found intraoperatively within the hernia sac, leading to appendectomy followed by successful inguinal closure of the hernia sac, highlighting the diagnostic difficulty of this rare condition.

Keywords

Claudius Amyand Hernia, Incarcerated or Strangulated Inguinal Hernia, Appendix, Child, Pediatric Surgery

1. Introduction

Claudius Amyand hernia (CAH) is defined by the presence of a normal or inflammatory vermiform appendix within a hernial sac, often inguinal [1]. It is a very rare entity in children. It was first described by Claudius Amyand in 1735 at St. George's Hospital in London in an 11-year-old child who was admitted for a right inguinal hernia complicated by a right scrotal stercoral fistula. Amyand discovered a pin within the stercolith during exploration through a right inguinal incision. He performed an appendectomy with resection, closure of the hernial sac and flattening of the fistula. The postoperative course was simple [2]. The definitive diagnosis of this condition is intraoperative in the vast majority of cases. We report 2 cases of Clau-

dius Amyand hernia (CAH) in children discovered incidentally during surgery in a pediatric surgical setting in Guinea Conakry and through our cases, we will discuss the epidemiological, diagnostic and therapeutic aspects of this condition with a review of the literature.

2. Our Observations

2.1. Observation 1

CS: This is a 4-year-old boy who was admitted for a large right inguinal scrotal hernia at the HBB medical-surgical clinic in Lambanyi. According to the parents, the inguinal swelling was congenital and gradually increased in size and became bothersome. There were episodes of transient inguinal pain at times, no transitory disturbance upon reception or notion of hernial strangulation. The delay in treatment was due to the parents' financial means. It was through social networks that we were informed of the child's situation and he was taken care of free of charge by the clinic. On physical examination, the child was in good general condition, conscious and cooperative, the conjunctiva and integuments were well colored, he weighed 16.5 kg and was apyretic at 36.5˚C; the cardiopulmonary examination was normal. Locally, a large right inguinal scrotal swelling (with normal-looking skin) was noted, more or less soft, painless, reducible, and expansive on exertion; the transillumination test was negative (**Figure 1**). At the left inguinal scrotal level, there was no swelling, the left inguinal hernial orifice was free; a normal-sized testicle was palpated in the left hemi-scrotum, the penis was normal-looking and circumcised; the abdomen was supple, painless without visceromegaly; this abdomen was the site of a medium-necked umbilical hernia. The rest of the examination was unremarkable. At the end of our clinical examination, the diagnosis of a large right inguinal scrotal hernia (RISH) associated with an umbilical hernia with episodes of infatuation was retained. The indication for surgical repair of both hernias was asked of the parents, who gave their consent. The preoperative assessment was unremarkable and the pre-anesthetic consultation was normal. The patient was taken to the operating room.

Operative Protocol

- Setup: Patient in supine position on the operating table under general anesthesia with orotracheal intubation, painting of the operating field followed by the placement of sterile drapes; antibiotic prophylaxis with intravenous amoxicillin clavulanic acid weight dose.

The first surgical step consisted of the cure of the umbilical hernia, which is not the subject of this article: surgical exploration after an approach to the lower umbilical fold showed a large sac and a medium neck, there was no incarceration of abdominal viscus on the neck, aponeurorrhaphy was performed, followed by fixation of the umbilicus and skin closure.

The second surgical procedure concerned the large right inguinal scrotal hernia, which is the subject of this scientific article.

Approach: Cold blade skin incision of approximately 3 cm in the lower right ab-

dominal crease, followed by hemostasis dissection of the cellular tissue and opening of the fascia.

Exploration: Evidence of a large, thick hernial sac. Upon opening, we note the presence of a large, long appendix strongly adherent to the bottom of the sac as well as the cecum, part of the terminal ileum (Figure 2).

Procedures: Meticulous and laborious release of the peritoneal adhesions of the hernial sac, and easy mobilization of the ascending colon due to the lack of attachment of the latter; after isolation of the vas deferens and the spermatic vascular pedicle, an antegrade appendectomy was performed, followed by the somewhat difficult reintegration of the viscera into the peritoneal cavity. We finally proceeded to the closure of the hernial sac at its base, followed by its resection, aponeurorrhaphy, subcutaneous approximation and skin closure with simple stitches (Figure 3). The patient was hospitalized for 24 hours with infusable paracetamol 15 mg every 8 hours. The postoperative course was simple with healing of the wounds by first intention apart from scrotal edema, which regressed after 3 weeks; he was followed for a year and had no particularity.

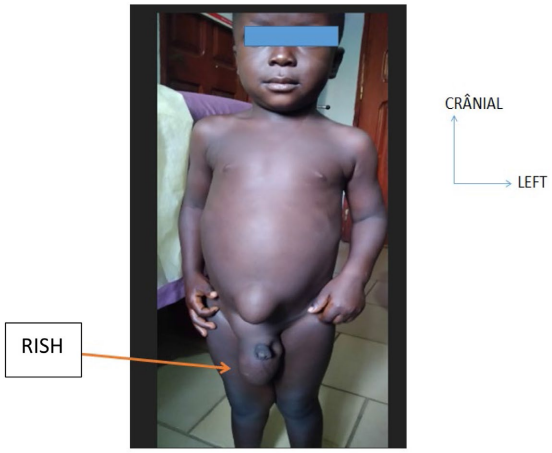

Figure 1. 4-year-old boy with a large right inguinal scrotal hernia (RISH).

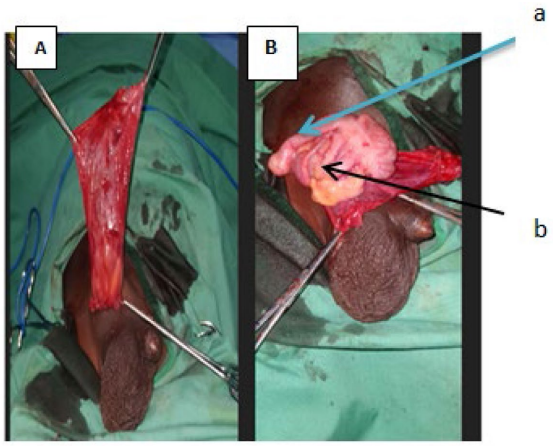

Figure 2. Intraoperative exploration of the hernial sac (A) and its contents (B): a large, long appendix (a) and the cecum (b) with strong adhesions to the sac.

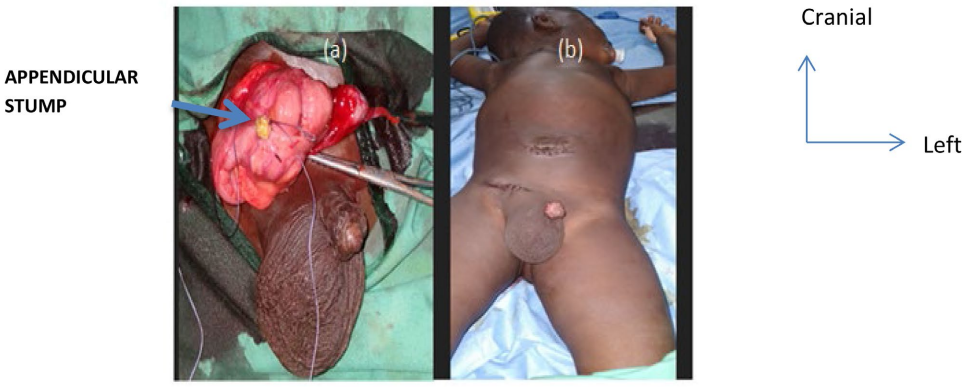

Figure 3. (a) Appendectomy followed by suturing of its stump after opening of the hernia sac; (b) Suturing of the operative wounds.

2.2. Observation 2

DA: A 2-month-old male infant was urgently admitted to the pediatric surgery department of the Donka National Hospital (HND) University Hospital for a hard, inexpansive, painful, and irreducible right inguinal scrotal swelling; this symptomatology had been evolving for 8 hours. The child was referred to us by the pediatric emergency department of the Donka National Hospital. In the history, the child was born to a primiparous mother at term, the mother reported the presence of intermittent inguinal swelling with spontaneous reduction since birth and a notion of crying during the expansion of the swelling, rhinorrhea and infant colic, no transit disorder. On examination, the infant presented in good general condition, awake, conjunctiva and integuments of normal color, but painful, weighing 3600 g, and subfebrile at 37.5˚C. The abdomen was soft with no palpable mass. Examination of the perineum revealed a hard, painful, and irreducible right inguinal scrotal swelling with negative transillumination. On the left, there was no inguinal scrotal swelling; the testicle was intra-scrotal. The rest of the examination was normal. At the end of our somatic examination, we concluded that there was a strangulated right inguinal scrotal hernia (RSISH) (**Figure 4**).

An indication for emergency surgery was given, and the child was admitted to the operating room after a preoperative assessment, which was normal except for a slightly elevated CRP. After an approach through a skin incision in the right lower abdominal crease, opening of the hernial sac revealed a very hyperemic, non-perforated, inflammatory appendix with the cecum and part of the ileum, which was ecchymotic (**Figure 5**). In-depth exploration noted viability of the loops and a lack of attachment of part of the ascending colon. The surgical procedure consisted of an antegrade appendectomy with repression of the cecum and ileum into the peritoneal cavity, followed by careful dissection of the sac down to the preperitoneal fat at the deep inguinal orifice. After isolation of the vas deferens and the spermatic pedicle, the sac was ligated and resected (**Figure 6**). The infant was observed for 72 hours and given antibiotics and analgesics, and was discharged with restored bowel movements and normal feeding. The first dressing was applied one week

postoperatively and the sutures were removed on postoperative day 12; the postoperative course was uneventful with a follow-up of 6 months.

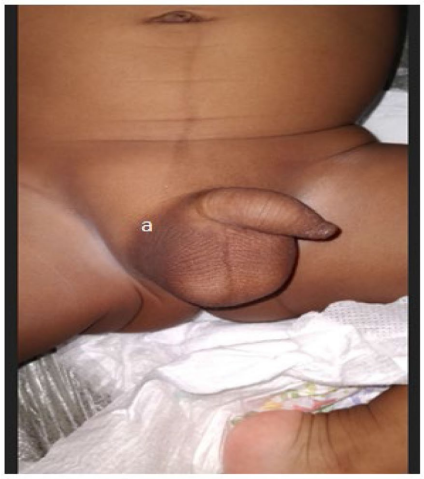

Figure 4. 4-month-old infant with painful, irreducible right inguinal scrotal swelling (a).

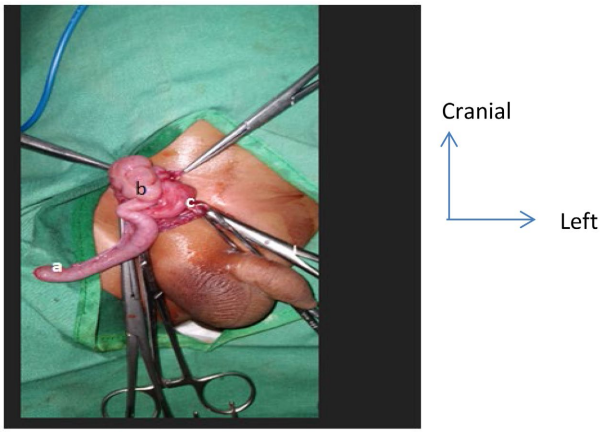

Figure 5. Intraoperative image of sac contents: Inflammatory appendicitis (a), cecum (b) and terminal ileum inflammatory and ecchymotic (c).

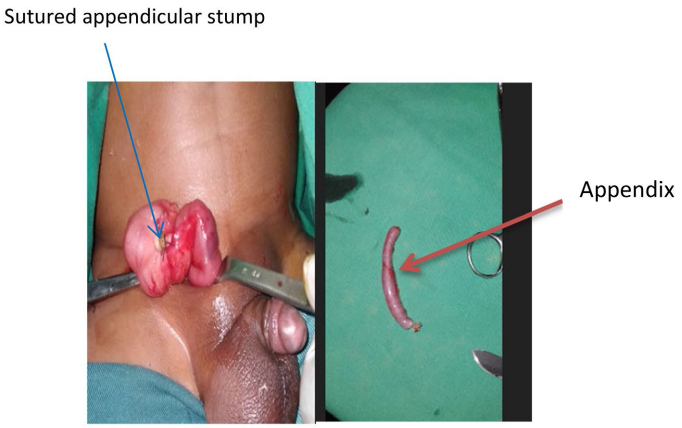

Figure 6. Appendectomy of an inflammatory appendix via the inguinal route with suture of the stump.

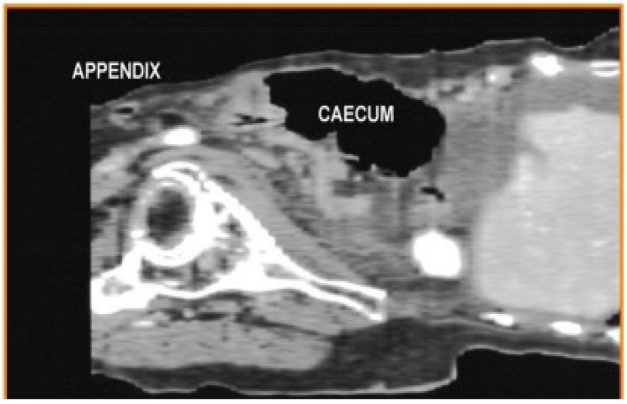

Figure 7. CT image after two-dimensional reconstruction of a Claudius Amyand hernia: the appendix is visible in the inguinal canal [6].

3. Discussion

HCA is an extremely rare pathology in children [3], despite this rarity, all ages are affected from 3 weeks to 92 years [4]. The clinical presentation is often that of a strangulated inguinal hernia [1] [5] and frequently encountered in boys and the right side is more affected [2] as is the case in our two observations; however the rare cases on the left reported in the literature could be linked to situs inversus, intestinal malrotation, a mobile cecum or a very long appendage [4].

Preoperative diagnosis is rare in current practice because of the obvious indication for surgery in a picture of strangulated inguinal hernia [6]. To diagnose CAH in the face of a picture of incarcerated or strangulated hernia, some authors request an inguinal scrotal ultrasound; however, the ultrasound does not always allow discrimination of intestinal loops from an inflamed appendix. This imprecision makes diagnosis difficult and leads to diagnostic errors. Laermans *et al.* have shown that the combination of CT and multiplanar reconstruction is the most effective technique to better visualize the appendix and its relationships with surrounding structures, thus helping to establish with certainty the correct preoperative diagnosis [3]. CT scanning is not systematically used in cases of clinical suspicion of a complicated hernia [7].

Balthazar, Atema and Stoma showed a significant superiority of CT scanner compared to ultrasound according to Dobos *et al.* [7]. Stroman in a study on 107 patients mentions a sensitivity of 30% for ultrasound against 92% for CT scanner [7]. Inan *et al.* [6] diagnosed through CT scan in one of their patients the presence of the appendix in the inguinal canal, thanks to the scanner (**Figure 7**). In addition, some authors propose that a CT scan be systematically performed when developing a strangulated hernia, as well as an exploratory laparoscopy for diagnostic and curative purposes. This coelioscopy would avoid reinterventions burdened with high morbidity and mortality [7]. CT scan and coelioscopy are examinations that are not within the reach of the majority of our patients, given their cost in our context. Health insurance for all and awareness among our doctors could change this situation in our work context.

The positive diagnosis of Claudius Amyand hernia is made intraoperatively upon observation of a vermicular appendix located within the hernial sac, whether it is inflamed or not [2] [6]. Both of our observations were discovered incidentally during the operation; ultrasound and CT scans were not performed. When we went to the operating room, we did not think of a Claudius Amyand hernia, it was during the operation that we were faced with the evidence. Surgical exploration of our first patient had revealed a large long appendix within the hernial sac, strongly adhering to the latter as well as the cecum, a part of the terminal ileum; in the second patient, the appendix was very inflamed, located in the hernial sac with its cecum and a part of the terminal ileum, with intestinal distress. In both cases, there was a defect in the attachment of the proximal ascending colon. Colonic and cecal attachment defects and a long appendix have been described by some authors as factors favoring HCA [3] [4] [6]. In our cases, abdominal hyperpressure would have led to the unfixed cecum with the appendix in the persistent peritoneo-vaginal canal.

The presence of the appendix in the hernial sac predisposes to the development of adhesions between its serous membrane and the hernial sac, resulting in an irreducible hernia. Compression of the prolapsed appendix in the hernial sac and adhesions could lead to perforation of the appendix [3] [4]; in case of spontaneous reduction of a strangulated hernia or by taxis on CAH, the patient could develop an abdominal complication in the postoperative period, as reported by Dobos *et al*. [7] in their study. Among incarcerated hernias containing viscera, the presence of the appendix is estimated at 1%. The development of acute appendicitis inside a hernial sac of CAH hernias is estimated at 0.13% of all appendicitis. Despite this rarity, it is a pathology that, in the event of delayed diagnosis, can be complicated by appendicular abscess or peritonitis, thus putting the patient's life at risk [6]. Our second patient therefore presented with appendicitis due to a Claudius Amyand hernia.

The practical approach to CAH depends on the appearance of the vermiform appendix in the hernial sac and the clinical picture [4]. Appendectomy by inguinal herniotomy followed by closure of the peritoneovaginal canal is the ideal treatment for uncomplicated Claudius-Amyand hernia. Subumbilical laparotomy associated with herniotomy is necessary in complicated cases. Appendectomy in the hernial sac through the right lower abdominal crease approach was performed in our patients, followed by closure of the sac. The classification of Lossanoff and Basson into four types [4] [7] in 2008 codified the therapeutic attitude of Amyand's hernia, this classification was modified by Rikki into five types (**Table 1**) [3] [4]. Our two clinical cases can be classified as type 1 for the 1st case and type 5b according to the Rikki classification of Claudius D'Amyand hernias. It should be noted that in children, the use of prostheses is prohibited in cases of CAH. Appendectomy and closure of the peritoneo-vaginal canal are the procedures to be carried out simply in children. In reality, this classification is not adapted to children.

This latter classification does not take into account left CAH for which a preventive appendectomy is recommended because, in case of future appendicitis, there is a high risk of diagnostic delay [3] [4]. Laparoscopic reduction has also been de-

scribed in the literature [4]. We compare the diagnostic aspects and therapeutic attitude of our patients according to the characteristics of the appendix with those of some authors in Table 2. In this table, we note that all authors are doing appendectomy followed by closure of the hernia sac in children.

Table 1. Classification of Amyand's hernia after modification of Rikki [4].

Types	Clinical description	Surgical treatment
Type 1	Normal appendix in an inguinal hernia	Hernia reduction, mesh replacement
Type 2	Acute appendicitis in an inguinal hernia without abdominal sepsis	Appendectomy, primary hernia repair without prosthesis
Type 3	Acute appendicitis in an inguinal hernia with peritoneal and/or abdominal wall sepsis	Laparotomy, appendectomy and primary hernia repair without prosthesis
Type 4	Acute appendicitis in an inguinal hernia with pathology concomitant abdominal	Same as type 3 plus sockets burden of concomitant disease
Type 5a	Normal appendix found in a hernia sac	Hernia reduction, repair primary hernia, including replacement of the mesh
Type 5b	Acute appendicitis within the hernial sac without peritonitis	Appendectomy by herniotomy, primary closure of the aponeurotic space, no prosthetic hernia repair
Type 5c	Acute appendicitis within the hernial sac with peritonitis or Abdominal wall sepsis or in connection with previous surgery	Support like type 4

Table 2. Diagnostic aspects and therapeutic attitude of our patients according to the characteristics of the appendix.

Authors	Patients	The appearance of the appendix intraoperatively	Therapeutic gestures after incision of the lower right abdominal fold
Hind Cherrabi (PAMJ 2018 Morocco [2]	22-day-old newborn male with RSISH complicated by occlusion	Necrotic appendix in the sac + 1 segment of the ascending colon	Appendectomy + Hernia Sac Closure (HSC)
Ngakani Offobo (RECAC 2022 Gabon) [5]	12-month-old infant (M) with RSISH	Phlegmonous appendicitis in the bag	Appendectomy + Closing the Bag
	3-year-old boy with an RSISH	Phlegmonous appendicitis in the bag	Appendectomy, Closure of the CPV + Parietorrhaphy
C.S. Metchihoungbe (JSBCB 2022 BENIN) [4]	8-month-old infant (M) with RSISH with occlusion and simple HI on the left	Appendix appears normal	Appendectomy + Closure of the Sac
	10-month-old infant RISH reduced by taxis under AG	Vermiform appendix in the hernial sac with adhesions	Appendectomy + Closure of the Hernia Sac, Histology: Normal Appendix
	8-month-old boy with SIMPLE **IH**	Vermiform appendix in the hernial sac with adhesions normal appearance	Appendectomy + Closure of the Sac
	22-month-old infant (M) with bulky RISH	Vermiform appendix in the hernial sac with adhesions	Appendectomy after Release of Adhesions + Closure of the Sac

Continued

F. Smahi (JECM 2024) Morocco [3]	3-year-old boy with RISH SIMPLE	Normal-appearing vermiform appendix adhering to the wall of the hernial sac	Appendectomy after Release of Adhesions + Closure of the Sac
	22-day-old newborn with an RSISH	Necrotic distal appendix Lack of attachment of the ascending colon	Appendectomy + Closure of the Sac
Our observations	4-year-old boy with Voluminous RISH	A big long appendage in the bag + Cecum and an ileal part	Appendectomy after Release of Sac Adhesions + Closure of the Sac
	2-month-old infant (M) with a RSISH	The appendix was very inflamed located in the hernial sac with its cecum and part of the terminal ileum	Appendectomy + Closure of the Sac

RSISH: Right strangulated inguinal scrotal hernia; RISH: Right inguinal scrotal hernia; IH: Inguinal hernia; M: Male.

4. Conclusion

Claudius Amyand hernia most often presents in children incidentally during the repair of an incarcerated or strangulated right inguinal hernia. Since preoperative diagnosis is rare, the systematic use of CT scans for strangulated hernias in children and exploratory laparoscopy for diagnostic and curative purposes would help avoid diagnostic errors. The reduction of strangulated hernias, especially on the right, under anesthesia or by taxis in children must be carefully considered to avoid missing a Claudius Amyand hernia with its abdominal complications, such as appendicular peritonitis, which can be life-threatening for the child.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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