

Inguinal Hernia with Intestinal and Ovarian Content: A Rare Case in Pediatric Age

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ABSTRACT

Inguinal hernia is a common congenital abnormality in children. Clinically it manifests itself with a palpable swelling in the groin. The ultrasound examination is essential to confirm the clinical hypotheses. We describe a rare case of inguinal hernia with both intestinal and ovarian contents in an infant who arrived at the emergency room of the "Santobono-Pausilipon" pediatric hospital.

Keywords: *Inguinal Hernia, Ovary, Intestine, Ultrasound*

Introduction

Inguinal hernia is the most common form of hernia of the lower abdominal wall in children. The estimated incidence is between 0.8% and 4.4%, occurs mainly in the first year of life, with greater frequency in males and a ratio between males and females of 6: 1 (Dan Poenaru, 2000). The inguinal hernia is to be considered a congenital anomaly secondary to a failure to obliterate the vaginal process. The hernial sac can contain intestinal loops, omentum and genital organs; the incidence of ovarian hernias is around 15-20% in female infants (Laing *et al.*, 2007). Rarer, however, are hernias containing the uterus and ipsilateral ovary or both ovaries (Cascini *et al.*, 2013). On physical examination, the inguinal hernia appears as a palpable swelling, momentarily reducible, which can face complications such as incarceration. For this reason, early diagnosis and therapy are essential. Ultrasound and color

Doppler are fundamental tools for diagnostic confirmation and for the evaluation of possible complications (Dal Mo Yang *et al.*, 2014).

Case Report

A month-old infant arrived at the emergency room for the appearance of a sudden swelling in the left inguinal-crural site. Upon physical examination, the abdomen appeared treatable and painless on palpation. The swelling was partially reducible and reappeared with tears. In the suspicion of an inguinal hernia, an ultrasound examination was performed which showed a dehiscence of the muscle structures with engagement in the inguinal canal of intestinal loops (Fig. 1) and

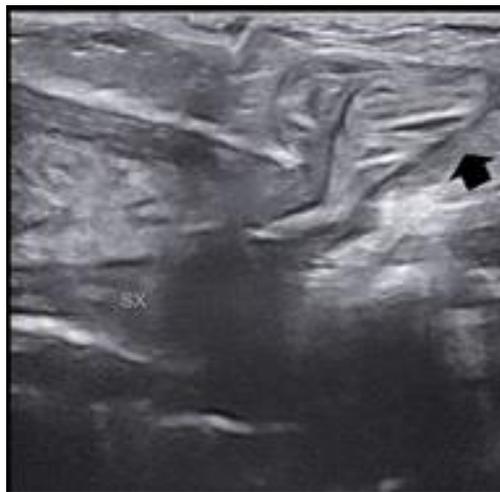


Figure 1: Longitudinal sonogram shows in correspondence with the swelling clinically palpable a dehiscence of the muscle structures with commitment in the inguinal canal of bowel loops (black arrow)

just below the intestinal loops, above the muscle wall on the clinically palpable swelling left side, a formation was evident, with an echogenic oval morphology with contextual cystic areolas, compatible with the annexal structure (Fig. 2).



Figure 2: Longitudinal ultrasound scan showing double herniation

On the eco-color Doppler examination, there was a regular vascularization of both the intestinal walls and the herniated ovary, thus excluding complications in progress (Fig. 3-4).

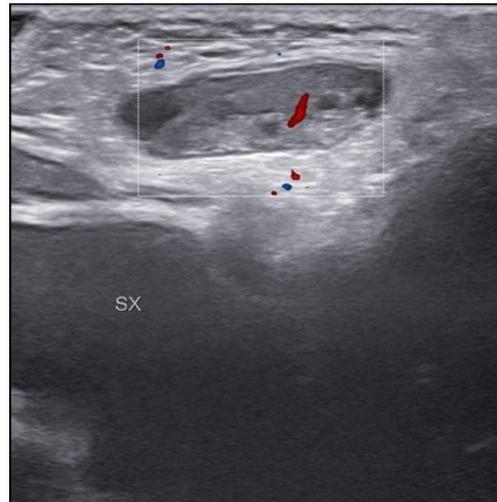


Figure 3: Longitudinal ultrasound scan with color-Doppler integration shows an echogenic oval formation with contextual cystic areolae compatible with adnexal structure

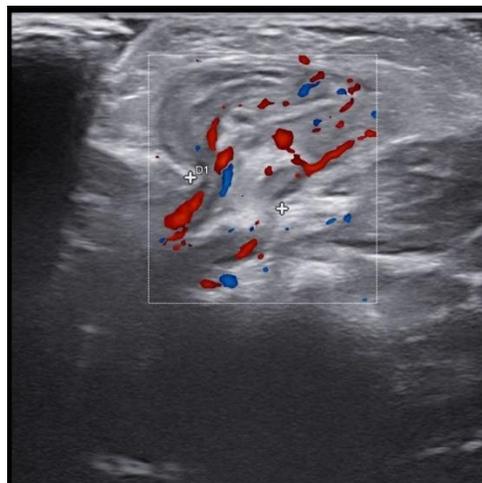


Figure 4: Longitudinal ultrasound scan with color-Doppler integration shows regular vascularization of both the intestinal walls and the herniated ovary

The infant was subjected to surgery, which confirmed the preoperative diagnosis.

Discussion

Inguinal hernia is a very frequent congenital anomaly in children and is secondary to changes in the inguinal canal that occur during embryonic development (Shadbolt *et al.*, 2001). This development, in both the male and female foetuses, requires a series of phases involving two main anatomical structures: the gubernaculum testis and the vaginal process. The gubernaculum testis is a ligamentous

formation that inserts above the lower pole of the fetal gonad and below the skin of the inguinal region (Merriman and Auld, 2000). In the male foetus it helps the descent of the testicle through the inguinal canal into the scrotum while in the female foetus it prevents the ovary from descending into the inguinal canal. The vaginal process, called the Nuck canal in the female gender, is a peritoneal fold that invaginates into the inguinal canal and, depending on the gender, accompanies the testicle or the round ligament of the uterus towards the scrotum or labia majora. At birth or shortly before the vaginal process obliterates; otherwise, a herniation of the intestinal loops or genital organs in the inguinal canal may occur. Therefore, a premature birth before the closure of this canal occurs increases the risk of developing an inguinal hernia (Ziegler, 1994). In about 60% of cases, inguinal hernias arise on the right side because the right vaginal process obliterates later than the left; in 10% of cases the hernia can be bilateral (Ming *et al.*, 2011). Inguinal hernias can have a varied content; the hernial sac may in fact contain intestinal loops, omentum, testes, ovaries, fallopian tubes, uterus and urinary bladder (Minella *et al.*, 2020). On physical examination, uncomplicated hernias usually present with intermittent swelling in the groin region, which in males can extend to the scrotum and in females it can extend to the labia majora (Shalev *et al.*, 2001). Swelling is generally reducible with light pressure but may recur after the reduction maneuver or during crying. Incarceration of inguinal hernias is an important complication in children and occurs with a frequency of 31%. The intestine, the ovaries and the fallopian tubes are the organs that can most commonly encounter this complication that clinically manifests itself with non-reducible swelling (Caprio *et al.*, 2019). Some hernias can regress spontaneously, less likely if the hernia has an ovarian content; therefore, even in the absence of complications, hernias with an ovarian content must be managed with early surgery. An incarcerated hernia can progress rapidly towards strangulation which leads to vascular impairment of the incarcerated contents. This is clinically manifested by abdominal pain, irritability and vomiting. The imprisoned ovaries are, in turn, susceptible to twisting (Rossi *et al.*, 2019). Therefore, early diagnosis and therapy are essential to prevent irreversible damage to herniated structures. Imaging plays a fundamental role in the diagnostic framework of inguinal hernias (Tufano *et al.*, 2020). In particular, ultrasound is the main diagnostic test, being an easily available, low cost and free of ionizing radiation exam. The ultrasound, in addition to giving a diagnostic confirmation, allows to recognize the hernial content through the characteristic ultrasound aspect of the anatomical structures involved and to preclude early the appearance of complications, which in the case of intestinal loops are announced by the thickening of the walls, by the presence of free fluid in the hernial sac and by intra-abdominal intestinal dilatation. In the event that the herniation has an ovarian content and there is a suspicion of torsion, it is possible to find a heterogeneous echogenic mass larger than 5 cm, with follicles arranged peripherally (Draghi *et al.*, 2020). No vascular signal appears on color-Doppler examination (Calle-Toro *et al.*, 2019). Ultrasound examination should evaluate both inguinal channels, as clinically not evident contralateral hernia can be

found in 88% of cases (Aso et al., 2005).

Conclusion

In the presence of an inguinal swelling in pediatric inguinal hernias must be considered in the differential diagnosis. Ultrasound should be used as a first choice imaging exam because it is essential for both diagnostic confirmation and evaluation of complications.

Conflict of Interest

The Authors declare that they have no conflict of interest.

Informed Consent

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, and its late amendments. Additional informed consent was obtained from all patients for which identifying information is not included in this article.

Human and Animal Rights

This article does not contain any studies with human or animal subjects performed by any of the Authors.

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