

Inguinal Hernia Containing the Fallopian Tube and the Ovary in a Premature Infant: A Case Report

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Abstract: In pediatric patients, the pelvic and the abdominal contents of hernias of the canal of Nuck have increased risk of strangulation. Early diagnosis of these hernias with ultrasonography is important. We report a case of a hernia of the canal of Nuck presented as a left inguinal mass containing the ipsilateral ovary in a 26-day-old premature infant girl.

Keywords: *the canal of Nuck, indirect inguinal hernia, ovarian protrusion*

Introduction

Indirect inguinal hernia is a common surgical pediatric disease with cumulative incidence of 4.2% in children aged 0 to 15 between 1997 and 2005; it occurred mostly during the first year of life and has a high incidence of 30% in premature infants.¹ In approximately 20% of cases, sliding inguinal hernias in infant girls contain one ovary and sometimes include the fallopian tube as well.² Rarely, the uterus and both ovaries may be involved in the content of these hernias.² We report a case of a premature infant girl who presented with an indirect inguinal hernia containing an ovary.

Case Presentation

An infant girl was born at the 37th week of gestation (birth weight 2 825 g, height 53 cm, Apgar score of 5/9 at 1 and 5 minute, respectively) via an uncomplicated, spontaneous vaginal delivery. Findings of the patient's physical examination at the time of birth were within

Key Points

- Indirect inguinal hernias most commonly occur during the first year of life and have an increased incidence in premature infants.
- Incomplete or delayed closure of the embryonic processus vaginalis may provide a pathway, called the canal of Nuck in female children, for indirect inguinal hernia.
- When indirect inguinal hernia in children involves the ovaries, early diagnosis and treatment are important because of the risk of ovarian strangulation.

normal limits and without any inguinal masses palpated. Twenty six days later, the parents noticed a newly developed mass in the left groin of the infant and brought her to the hospital for evaluation. Examination of the patient raised suspicion for an inguinal hernia. Given the size of the mass, there was a concern for increased risk of strangulation of the hernia content.

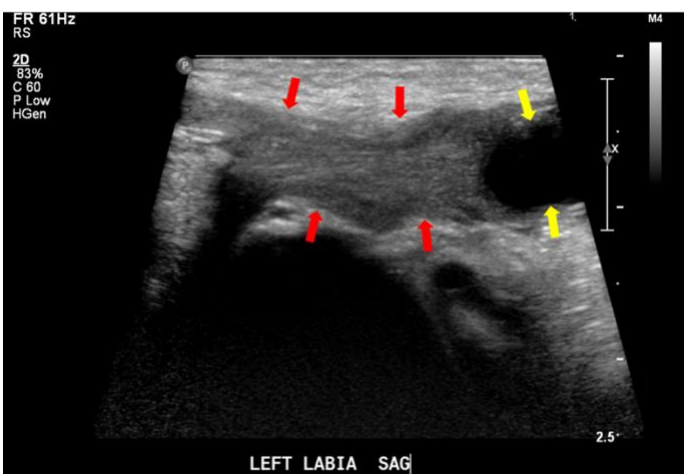
Transabdominal ultrasound and normal color Doppler flow revealed the left ovary with a small follicle in the left groin (Figure 1, 2). The finding was compatible with an indirect left inguinal hernia

containing the left ovary protruded through the canal of Nuck. No spontaneous reduction of hernia was noted. The right ovary and the uterus were visualized in the pelvis.

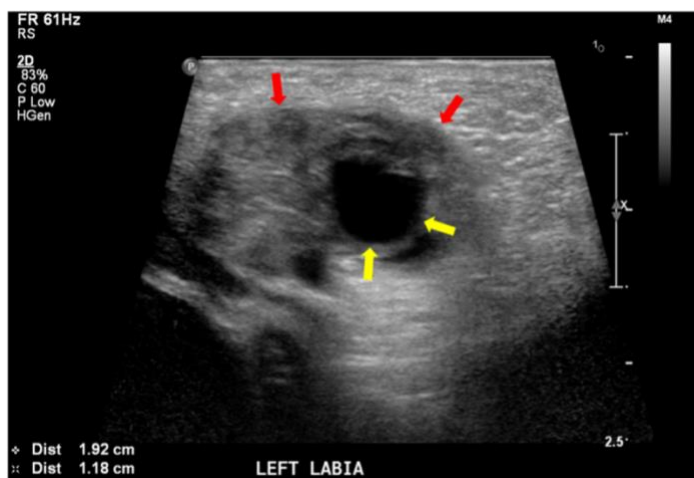
On the following day, the patient's condition was evaluated by a pediatric surgeon who planned for an elective surgery a week later, based on no immediate concern for strangulation of the hernia

Figure 1. Transabdominal Grayscale Ultrasonography of a Mass in the Left Groin of a 26-day-old Infant.

A Sagittal View

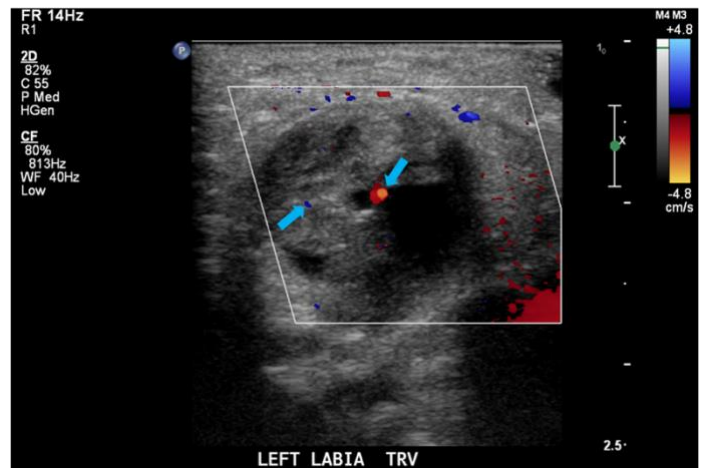


B Axial View



Ultrasonograms (1A and 1B) show a hypoechoic 1.9 x 1.8 x 1.5 cm soft tissue structure (1A and 1B, red arrows) located in the region of the left labium, corresponding to the palpable abnormality found on physical examination. The imaging characteristics of the structure are consistent with an ovary that contains a 6 mm ovarian follicle (1A and 1B, yellow arrows).

Figure 2. Color Doppler Axial Image of a Mass in the Left Groin of a 26-day-old Infant.



There is normal blood flow (blue arrows) to the ovary in the region of the left labium.

content. A repair of the left sliding inguinal hernia was performed via the inguinal approach. The hernia sac was dissected and opened to reveal a sliding component. The fallopian tube was dissected off the sac and together with the left ovary reduced into the abdominal cavity. A purse-string stitch was used to close peritoneum at the internal ring. The hernia sac was resected and sent for histopathologic analysis. In view of a high probability of a patent processus vaginalis on the side opposite a diagnosed inguinal hernia in patients of this age, the same inguinal approach was chosen to explore the patient's contralateral groin where a right-sided hernia containing only omental fat was found. The hernia sac was also resected and sent for histopathologic analysis. The patient's postoperative course was uneventful, without complications or recurrence of symptoms.

Discussion

Inguinal hernias that are caused by incomplete or delayed closure of embryonic processus vaginalis (PV) affect 20.4% of premature infant girls.³ The PV is an evagination of the parietal peritoneum that develops at around the sixth month of gestation and obliterates between the eighth month of gestation and the end of the first year of an infant's life.⁴ If the PV remains open, it provides a pathway, called the canal of Nuck in females, for

protrusion of the abdominal and the pelvic contents through the deep (internal) inguinal ring and the inguinal canal into the ipsilateral labium majus.^{4,5}

Several hypotheses have been proposed to explain the pathogenesis of indirect sliding inguinal hernias in infants and children. One such hypothesis⁶ suggests that raised intra-abdominal pressure, whether in response to crying or to positive pressure ventilation, is a highly probable cause of herniation of the internal genitalia into the canal of Nuck, especially in premature infants. The other hypotheses⁶ explain the mechanism of this type of hernias by anatomic abnormalities of the cranial suspensory ligament, the ligament of the ovary, and the round ligament or by the close proximity of these ligaments to the deep inguinal ring.

Although risk factors for ovarian strangulation are not clearly identified,³ early diagnosis of indirect inguinal hernias in children is important because strangulation can occur in as many as 2%-33% of cases of ovarian herniation.⁷ The torsion of a herniated ovary can lead to vascular and lymphatic compromise and, ultimately, to infarction.⁸ Thus, if incarceration or strangulation is suspected, emergency surgery is recommended.^{7,8} In the case reported here, the ovarian inguinal hernia had an adequate blood supply, which allowed for scheduling an elective surgery.

High-frequency high-resolution ultrasonography provides efficient and accurate evaluation of inguinal hernias⁹ with sensitivity 93%, specificity 80%, and accuracy 89%. Because of the superficial location of these hernias, high-frequency linear-array transducers should be used to adequately visualize hernia contents.^{9,10} On ultrasonography, ovary-containing hernias appear as solid masses, sometimes with cystic components that represent ovarian follicles.¹⁰ Other herniated contents, such as the uterus, the fallopian tubes, the bowel, lymph nodes, free fluid, and omental fat, can also be differentiated using high-resolution ultrasound.^{5,10}

This case report confirms the utility of prompt use of ultrasonography for diagnostic evaluation of female infants with clinical presentation suspicious for an inguinal hernia. These hernias can involve a variety of pelvic structures, and timely surgical

intervention may be warranted to prevent any sequelae.

Author Contributions

Conceptualization, M.K.P.; Acquisition, analysis, interpretation of data, and writing – original draft preparation, R.O.C.; Review and editing, M.K.P.; Supervision, M.K.P. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Disclosures

None to report.

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