

# An unexpected groin mass: infant ovarian herniation

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**Point-of-care ultrasound provides a safe, rapid, effective, and accurate tool for evaluating congenital groin masses in infants. We present a 4-week-old infant who presented to the emergency department with bilateral inguinal masses. Point-of-care ultrasonography discovered bilateral hernias with an ovary herniated through a patent processus vaginalis into the labium majora on the right side. The ovarian herniation reduced in the emergency department and the patient was discharged from the emergency department after arranging close follow-up with a pediatric surgeon for a prompt repair. Its use should be employed early, as delayed discovery of ovarian**

**herniation can lead to subsequent infertility. *Ann Pediatr Surg* 11:33–34 © 2015 Annals of Pediatric Surgery.**

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## Introduction

The processus vaginalis is a passage through the peritoneum created during embryogenesis. In male individuals, the inguinal canal allows the testicles and the processus vaginalis to pass into the hemiscrotum. Incomplete closure of the processus vaginalis allows for herniation of peritoneal structures in an inguinal hernia. This failure of closure occurs six times more commonly in male individuals [1]. In female individuals, the processus vaginalis is called the canal of Nuck and allows for passage and attachment of the round ligament to the ipsilateral labium majorus. Canal of Nuck herniation is a rare condition. Ovarian herniation into the canal of Nuck mostly occurs in patients younger than 5 years of age [1,2]. We present a 4-week-old girl with ovarian herniation through a patent processus vaginalis diagnosed by emergency physician performed point-of-care ultrasound.

## Case

A 4-week-old otherwise healthy girl presented to our emergency department directly from her pediatrician's office for further evaluation of 'bilateral inguinal hernias'. The patient was full-term, born by spontaneous vaginal delivery, and seen in the office for a regular check-up when bilateral masses in the medial inguinal crease were palpated. The patient was well appearing, feeding well, and having normal bowel movements. On examination, a left-sided abdominal wall defect was identified and a right-sided mass was palpated lateral to the labia majora. Ultrasonography with a Z. one ultrasound system/L14–5W transducer (Zonare Medical Systems, Mountain View, California, USA) revealed a small amount of fluid and debris in patent processus vaginalis, right greater than left without evidence of peritoneal bowel loops. An ovoid, nonperistalsing, hypoechoic structure with small anechoic foci was seen external to the peritoneal cavity (Fig. 1). This finding was consistent with a patent processus vaginalis with extraperitoneal ovary. The patient was seen and evaluated by a pediatric surgeon, the ovarian herniation was spontaneously reduced in the emergency department, and the patient was discharged home with plan for elective bilateral inguinal hernia repair.

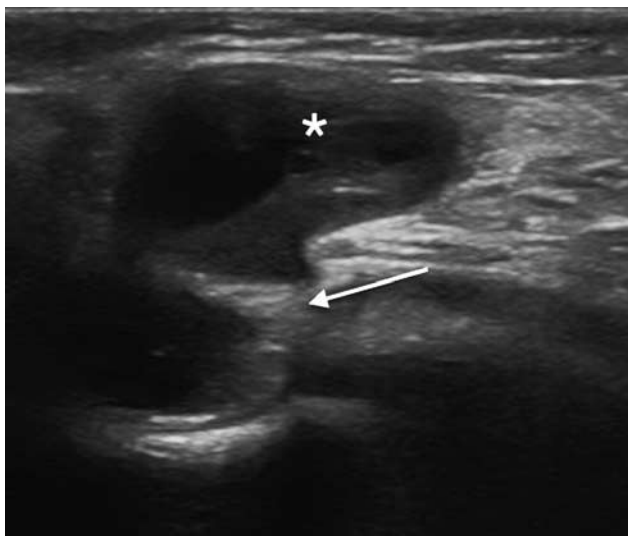
Upon follow-up, the patient underwent laparoscopic bilateral inguinal hernia repair. At the time of surgery, no genitourinary structures were present within the hernia sacs.

## Discussion

Herniation of the female reproductive organs into a patent processus vaginalis is a rare condition. When it occurs, it is typically (70%) in the pediatric (< 5 years old) population [2]. The processus vaginalis develops during the sixth month of fetal life and represents the peritoneal invagination into the inguinal canal. This canal structure is known as the canal of Nuck [1,3]. This canal usually closes *in utero*; however, it can remain open through the first year of life allowing for the development of a hydrocele or herniation [1]. Every physician caring for pediatric patients needs to be aware of this embryology and the potential for herniation of reproductive organs into the canal of Nuck. Ovarian herniation into this canal is reported to occur in 2.9–20% or more cases [1,2]. The uterus and fallopian tube are known to herniate through this defect as well. This diagnosis needs to be made promptly, as up to 27% of cases with tube and ovary herniation have strangulation or torsion [4]. The risk for incarceration is the highest in the first month of life [5]. Suspicion of additional genitourinary abnormalities should exist if uterine herniation is found. Uterine herniation into this canal has been associated with suspensory ligament abnormalities, vaginal atresia, uterine developmental changes, and even renal lesions [5,6].

The primary symptom of canal of Nuck herniation is swelling in the groin, perineum, or labia. This physical examination finding is, however, not specific for diagnosis. There is a broad differential diagnosis including lymphadenopathy, Bartholin's cyst, both benign and malignant tumors, abscess, hydrocele, and other cysts [1,7,8]. Herniation typically presents as painless swelling that can increase in size when the infant cries, strains, or is placed in an upright position [5,7]. Transillumination has been described to differentiate between hydrocele and hernia, but this is unreliable in canal of Nuck herniation as fascia from the external oblique can line the hernia sac,

Fig. 1



Ultrasound image of the right groin in an infant demonstrating the comma-shaped ovary (\*) herniated through a patent canal of Nuck (arrow).

thus obscuring transilluminated light [3]. Ultrasound evaluation provides a rapid, safe, accurate, and radiation-free way for the clinician to improve diagnostic accuracy over the physical examination.

In our case, the use of point-of-care ultrasound allowed for the prompt evaluation and diagnosis of ovarian herniation into the canal of Nuck. Ultrasound should be considered and performed early to evaluate and confirm a hernia diagnosis. The importance of early ultrasound is more pronounced if the reproductive organs are noted to have herniated. If an ovary has herniated and appears abnormal, early operative intervention should be performed due to the risk for incarceration and subsequent infertility [4]. The point-of-care sonographer should be aware of the potential for ovarian herniation when performing these scans. Approximately 80% of infant ovaries have follicular cysts on ultrasound. This can be used to help distinguish a herniated ovary from a lymph node or, in cases of ambiguous genitalia, from an undescended testicle [4]. A herniated ovary with torsion appears heterogeneous, enlarged, with multiple peripheral follicles and may show no Doppler signal [9]. This is in contrast to the appearance of a normal ovary, which can be described as having a low resistance flow Doppler signal, homogeneity, without a significant size difference bilaterally, and can contain small anechoic structures that make the ovary appear microcystic [10]. In addition, it is recommended that ultrasound be performed in these hernias preoperatively to identify hernia sac contents.

Ultrasound has been shown to be an easy and accurate way to distinguish between hernia and hydrocele, demonstrating nearly 100% efficacy [1,8].

Upon discovery of ovarian herniation, early surgical consultation should be sought. Manual reduction of the hernia sac contents should be attempted to help preserve reproductive function, if the ovary appears normal on ultrasound evaluation [6]. When an ovary is present in the hernia sac on ultrasound, there is a decreased likelihood of spontaneous reduction, but manual reduction should still be attempted. Although the ovary is spontaneously reduced, surgical repair should be performed within 24–48 h, as the risk for torsion remains high [5]. Inguinal hernia repair is the most common operation for pediatric surgeons; however, they should use utmost care during surgical dissection to avoid herniated organ injury [5].

### Conclusion

Canal of Nuck hernia is uncommon with ovarian herniation occurring with even less frequency. Point-of-care ultrasound allows for the early, rapid, and safe evaluation of inguinal masses, and ultrasound allows for the clinician to narrow a broad differential diagnostic list. Diagnosis of canal of Nuck ovarian herniation should not be delayed due to the risk for incarceration, torsion, and subsequent infertility. Point-of-care ultrasound allows for accurate, safe, and rapid evaluation of unknown groin masses in the neonate.

### Acknowledgements

#### Conflicts of interest

There are no conflicts of interest.

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