



Hernia Inguinalis Ovarii: A Case of Groin Mass Needing Urgent Attention

Hernia Inguinalis Ovarii: Acil Müdahale Gerektiren Kasık Kitlesi Olgusu

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Abstract

Congenital inguinal abnormalities in females vary from benign to potentially life-threatening etiologies. Canal of Nuck hernia is one such condition. Cases with ovarian prolapse, though initially asymptomatic, pose a significant risk of torsion, potentially impacting future fertility and therefore warrant timely surgical management. Herein, we report a case of bilateral canal of Nuck hernia with ovarian herniation in a female infant with a history of prematurity. An appropriate presumptive diagnosis, in conjunction with confirmatory ultrasound, is mandatory to help general pediatricians, pediatric surgeons, and emergency physicians manage cases promptly, as early intervention can significantly reduce the anticipated morbidity.

Keywords: Canal of Nuck hernia, ovarian herniation, prematurity, bilateral, ultrasound

Öz

Kadınlarda doğuştan inguinal anomaliler, iyi huylu olanlardan potansiyel olarak yaşamı tehdit eden etiyolojilere kadar çeşitlilik gösterir. Nuck kanalı hernisi de bu tür bir durumdur. Over prolapsus olan olgular, başlangıçta asemptomatik olsalar da torsiyon riski taşırlar ve bu durum da ileride fertilitiyi etkileyebilir, bu nedenle zamanında cerrahi tedavi gerektirir. Bu çalışmada, prematüre doğum öyküsü olan bir kız bebekte over herniasyonu ile birlikte bilateral Nuck kanalı hernisi olgusu sunulmaktadır. Erken müdahale, beklenen morbiditeyi önemli ölçüde azaltabileceğinden genel pediatriklerin, pediatrik cerrahların ve acil tıp hekimlerinin olguları hızlı bir şekilde yönetmelerine yardımcı olmak için, doğrulayıcı ultrason ile birlikte uygun bir ön tanı konulması zorunludur.

Anahtar Kelimeler: Nuck kanalı hernisi, over hernisi, prematüre, bilateral, ultrason

Introduction

The canal of Nuck hernia, a female counterpart of congenital inguinal hernia in males, is due to the patent processus vaginalis, also known as Nuck diverticulum. The canal of Nuck was named after the Dutch anatomist Anton Nuck in 1691. The incidence of female inguinal hernias is 1.9%, and the content in 15-20% of female inguinal hernias is ovaries and/or fallopian tubes.¹ The complications most commonly associated with this condition are incarceration (trapping of hernial

content causing irreducibility), strangulation (compromised blood supply of the trapped organ), and torsion (twisting of abnormally lengthened pedicle causing inviability of the herniated organ), which typically warrant emergency surgery. This includes ovarian herniation where such adverse effects lead to infertility or subfertility, jeopardizing the individual's reproductive potential. Thus, it is imperative to diagnose this condition immediately to avoid needless complexity and inappropriate interventions. In this report, we aim to discuss a case of bilateral canal of Nuck hernia with ovarian content.

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Case Report

A 2-month-old female baby presented with a left-sided inguinal swelling, gradually increasing in size, not associated with an irritable cry or erythema (Figure 1). On examination, a hard, non-tender, reducible swelling was noted in the left side of the groin. A history of prematurity was observed. The closest differential diagnosis considered is abscess, lymphadenopathy, hydrocele, and hernia, and their respective clinical and radiological features are described in Table 1. Ultimately, ultrasound was advised for diagnostic confirmation. On sonography, an ovoid-shaped multi-cystic structure representing the ovary, with a hypoechoic pedicle, is noted in the left inguinal region. On the right side, the hernial sac contained minimal collection, and on crying, herniation of the ovary was noted. Color Doppler study reveals appropriate blood flow in bilateral ovaries. Magnetic resonance imaging (MRI) confirmed the structure as the left inguinal ovary and showed a sac with minimal fluid in the right inguinal region. The right ovary was located near the deep ring. Hence, a diagnosis of bilateral canal of Nuck hernia was made (Figure 2). The patient underwent open bilateral inguinal herniotomy, first on the left followed by the right. Under general anesthesia and aseptic precautions, a transverse inguinal crease incision was made, followed by opening the oblique muscles layer by layer. Identification of the sac followed by tracing up to the deep inguinal ring was performed. The sac was opened, a

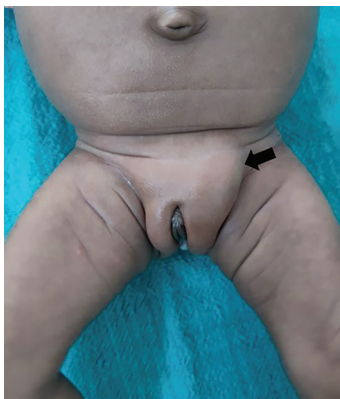


Figure 1. Canal of Nuck hernia presenting as groin mass on the left side (black arrow)

viable ovary was seen, and no obvious adhesions were noted. The contents of the canal are repositioned into the peritoneal cavity, followed by trans-fixation of the sac at the deep ring. Lastly, the sac excision was done and ended with anatomical closure. The follow-up was uneventful. Intraoperative findings validated the imaging-based diagnosis.

Discussion

Embryologically, the invagination of the processus vaginalis, a part of the parietal peritoneum in the inguinal canal, is a normal phenomenon that occurs at 6 months of intrauterine life, helping the process of testicular descent in males. In females, it is a vestigial remnant passing alongside the round ligament and is termed the canal of Nuck. Ideally: at 8 months of intrauterine life, craniocaudal obliteration of this process is observed (Figure 3). In some rare instances, it could remain open in the extrauterine period up to the first year of life.² Incomplete obliteration of this remnant processus can cause hernia or hydrocele. The incidence of herniation is approximately six times higher in males. Right-sided hernia is more common than left-sided hernia because of delayed closure of the right deep ring or the sigmoid colon hindering the left deep ring.³ The contents of this sac may be peritoneal fluid, omental fat, bowel loops, ovary, fallopian tube, and rarely uterus and urinary bladder.⁴

In this case report, we present a female infant with bilateral canal of Nuck containing her ovaries. Normally, the ovaries are prevented from descending into the labia majora by fixation of the proximal gubernaculum between the ovaries and the uterine cornu. Persistent canal of Nuck, coupled with failed closure of the internal ring, or failure of attachment of the proximal gubernaculum to the uterine cornu, provides the defect necessary for the development of an ectopic inguinal ovary. The possible postulated theories include ovaries being pulled into the inguinal canal by their attachments, a shorter round ligament, increased ovarian mobility due to lengthened fallopian tubes, increased intra-abdominal pressure, and a history of prematurity, which may delay the closure of the processus vaginalis.^{5,6}

Table 1. Clinical and radiological findings of differential diagnosis

Differential diagnosis	Clinical findings	Radiological findings
Abscess	Soft swelling; tenderness, local rise in temperature +/- erythema	Poorly defined/loculated hypoechoic or anechoic collection with internal debris.
Lymphadenopathy	Hard swelling +/- tenderness	Well defined mass lesion with variable shape and size. Hyperechoic hilum in benign aetiology and loss of hyperechoic hilum with central hypo echogenicity or necrotic content in malignant aetiology.
Hydrocele of canal of Nuck	Soft swelling with no reducibility.	Well defined thin-walled anechoic cystic structure with or without internal septations or debris.
Inguinal hernia	Soft swelling +/- reducibility; Increase in size with Valsalva manoeuvre.	Herniation of hyperechoic fat or bowel into the canal can be seen.

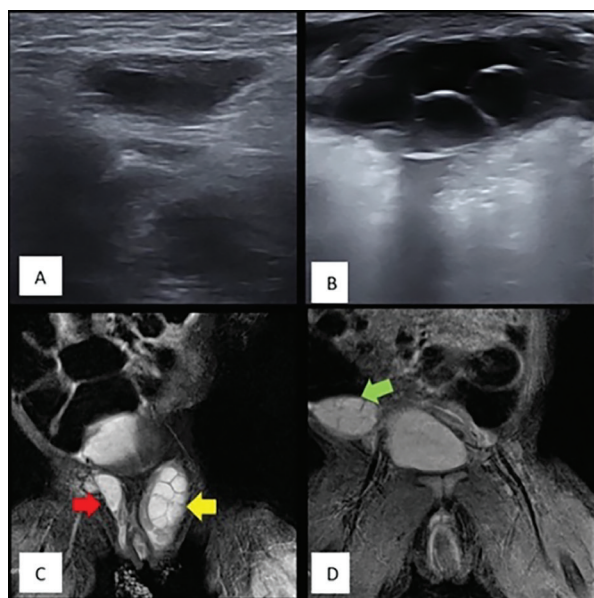


Figure 2. Ultrasonography showing, A) sac containing fluid in right inguinal region, B) ovary in the left side. MRI in coronal section of STIR sequence, C) showing left ovary in left inguinal region (yellow arrow) and sac containing fluid in right inguinal region (red arrow), D) right ovary in right iliac fossa at the level of deep ring (green arrow)
MRI: Magnetic resonance imaging, STIR: Short tau inversion recovery

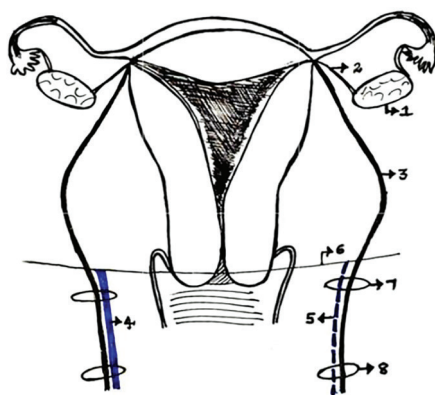


Figure 3. Schematic diagram describing the course of canal of Nuck;
1. Ovary, 2. Ovarian ligament, 3. Round ligament, 4. Patent canal of Nuck, 5. Obliterated canal of Nuck, 6. Partial peritoneum, 7. Deep inguinal ring, 8. Superficial inguinal ring

Inguinal gonads usually manifest as a groin mass, sometimes, extending up to the labia, with variable reducibility and possibility of pain. Devitalized hernial contents may present on local examination with signs of inflammation, such as localized edema, erythema, and rarely bluish discoloration. Infants may present with irritable cries, whereas adults and children may present with vomiting and abdominal pain.⁷ Though hernia is primarily diagnosed clinically, the definitive diagnosis is confirmed through imaging modalities, with potential diagnoses being noted in the targeted anatomical region. The differentials so far observed in this region are hernia, hydrocele, lymphadenopathy, abscess, cyst, benign

or malignant neoplasms, and rarely vascular and lymphatic malformations, ganglion cyst from the hip, and developmental aberration such as asymmetrical labium majus enlargement.⁸ Various structures have been noted herniating within the canal of Nuck hernia until now, out of which the herniation of reproductive organs becomes urgent.

Ultrasound serves as the first line imaging tool for diagnostic confirmation. Grey-scale imaging combined with Doppler study plays an essential role as real-time scanning with provocative maneuver, helps in better understanding of the herniated organ and its nature. On grey-scale ultrasonography, ovaries appear as an elliptical mass hypoechoic to surrounding tissue with multiple small anechoic cysts similar to the appearance of a chocolate chip cookie, and Doppler study reveals normal stromal vascularity. Ovarian volume enlargement with heterogeneous echogenicity of stroma, peripherally displaced follicles, focal or totally blurred margins with or without adjacent fat stranding, and disappearance of ovarian blood flow are the findings associated with ovarian torsion.^{6,7} In cases of inconclusive sonography, MRI is more advisable than computed tomography (CT), owing to its superior soft tissue contrast and lack of radiation hazard in young infants. The CT pelvis reveals a missing intrapelvic ovary with the pedicle extending into the Nuck diverticulum, and a low-density mass representing the ovary. MRI reveals an intermediate signal mass containing high T2 cysts resembling follicles in the canal of Nuck; sometimes T2 high signal fluid within the sac can be noted.⁹

Management of canal of Nuck hernia involves hernial repair. However, the precise surgical technique for the treatment of canal of Nuck hernia is not well established, and the timing of surgery depends on the contents of the sac and their viability. Similar to the treatment of male congenital inguinal hernia, herniotomy with sac reduction, and high ligation of sac is preferable in young infants.¹⁰ Previous literature has advocated classical herniorrhaphy, especially in the presence of adhesions, whereas other reports have favored hernioplasty as a viable option.¹¹ In adults, hernia repair can be performed through an open anterior approach such as herniorrhaphy and hernioplasty, or laparoscopic techniques such as transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP). In TAPP, the peritoneum is incised to separate the main peritoneal cavity from the inguinal portion, and a purse string is used to close the peritoneum. In TEP, the peritoneal opening at the internal ring is closed with sutures introduced through a separate groin incision.¹² Intraoperative identification of non-viable ovaries necessitates oophorectomy. Additional oophoropexy can be considered in cases with repeated episodes of torsion due to their abnormal attachments.¹³

Conclusion

Utmost care should be taken in female infants presenting with a groin mass regardless of symptoms, since ovarian herniation in the canal of Nuck requires early diagnosis and prompt treatment to mitigate infertility risks. Although various surgical techniques have been described in the literature, high ligation herniotomy remains the preferred approach in infants. The management may also differ based on case specifics. Therefore, this case is presented to enhance the corresponding clinicians' awareness and understanding of this uncommon clinical entity.

Ethics

Informed Consent: The consent was obtained from the patients' parents. They were informed that the patient's image and clinical information would be reported in this journal. Her name and initials will not be published and due efforts will be made to conceal her identity.

Footnotes

Authorship Contributions

Surgical and Medical Practices: R.M., Concept: R.M., P.C., Design: R.M., P.C., Data Collection or Processing: R.M., P.C., Analysis or Interpretation: R.M., P.C., Literature Search: R.M., Writing: R.M.

Conflict of Interest: No conflict of interest was declared by the authors.

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