Solitary Canal of Nuck Cyst with Endometriosis Presenting as a Left Inguinal Mass: A Rare Clinical Variant

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Abstract

A cyst of the canal of Nuck is a rare clinical entity in females, resulting from the failure of obliteration of the processus vaginalis. Although it is typically diagnosed in the pediatric population, it is extremely rare in adult women and often misdiagnosed as an inguinal hernia, leading to delays in appropriate treatment. Clinically, it usually presents as a painless, fluctuating mass in the inguinal region. Ultrasonography is the primary imaging modality for diagnosis, while magnetic resonance imaging (MRI) can further delineate the origin and anatomical relationships of the lesion. Surgical excision remains the standard treatment approach.

Herein, we present the case of a 34-year-old woman who presented with a painless swelling in the left inguinal region. A preoperative diagnosis was established based on imaging findings, and the lesion was surgically excised. Histopathological examination revealed a focus of endometriosis within the cyst wall. This case underscores the importance of considering rare coexisting pathologies, such as endometriosis, in the differential diagnosis of canal of Nuck cysts in adult women. It also aims to raise clinical awareness regarding this uncommon presentation.

***Keywords**: Canal of Nuck Cyst; Endometriosis; Inguinal Mass; Female; Magnetic Resonance Imaging; Surgical Excision*

1. Introduction

The canal of Nuck is a peritoneal extension that accompanies the round ligament through the inguinal canal to the labium majus in females, and is considered the female equivalent of the processus vaginalis. Under normal circumstances, this canal undergoes obliteration after birth. Failure of this process can result in the formation of a fluid-filled sac, clinically referred to as a canal of Nuck cyst or female hydrocele.[1]

Although canal of Nuck cysts are more commonly diagnosed in the pediatric population, they are extremely rare in adult females. Clinically, they typically present as a painless swelling or mass in the inguinal region and are often misdiagnosed as indirect inguinal hernias.[2] While diagnosis can often be made through physical examination and pelvic ultrasonography, magnetic resonance imaging (MRI) offers superior diagnostic value in identifying the lesion's origin and anatomical relationships.[2,3] The mainstay of treatment is surgical excision, and histopathological analysis is essential for definitive diagnosis.[4]

In rare cases, other pathologies may coexist with canal of Nuck cysts. Endometriosis, mesothelial cysts, serous cystadenomas, and even malignancies have been reported in association. The presence of endometriotic foci within the cyst wall is particularly rare, with only a limited number of adult cases documented in the literature.[5-7]

In this report, we present a rare case of a canal of Nuck cyst extending from the left adnexal region into the inguinal canal, preoperatively diagnosed through imaging studies, surgically excised, and histopathologically confirmed to contain endometriotic foci within the cyst wall. This case highlights the importance of including canal of Nuck cysts in the differential diagnosis of inguinal masses in adult females and emphasizes the unique histopathological findings when accompanied by endometriosis.

2. Case

A 34-year-old female patient presented with a painless swelling in the left inguinal region, which occasionally became more prominent. Her medical history revealed no previous surgeries or known systemic diseases. On physical examination, a soft, mobile mass was palpated in the left inguinal area. Transabdominal ultrasonography revealed a septated, tubular cystic lesion located in the lower left

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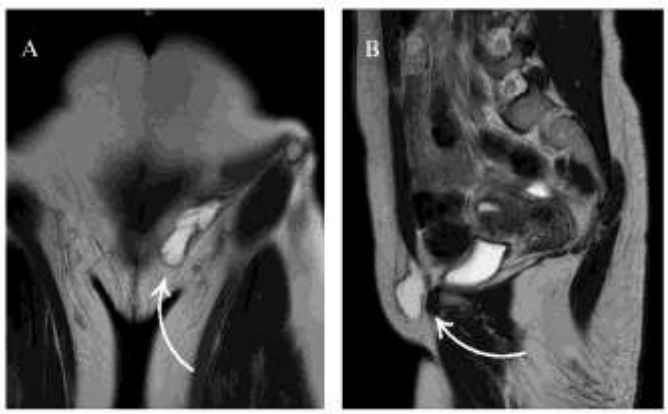
abdomen, measuring approximately 3 cm in diameter and 9 cm in length, extending into the inguinal canal. To further clarify the diagnosis, pelvic magnetic resonance imaging (MRI) was performed, revealing a tubular, septated cystic lesion measuring approximately 87 × 24 mm, extending along the left round ligament to the inguinal canal, showing hyperintense signals on T2-weighted sequences. No direct connection was observed between the cyst and the ovary or fallopian tube (Figure 1).

Figure 1

Preoperative Magnetic Resonance Imaging (MRI)



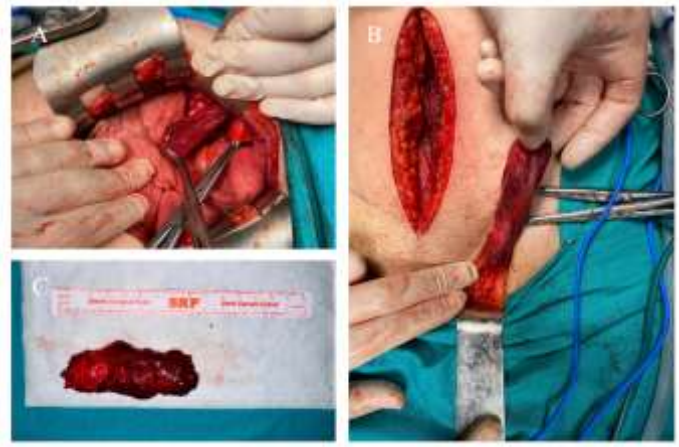
A. *Coronal T2-weighted image shows a T2 hyperintense cystic lesion in the left inguinal region (indicated by arrow).*
B. *Sagittal T2-weighted image demonstrates the tubular cystic structure extending from the left lower abdominal area into the inguinal canal along the course of the round ligament (indicated by arrow).*

The patient underwent surgery under general anesthesia. A lower midline incision was made to access the abdominal cavity. Exploration revealed that the uterus, bilateral tubes, and ovaries appeared normal, and no intraabdominal pathology was detected. The cystic lesion extending along the left round ligament into the inguinal canal was dissected from its peritoneal attachment. Subsequently, the inguinal canal was explored through a left half-Pfannenstiel incision with the assistance of the general surgery team. The cyst was carefully dissected from surrounding tissues using blunt and sharp dissection techniques and was completely excised. Intraoperatively, a 1 cm defect was detected in the transversalis fascia, which was primarily repaired and reinforced with a polypropylene mesh (Figure 2).

The excised cystic structure measured approximately 9.2 cm in length and was filled with serous fluid. Microscopically, the cyst wall was lined by flattened mesothelial-like cells and supported by fibrous connective tissue. Multiple foci of endometrial-type glands and surrounding endometrial stroma were identified within the fibrous wall, consistent with ectopic endometrial tissue. No evidence of atypia or malignancy was observed. Immunohistochemical staining showed positive reactivity for estrogen receptor (ER) and CD10 in the stromal component, supporting the diagnosis of endometriosis. The final diagnosis was reported as endometriosis associated with a canal of Nuck cyst (Figure 3).

Figure 2

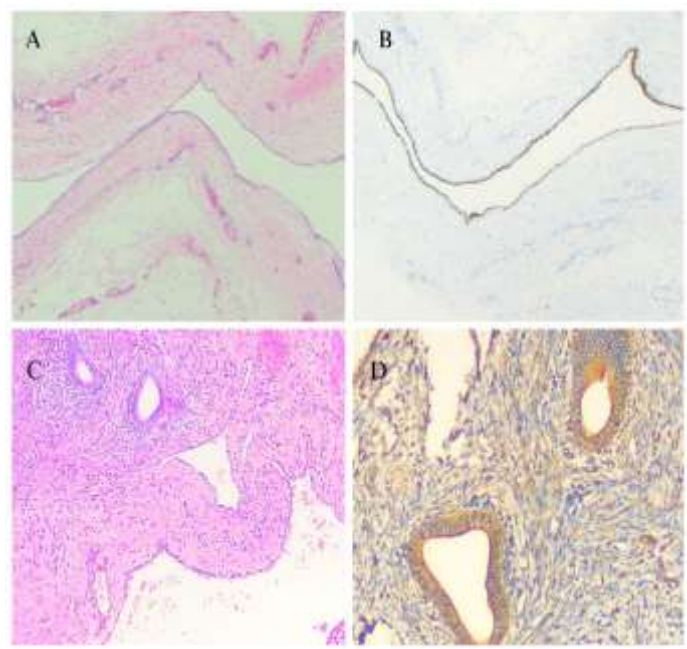
Surgical Excision of the Canal of Nuck Cyst



A. *Intraoperative dissection of the tubular structure extending along the round ligament through a median incision into the abdominal cavity.*
B. *Externalization of the cystic lesion while maintaining its continuity during removal from the inguinal canal.*
C. *Gross view of the completely excised cystic lesion measuring approximately 9 cm in length.*

Figure 3

Histopathological Evaluation of the Cyst Wall



A. *Histological section showing the cyst wall lined by a single layer of flattened to cuboidal mesothelial cells. Hematoxylin and eosin staining (HE), ×100 magnification.*
B. *Immunohistochemical staining for calretinin demonstrates strong positivity in the mesothelial cells, confirming mesothelial origin. Calretinin, ×200 magnification.*
C. *Endometriosis focus within the cyst wall composed of endometrial glands and stromal elements. HE staining, ×100 magnification.*
D. *CD10 immunostaining shows strong cytoplasmic positivity in the endometrial stroma, supporting the diagnosis of endometriosis. CD10, ×200 magnification.*

3. Discussion

Canal of Nuck cysts are rare clinical entities in females, typically presenting as a painless swelling in the inguinal region, and may be misdiagnosed as indirect inguinal hernia, lymphadenopathy, or endometrioma.[1,2] These cystic formations arise from the failure of obliteration of the processus vaginalis during embryological development. Although more frequently reported in the pediatric population, they are exceptionally uncommon in adult females, often leading to delayed diagnosis.[2,4]

While ultrasound is generally sufficient for diagnosis, magnetic resonance imaging (MRI) offers superior diagnostic value in delineating the cyst's relationship with the round ligament and for surgical planning.[1,4] A tubular, hyperintense cystic structure extending along the round ligament on T2-weighted sequences is considered highly characteristic on MRI.

The presence of endometriosis in canal of Nuck cysts is extremely rare and has only been reported in a limited number of adult cases in the literature.[5,7] Diagnosis in such cases is typically confirmed through characteristic imaging features and histopathological analysis. In one of two adult cases reported by Singh et al., MRI revealed septations and hemosiderin deposition, and histopathological examination confirmed foci of endometriosis.[5] Similarly, in a case reported by Okoshi et al., which was confirmed via immunohistochemistry, the lesion was located on the right side and symptoms were reported to fluctuate with the menstrual cycle.[3]

These cases highlight that coexisting endometriosis in canal of Nuck cysts can be suspected based on clinical evaluation and MRI findings. MRI is particularly valuable in demonstrating the cyst's tubular morphology, extension along the round ligament, and associated contents such as septations or hemosiderin deposits.[3,5]

In the literature, inguinal or Pfannenstiel incisions are most commonly preferred for surgical excision of canal of Nuck cysts in adult females.[1,4] However, laparotomy may be necessary in cases with large cysts or extensive extension along the round ligament. In our case, MRI revealed a tubular cystic structure measuring approximately 9 cm in length along the round ligament. To exclude potential intraabdominal involvement and ensure safe excision, a lower midline incision was preferred. This surgical approach provided both diagnostic clarity and technical safety during the excision.

4. Conclusion

Canal of Nuck cysts should be considered in the differential diagnosis of adult females presenting with inguinal or adnexal masses. MRI is advantageous in visualizing the detailed anatomy of tubular cystic lesions. Although rare, coexisting pathologies such as endometriosis may be present, underscoring the importance of histopathological examination in confirming the diagnosis and guiding prognosis. The unique features of our case aim to enhance clinical awareness and inform surgical decision-making in such uncommon presentations.

Statement of ethics

As this study is a case report, approval from an ethics committee was not required. Written informed consent was obtained from the patient. The authors certify that they have obtained written informed consent from the patient. In the consent form, the patient agreed to the publication of her clinical information and relevant medical images in the journal. The patient understands that personal identifiers such as name or initials will not be published and efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

genAI

No artificial intelligence-based tools or generative AI technologies were used in this study. The entire content of the manuscript was originally prepared, reviewed, and approved by both authors.

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Conflict of interest statement

The authors declare that they have no conflict of interest.

Author Contributions

Conceptualization/Design: CA, GÖŞ; Data Acquisition: CA, GÖŞ; Data Analysis and Interpretation: GÖŞ; Manuscript Drafting: CA; Critical Revision of the Manuscript: M.S.; Final Approval and Accountability: CA, GÖŞ, ŞÇ, MG, MS; Technical or Material Support: ŞÇ; Supervision: MS.

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