

Epidermoid Cyst of the Canal of Nuck: A Rare Differential for Inguinolabial Mass: A Case Report

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ABSTRACT

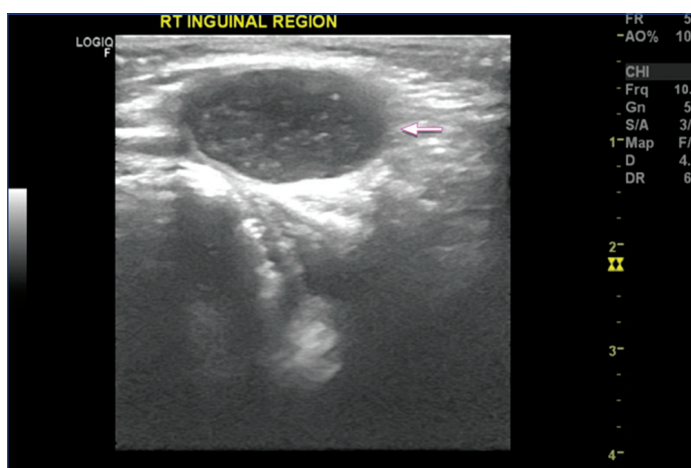
Epidermoid cysts of the canal of Nuck are an uncommon surgical cause of female inguinal enlargement when the processus vaginalis fails to close during embryologic development. The canal of Nuck, formed by the processus vaginalis in the inguinal canal, is a homolog of the processus vaginalis in men. The canal of Nuck should be considered in the differential diagnosis when a non reducible groin mass is observed in women and girls. Ultrasonography (USG) is the primary imaging modality that accurately and reliably diagnoses these groin masses. The incidence of pathologies is mainly encountered in young girls and is lower in adults. Various pathologic disorders related to the failure of processus vaginalis obliteration can occur, including the herniation of intra-abdominal structures such as the uterus, fallopian tube, ovary and hydrocoele of the canal of Nuck. Hernias are often suspected in paediatric patients with lumps in the inguinal region. Here the authors, present a case of an epidermoid cyst of the canal of Nuck in a two-year-old female identified by USG and Magnetic Resonance Imaging (MRI). The two-year-old female underwent surgical treatment, and subsequent histopathologic evaluation of the cystic lesion revealed an epidermoid cyst. Due to its rarity, the epidermoid cyst of the canal of Nuck is commonly misdiagnosed as a typical groin mass.

Keywords: Groin mass, Hernia, Magnetic resonance imaging, Ultrasonography, Uterus

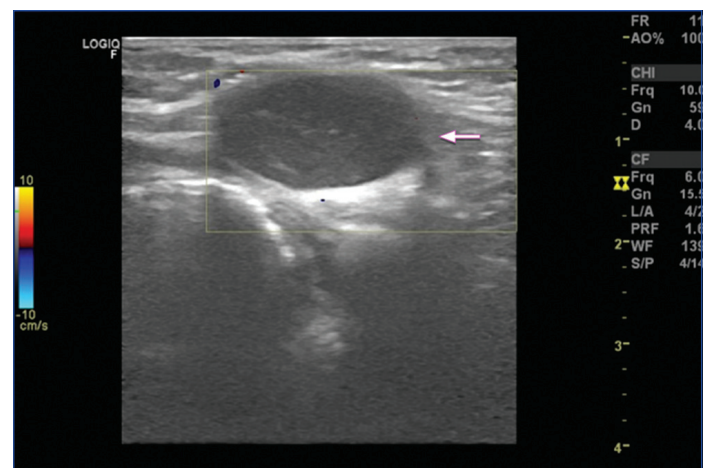
CASE REPORT

A two-year-old female presented to the Paediatric Surgery Outpatient Department with right-sided inguinal swelling for three months. The patient had no history of fever, vomiting or constipation. There is no known history of trauma. Upon examination, a 2×2 cm oval-shaped swelling that was tender, cystic and fluctuant was discovered near the right inguinal canal. The swelling could not be reduced by physical pressure. Inflammation indicators were non-existent and the examination of the lymph nodes was normal.

Ultrasonography of the right inguinal region shows a focal uniloculated cystic lesion in the right inguinal region extending to the mons pubis, with a size of approximately 16×14 mm. The lesion shows central fine echoes with no colour flow (vascularity) on colour doppler, a smooth peripheral margin, and an oval shape. No herniation of omental contents or bowel loop is observed. A diagnosis of the possibility of a cyst or hydrocoele of the canal of Nuck was given [Table/Fig-1,2].



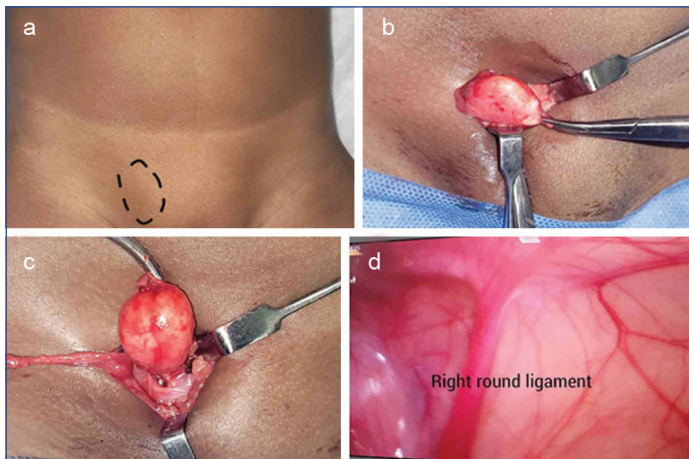
[Table/Fig-1]: Ultrasonography (USG) of the right inguinal region: A gray-scale image shows a focal uniloculated cystic lesion in the right inguinal region extending to the mons pubis of size, 16×14 mm; central fine echoes; smooth peripheral margin; oval-shaped (short white arrow).



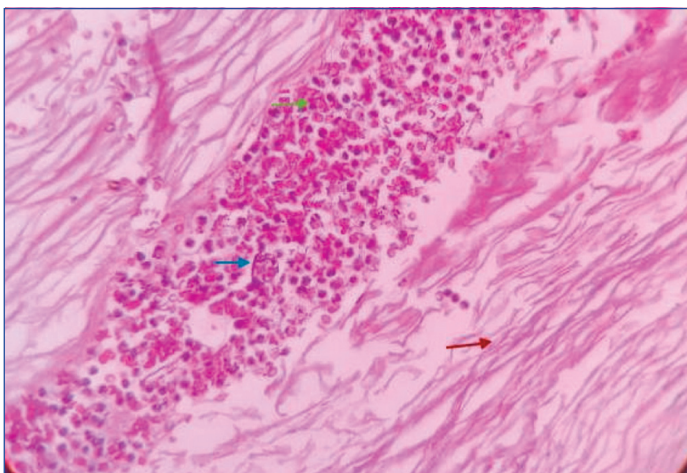
[Table/Fig-2]: Ultrasonography (USG) of the right inguinal region: A colour doppler image shows no colour flow (vascularity) in the cystic lesion in the right inguinal region (short white arrow).

After being declared anaesthetically fit, the patient underwent right inguinal exploration surgery. During the surgery, a 2×1.5 cm soft mass in the right inguinal canal originating from the superficial ring was removed and sent for histological analysis [Table/Fig-3a-d]. A diagnostic laparoscopy was performed, and the uterus and both ovaries were found to be healthy. The healing process was uneventful, and the wound was in good shape. According to the Histopathology Examination (HPE) reports, the exterior surface was macroscopically congested. Sections under the microscope revealed a fibrocollagenous cyst with a stratified squamous epithelium lining, a granular layer, and flakes of lamellated keratinous material encircling it. A few crowded capillaries were seen on the wall. An impression of the features of the epidermal cyst in the canal of Nuck was given [Table/Fig-4]. The child made a full recovery and the patient was discharged.

During the first follow-up (1-2 weeks after surgery), the surgeon examined the surgical site and ensured proper wound healing with no signs of infection, swelling, or other complications. The surgeon



[Table/Fig-3a-d]: Intraoperative findings show a 2x1.5 cm soft mass in the right inguinal canal during surgery and originating from the superficial ring was removed.



[Table/Fig-4]: Histopathology Examination (HPE) shows the exterior surface was macroscopically congested. Sections under the microscope shows a fibrocollagenous cyst with a stratified squamous epithelium (red arrow) lining it, a granular layer (green arrow), and flakes of lamellated keratinous material encircling it. A few crowded capillaries (blue arrow) were seen on the wall (H&E; 10X).

removed stitches and dressings. In the final follow-up (several months after surgery), the surgeon examined the surgical site, and the two-year-old female showed stable recovery with no signs of recurrence of the epidermal cyst or related symptoms. The patient has resumed normal physical activities.

DISCUSSION

In females, the parietal peritoneum evaginates through the inguinal canal, leading to the canal of Nuck, which typically disappears within the first year of life [1,2]. Rare anomalies, such as defects in the Nuck canal, are usually identified and corrected in young girls during the first five years of life [3]. Anton Nuck recorded the first instance of a problem with the canal of Nuck in 1691 [4]. Female hydrocoele, cyst of the canal of Nuck, and hydrocoele of the Nuck canal are uncommon developmental abnormalities of the reproductive system that can cause painless or painful swelling in the inguinal region or even the labia majora [5].

Epidermoid cysts are inclusion cysts that can develop due to congenital epidermal invasion into the dermis, epithelial invasion brought on by trauma or surgery, or both. Although these epidermoid cysts can develop anywhere on the body like head, scalp, face, neck and trunk, it is uncommon to find an epidermoid cyst in the canal of Nuck. Diagnosing an epidermoid cyst in the inguinal area requires a high level of suspicion [6].

A study by Ascar PC et al., focused on a 45-day-old female child with a firm, painful right inguinal tumour and no other gastrointestinal or intestinal symptoms. Under the assumption that she had an incarcerated inguinal hernia, emergency surgery was performed. During the procedure, a spherical tumour containing meconium

material and a severe inflammatory process were found in the right inguinal region. A similar substance to meconium was also discovered inside the hernial sac during inguinal exploration on the left side, although with a less severe inflammatory condition. The recovery phase progressed without any problems [1].

The anterior round ligament extends, and the parietal peritoneum protrudes into the labia majora, as it passes through the internal ring and into the inguinal canal in females. Similar to how the vaginalis develops in men, the parietal peritoneum in females evaginates and is known as the canal of Nuck. A hydrocoele or an indirect inguinal hernia develops when the evagination of the parietal peritoneum remains patent after delivery in either gender. Partial obliteration of the proximal portion of the parietal peritoneum with a patent distal portion forms a cyst of the canal of Nuck [7]. The secretory membrane covering the process vaginalis secretes and is absorbed unevenly, leading to cyst formation. The imbalance may be caused by trauma, infection, or idiopathic factors, altering lymphatic drainage [8].

Cyst of the canal of Nuck is an uncommon disorder that causes inguinal and vulvar enlargement in young female neonates and children. USG is a reliable diagnostic tool. Congenital or acquired epidermoid cysts are also possible. Congenital cysts develop when the surface ectoderm is abnormally sequestered at the embryonic fusion point or when the ectoderm fails to separate from the underlying neural tube. An acquired cyst forms during trauma when epidermal tissue is absorbed into the dermis and deeper tissue. Any patient presenting with an inguinal lump almost certainly has a hernia, as they are the most common inguinal swellings. According to the literature, this rare disorder presents as a cystic mass that is hypoechoic or anechoic, comma or mushroom-shaped, primarily unilocular and occasionally multilocular (with linear septa) [9]. The differential diagnosis for inguinal swellings, in addition to cutaneous cysts, includes femoral hernia, undescended testes, lymphadenopathy, lipomas, saphenavarix, varicosities, endometriosis of the round ligament and herniated ovaries in females.

Clinically, a cyst of the canal of Nuck appears as a painless, fluctuating, irreducible mass in the inguinal region. Approximately one-third of individuals have an associated inguinal hernia, which can make diagnosis challenging. A cough impulse over the deep and superficial inguinal rings and a pear or spherical-shaped bulge in the groin are signs of direct and indirect inguinal hernias [10]. The female equivalent of the male-specific spermatic cord hydrocoele is the hydrocoele of the canal of Nuck [11]. The cystic mass can be distinguished from an inguinal hernia as it lacks omental and intestinal contents. Diagnosing an epidermal cyst in the canal of Nuck requires a high level of suspicion. A common sign of an epidermal cyst in the patient is inguinal enlargement that varies in hardness from moderate to firm and is often non progressive or slowly progressive. Both conditions can resemble an omentum-containing hernial sac and have a doughy texture upon palpation. Unlike inguinal hernias, the cough impulse is absent. It is possible to mistake a cyst in the canal of Nuck for an incarcerated or irreducible hernia. They may also be mistaken for lipomas, which are the most common benign tumours derived from the spermatic cord [8].

The primary technique used to examine inguinal masses in both males and females is sonography. To rule out potential differential diagnoses in female patients with cystic masses in the groin, USG with colour doppler is helpful [6]. A tubular or oval anechoic lesion is observed in the labia majora or inguinal region [10]. Qureshi NJ and Lakshman K described a well-defined, oval, anechoic cystic enlargement within the inguinal canal associated with a left inguinal hernia [12].

In contrast, MRI shows T1-weighted images of hypointense cysts and T2-weighted images of hyperintense cysts. Diffusion-weighted imaging (DWI) shows low diffusivity (hyperintense) and low signal on Apparent Diffusion Coefficient (ADC) images, which suggests an epidermoid cyst [13]. MRI images were not included due to patient motion, resulting in image degradation and suboptimal image quality.

CONCLUSION(S)

Cyst of the canal of Nuck is a rare developmental condition, and its clinical presentation and history are often subtle and unsatisfactory. However, it should be included in the differential diagnosis of groin swellings in females. The preferred imaging modalities for diagnosing a cyst in the canal of Nuck are MRI and USG. Epidermal cysts, which can resemble inguinal swellings, should be considered in the evaluation of groin lumps in both males and females, although it is a rare clinical disorder. It can be distinguished from irreducible inguinal hernias through clinical examination, sonographic support, and a high level of suspicion. Surgical exploration is necessary for treatment, and histological examination should be performed to confirm the diagnosis.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Aug 02, 2023
- Manual Googling: Nov 03, 2023
- iThenticate Software: Aug 25, 2023 (20%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Aug 01, 2023**

Date of Peer Review: **Oct 13, 2023**

Date of Acceptance: **Nov 30, 2023**

Date of Publishing: **Feb 01, 2024**