



Case Report

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Canal of Nuck Cyst: A Conundrum of Inguinal Swelling in Adult Females

Nurul Amira MOHAMED¹, Bushra JOHARI^{1*}, Nazimah AB MUMIN^{1*}, Yahya MOHD ARIPI²

Abstract

Inguinal swelling is a common presenting complaint to the surgical clinic. However, among the list of differential diagnoses, Canal of Nuck (CON) cyst, which is rare, is not usually considered and can lead to delayed or misdiagnosis. We report the case of a healthy 41-year-old woman with a short history of left inguinal swelling initially thought to be an inguinal hernia. Ultrasound showed a uni-locular avascular cystic lesion with posterior acoustic enhancement, with no peritoneal cavity communication. Computed tomography scan confirmed the presence of a well-defined, non-enhancing, thin-walled encysted lesion anteromedial to the left common femoral vessels. Surgery confirmed the presence of a CON cyst. It is a rare developmental disorder, especially in the adult female population and should be considered as a differential diagnosis for groin swelling. Imaging can help establish a diagnosis prior to surgery.

Keywords: Inguinal mass; Canal of Nuck; Cyst; Hydrocoele; Hernia

Author Details:

1 Department of Radiology, Faculty of Medicine, Universiti Teknologi MARA, Malaysia

2 Department of Surgery, Faculty of Medicine, Universiti Teknologi MARA, Malaysia

Correspondence:

Nazimah AB MUMIN (namira.mohamed@ymail.com)

Bushra JOHARI (drbushra@uitm.edu.my)

INTRODUCTION

The Canal of Nuck (CON) cyst is rarely considered in the differential diagnosis of inguinal swelling in the female adult population. In a normal development, complete obliteration of the processus vaginalis

typically occurs by 1-2 years of age.¹ The portion of the processus vaginalis within the inguinal canal is called the CON, and failure or incomplete obliteration of this structure results in fluid accumulation in the region.² A

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comparable embryological process occurs in male, the processus vaginalis accompanies testicular descent passing through the inguinal canal into the scrotum, which typically takes place between the 7th and 8th months of gestation.¹ Obliteration of the processus vaginalis is usually completed by the age of 2 years. Incomplete obliteration can result in a patent processus vaginalis, potentially leading to the development of hydrocoele or indirect inguinal hernia in male.¹

Occurrence of this condition among the paediatric population have been reported, but is limited among adult females population.³ Due to its rarity, misdiagnosis and subsequent inappropriate management can potentially occur. We report the case of a healthy female patient presenting with left inguinal swelling, initially thought to be inguinal hernia and radiological imaging showed a cystic lesion in the left inguinal region and no communication to the peritoneum. Intraoperative findings confirmed the diagnosis of a CON cyst, which was subsequently excised successfully.

CASE REPORT

A 41-year-old woman with no known medical illnesses presented to the surgical clinic with a month history of left inguinal discomfort and swelling. There was no preceding trauma and she had not experienced similar symptoms previously. She did not have any fever, abdominal pain, or vomiting. Physical examination revealed a non-tender, non-reducible swelling in the left inguinal region, with no overlying skin changes. A clinical diagnosis of a left inguinal hernia was made.

An ultrasound scan of the left inguinal region (**Figure 1a**) was done to evaluate the swelling prior to

surgery. The scan revealed a unilocular avascular cystic lesion with posterior acoustic enhancement, measuring 4.2 x 2.3 cm (anterior-posterior x width). Connection to the peritoneal cavity was not demonstrated, ruling out an inguinal hernia. Subsequently, a contrast-enhanced computed tomography (CT) scan of the pelvis was performed, which confirmed the presence of a well-defined, non-enhancing, thin-walled cystic lesion anteromedial to the left common femoral vessels (**Figure 1b**), measuring 4.1 x 2.8 x 5.6 cm (anterior-posterior x width x cranio-caudal). There were no solid components, bowel loops, or omentum within the lesion, nor was there any communication with the peritoneal cavity. Differential diagnoses considered included CON cyst, mesothelial cyst of the left round ligament, or less likely, lymphangioma.

The patient then underwent surgery, which revealed a multiloculated cystic mass in the left inguinal canal, with a peritoneal pouch extending from the internal inguinal ring. The broad ligament (gubernaculum) was seen in anterolateral position to the pouch (**Figure 2**).

Post surgery, the patient recovered well with no complications and no recurrence of symptoms.

DISCUSSION

In females, the CON is formed by a small invagination of the parietal peritoneum, which is attached to the uterus by the round ligament and extends into the inguinal canal through the internal ring.¹ This invagination of the peritoneum is equivalent to the processus vaginalis in males in which if the processus vaginalis fails to obliterate, it can lead to fluid collection forming hydrocoele just like CON cyst in female.¹ Both conditions result

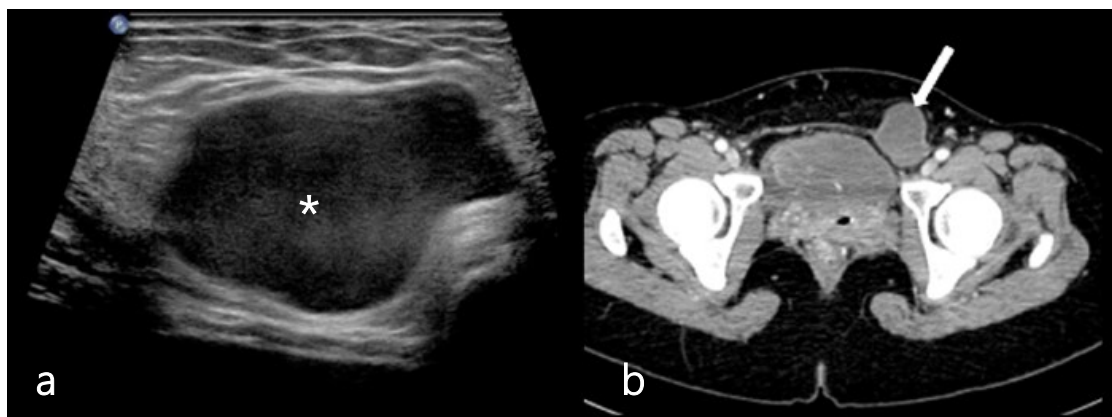


Figure 1: a) Ultrasound of left inguinal region using a 12MHz linear probe revealed a unilocular avascular cystic lesion with posterior acoustic enhancement (*), and 1b) CECT pelvis shows well-defined, non-enhancing thin-walled cystic lesion anteromedial to the left common femoral vessels (arrow), not communicating with the peritoneal cavity.



Figure 2: Intraoperative image showing Canal of Nuck cyst.

from a persistent peritoneal pouch and can present as inguinal or labial/scrotal swellings. In rare cases, it can cause an indirect inguinal hernia or CON cyst if it does not undergo complete closure after birth.³ CON cyst is postulated to occur due to partial failure of obliteration, where only the deep inguinal ring portion is closed, leaving the CON patent. This results in the accumulation of fluid in that region, forming a CON cyst.¹

Cysts of the CON are rare conditions, with their prevalence mostly reported among the paediatric population (<1%).³ However, only sporadic occurrences in adults have been documented in literature and the data on prevalence, particularly in the female adult population, are still unavailable.³ CON cysts are seldom encountered in clinical practice because of its rarity to occur in adult females and is limited by awareness among clinicians.⁴ They are often mistaken for inguinal hernias, as almost one-third of CON cyst cases present concurrently with inguinal hernias.⁵ Therefore, it is crucial to consider a CON cyst when evaluating an irreducible hernia in female patients.

Clinically, CON cyst appears as a fluid-filled mass that cannot be reduced, causing mild discomfort or presenting as a painless lump in the inguinal region.¹ The initial diagnostic consideration is often an inguinal hernia; however, the key differentiating features include the lack of omental and intestinal contents within the cystic mass. Additionally, a CON cyst can also be mistaken for other more prevalent diagnoses, such as a Bartholin's cyst, abscess, or tender adenopathy if it becomes infected.⁶ Other potential differential diagnoses include vascular aneurysms and benign or malignant tumours.⁶ In our case, an initial diagnosis of an inguinal

hernia was considered based on clinical findings prior to imaging evaluation.

Available literatures mostly describe the ultrasound findings for a CON cyst, followed by MRI evaluation of the lesion.⁷ Patients typically undergo ultrasound assessment to evaluate the characteristics of the lesion and its location. Ultrasound is a widely used and appropriate initial imaging modality, revealing a tubular or oval anechoic lesion in the inguinal area or labia majora.⁵ Subsequent MRI findings for cystic inguinal lesions are described in most literature as having hypointense T1 signals and hyperintense T2 signals.⁷

A contrast-enhanced CT scan is the preferred imaging modality for diagnosing this pathology, particularly in centres where access to MRI is limited. It is also the most suitable modality in adults for evaluating inguinolabial swelling. However, few studies describe the CT findings of CON cysts. On CT, the cyst is described as a thin-walled, homogeneous fluid-filled cyst extending along the course of the round ligament,⁸ which resembles our case. Other features of the cyst on CT, as described by Pandey *et al.*, include a multiloculated, hourglass-shaped cystic structure extending from the left iliac region along the inguinal canal to the labia majora.⁸ CT can also assess inguinolabial swelling to ascertain any communication of the cyst with the peritoneum through the inguinal canal. In cases of a CON hernia, CT can also identify any pelvic organ herniation through the patent CON.⁸

Three types of CON cysts have been reported in the literature. The most common type is the first type, where an encysted hydrocoele forms from the inguinal ring to the vulva, with the cyst having no communication with the peritoneal cavity.³ The second type has persistent communication with the peritoneal cavity.³ The third type is a combination of the first and second types, or the hourglass type, where the inguinal ring constricts the hydrocoele like a belt, leaving a communicating part and an enclosed part.³ The current case represents a type I variety.

Surgical excision is the treatment for symptomatic abnormalities of the CON once the diagnosis is confirmed. Surgical excision is performed with ligation of the neck of the processus vaginalis at the deep ring of the inguinal canal.⁹ Intraoperative findings of CON cysts are typically described as cysts containing serous or mucous, light-coloured fluid.³ Atypical appearance of CON cyst includes cyst with haemorrhagic and necrotic content,⁵ which is the case in our patient. Non-invasive alternative to surgery, such as cyst aspiration, have been

proposed; however, these incur an additional risk of recurrence.¹⁰

CONCLUSION

Cysts of the CON are rare developmental disorders. Despite their rarity, especially in the adult female population, they should still be considered as a differential diagnosis for groin swelling. Although ultrasonography and MRI are the preferred imaging modalities for evaluating this condition, CT can also be helpful for assessing the lesion, particularly in settings where access to MRI is limited.

Take Home Message

- Canal of Nuck cyst should be considered in adult females presenting with inguinal swelling.
- It is due to incomplete obliteration of processus vaginalis, an embryological remnant analogous to male processus vaginalis, which can lead to hydrocoele or inguinal hernia.
- Imaging is pivotal in preoperative diagnosis and assessment by identifying cystic morphology and excluding communication with peritoneal cavity.
- Definitive treatment is surgical excision as aspiration is associated with recurrence.
- Awareness is essential to avoid misdiagnosis.

Abbreviations

CON	Canal of Nuck
CT	Computed tomography
MRI	Magnetic resonance imaging

Declarations

Conflict of interests

The authors declare no conflict of interests.

Patient Consent

Patient consent has been obtained.

Acknowledgement

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