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Case Report

The deceptive groin mass: encysted hydrocele of the canal of Nuck mimicking an inguinal hernia in an adult female

Hima Pavan, Fahima Hussaina, B. Nitin Akileshwar*

Department of General Surgery, Sir Ivan Stedeford Hospital, Chennai, Tamil Nadu, India

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***Correspondence:**
Dr. B. Nitin Akileshwar,
E-mail: nakileshwar@gmail.com

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ABSTRACT

An encysted hydrocele of the canal of Nuck is a rare developmental anomaly in adult females, resulting from the incomplete obliteration of the processus vaginalis. It frequently mimics an inguinal hernia, leading to diagnostic challenges. We present the case of a 38-year-old female who presented with a right inguinal swelling present for five months. The patient exhibited a reducible right groin swelling that became prominent on straining, initially diagnosed clinically as a right inguinal hernia. Magnetic resonance imaging (MRI) demonstrated a 10-mm defect in the right inguinal region with an adjacent 18×10 mm cystic lesion. The patient underwent an open surgical exploration under spinal anesthesia. Intraoperatively, a well-defined cystic swelling containing clear fluid was identified along the round ligament, with no indirect hernia sac or peritoneal communication. The sac was completely excised, and the weakened posterior wall was reinforced using a 6×11 cm polypropylene mesh. Histopathological examination confirmed fragments of fibrocollagenous to muscular tissue with chronic inflammatory cells, consistent with a hydrocele sac. The patient had an uneventful postoperative recovery. The canal of Nuck hydrocele is a rare embryological relic that acts as a diagnostic chameleon in adult females, easily masquerading as a standard inguinal hernia. Definitive management requires a high index of intraoperative suspicion, complete surgical excision of the cyst, and concurrent prosthetic reinforcement of the frequently attenuated inguinal floor to ensure recurrence-free recovery.

Keywords: Canal of Nuck, Encysted hydrocele, Inguinal hernia, Round ligament, Case report

INTRODUCTION

During fetal development, the round ligament of the uterus descends through the inguinal canal to attach to the labia majora. A peritoneal evagination called the processus vaginalis accompanies this descent. The canal of Nuck, first described by the Dutch anatomist Anton Nuck in 1691, is the female homologue to the processus vaginalis in males. It is a peritoneal extension that accompanies the round ligament through the inguinal canal and normally obliterates during the first year of life.[1,6] Failure of this obliteration can lead to an indirect inguinal hernia or a hydrocele of the canal of Nuck.[2,6] Because of its rarity, it is frequently misdiagnosed clinically as an inguinal hernia, lymphadenopathy, or a lipoma.[3] Hydroceles of the canal of Nuck are classified into three anatomical types: type I is an encysted hydrocele with no peritoneal communication; type II is a communicating hydrocele; and type III is an hourglass hydrocele with a cystic portion in the inguinal canal communicating with an intra-abdominal cyst. Because of its rarity in adults, it is frequently misdiagnosed clinically.[3,7] We present a case of type I encysted hydrocele of the canal of Nuck in an adult female, highlighting the clinical presentation, radiological findings, and surgical management.

CASE REPORT

A 38-year-old female presented to the outpatient surgical department with complaints of intermittent swelling in the right inguinal region for five months. The patient noted that the swelling became more prominent upon straining

and was associated with localized pain. Her past medical history was significant for two previous lower segment cesarean sections (LSCS) in 2014 and 2017. She had no known allergies and no history of hypertension or diabetes.

On physical examination, the patient was alert, oriented and afebrile. with stable vital signs. Local examination revealed an approximately 2×2 cm palpable, cystic swelling in the right groin crease.

An initial ultrasound (USG) was performed, which prompted a subsequent magnetic resonance imaging (MRI) scan of the pelvis for definitive evaluation (Figure 1). The MRI demonstrated a defect of approximately 10 mm in the right inguinal ligament. Associated with this defect was a cystic focus measuring 18×10 mm in the inguinal region. There was no evidence of bowel herniation. The radiological impression was highly suggestive of an encysted hydrocele of the right inguinal canal. Routine preoperative blood investigations, including a complete blood count and viral markers, were within normal limits, and an echocardiogram showed normal left ventricular systolic function (EF: 65%).

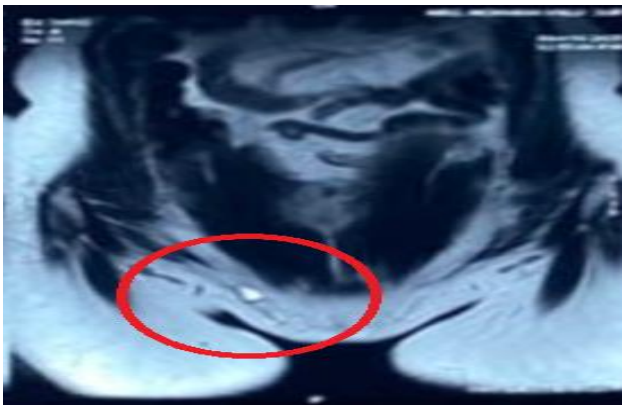


Figure 1: Preoperative T2-weighted magnetic resonance imaging of the pelvis. The scan demonstrates an 18×10 mm cystic focus in the right inguinal region with no evidence of bowel herniation, indicating an encysted hydrocele of the canal of Nuck.

Methods (surgical procedure)

The patient was admitted for elective surgical management. Under spinal anesthesia and strict aseptic precautions, a right inguinal groin crease incision was made. The incision was deepened, and the external oblique aponeurosis (EOA) was opened. The upper and lower flaps were raised to expose the conjoint tendon and the inguinal ligament (Figure 2).

Intraoperatively, a well-defined cystic swelling was identified extending along the round ligament in the right inguinal region (Figure 3). Careful dissection revealed an encysted hydrocele sac containing clear serous fluid. Crucially, there was no communication with the peritoneal cavity, and no indirect hernia sac was noted. The posterior wall of the inguinal canal appeared attenuated.

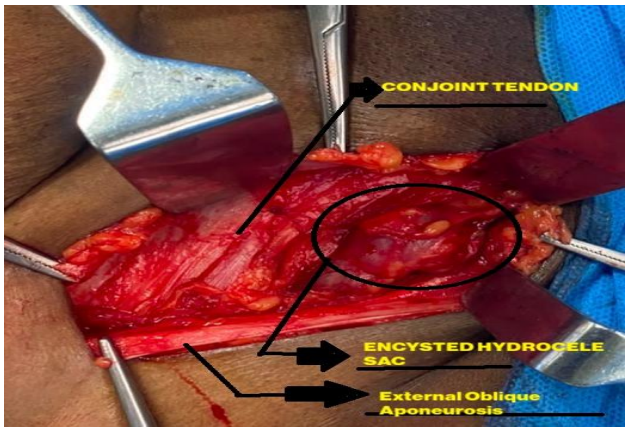


Figure 2: Intraoperative view of the right inguinal canal following the opening of the external oblique aponeurosis. A well-defined cystic mass is visible in the anatomical path of the round ligament, situated superior to the inguinal ligament.

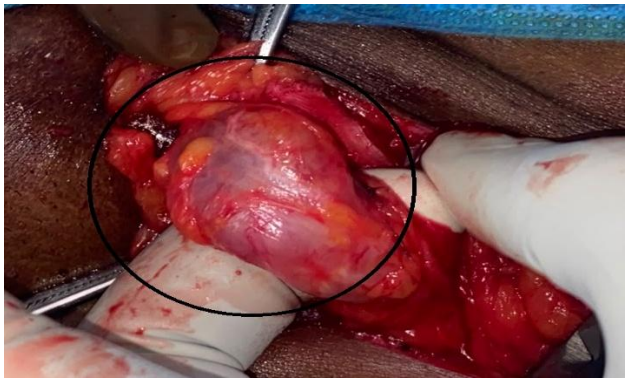


Figure 3: Close-up intraoperative view of the isolated encysted hydrocele sac. The fluid-filled structure has been completely mobilized from the surrounding tissues prior to excision, confirming the absence of a communicating peritoneal tract.

The cyst was carefully isolated, the fluid was drained, and the sac was completely excised. After securing hemostasis, the weak posterior wall was reinforced using a 6×11 cm polypropylene mesh placed on the posterior wall (Lichtenstein technique) and secured with PDS-1. The EOA was closed with 2-0 Vicryl, the subcutaneous tissue with 2-0 Vicryl, and the skin was approximated using staples.

The patient's postoperative course in the hospital was entirely uneventful. She was managed symptomatically with intravenous antibiotics (Ceftriaxone), analgesics, and supportive medications. She was discharged on postoperative day three in stable condition with a short course of oral medications (Amoxicillin/Clavulanate, Pantoprazole, Chymotrypsin-Trypsin, and Aceclofenac/ Paracetamol).

The excised specimen was sent for histopathological examination to definitively rule out differential diagnoses such as malignancy and endometriosis. Macroscopically, it consisted of two grey-tan soft tissue fragments measuring 3×2.5×1 cm. Microscopic examination of the sections showed fragments of fibrocollagenous to muscular tissue exhibiting foci of chronic inflammatory cell infiltration, admixed with congested blood vessels and areas of hemorrhage. There was no evidence of granulomatous disease or malignancy. The histopathology report confirmed the clinical and intraoperative diagnosis of an encysted hydrocele of the canal of Nuck.

DISCUSSION

Cystic swellings of the groin in females pose a diagnostic challenge due to the wide variety of potential pathologies. Clinicians must distinguish between indirect and femoral hernias, lymphadenopathy, lipomas, round ligament varicosities, endometriosis, and abscesses.[8] An encysted hydrocele of the canal of Nuck is a rare clinical entity that occurs when the proximal portion of the processus vaginalis obliterates, leaving a fluid-filled cyst in the distal portion that does not communicate with the peritoneal cavity.

Clinically, these present as painless or mildly painful, fluctuant, irreducible groin lumps. As seen in this patient, the swelling may become more apparent with increased intra-abdominal pressure, mimicking a hernia.[4] While ultrasound is often the initial imaging modality of choice due to its accessibility, an MRI provides superior anatomical detail, accurately delineating the cyst's relationship with surrounding structures and ruling out bowel herniation, as was crucial in our case planning.[5,10]

Definitive treatment is surgical excision of the cyst. During exploration, it is imperative to trace the cyst to the deep inguinal ring to ensure complete removal and to evaluate for a concomitant indirect inguinal hernia, which is reported to coexist in a significant percentage of cases. Given the intraoperative finding of a weakened posterior inguinal wall, concurrent mesh hernioplasty was performed to prevent future herniation.

The canal of Nuck is typically viewed as a pediatric anatomical footprint, yet its pathology can lay dormant for decades, setting a clinical trap for surgeons evaluating adult female groin masses. This case underscores a critical surgical pearl: not every strain-induced, fluctuant groin swelling is a straightforward hernia. An encysted hydrocele of the round ligament can convincingly mimic common pathologies, making advanced preoperative imaging like MRI an invaluable tool to avoid surgical surprises. However, intraoperative vigilance remains the ultimate diagnostic test. Encountering an unexpected cystic structure demands meticulous dissection to the deep inguinal ring to rule out a communicating sac or concurrent bowel herniation. Ultimately, surgeons must be prepared to seamlessly pivot their operative strategy, combining the complete excision of the embryological remnant with standard prosthetic reinforcement of the weakened inguinal canal. This dual approach ensures both immediate symptomatic relief and definitive, recurrence-free management for the patient.

CONCLUSION

In conclusion, an encysted hydrocele of the canal of Nuck should be maintained as a differential diagnosis for adult females presenting with an inguinal lump. Preoperative imaging aids in surgical planning, but definitive diagnosis and treatment require meticulous surgical exploration, complete cyst excision, and concurrent reinforcement of the inguinal floor when indicated.

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