CASE REPORT

A cautionary approach to adult female groin swelling: hydrocoele of the canal of Nuck with a review of the literature

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SUMMARY

Hydrocoele of the canal of Nuck in an adult female is a rare entity and analogous to hydrocoele in males. Its usual presentation is in children, and its occurrence in adults is very uncommon, more so of the hour-glass variety. We report a case of a 38-year-old woman presenting with a right inguinal swelling of 3-month duration. On physical examination, the swelling was non-tender, cystic and irreducible. There was no cough impulse. Ultrasonography and contrast-enhanced CT revealed a cystic swelling with clear contents in the right inguinal region. Surgery was performed with excision of the cyst. The histopathology report suggested flat mesothelium cells, confirming the diagnosis.

BACKGROUND

Hydrocoele of the canal of Nuck in women is a rare developmental disorder corresponding to hydrocoele of the spermatic cord of males and is often misdiagnosed, as these cases are rarely seen in clinical practice. The information regarding the incidence and presentation in adults is limited due to the very few cases reported. Hence in a clinical scenario, such as described above, a differential diagnosis of hydrocoele of the canal of Nuck in an adult female groin swelling would be beneficial.

CASE PRESENTATION

A 38-year-old woman presented with right inguinal swelling of 3-month duration. The swelling was insidious in onset, gradually increasing in size to about 8×4 cm. There was no history of local trauma, no redness and no associated skin oedema. There was neither nausea nor vomiting. There was no history of weight loss. There was no history of fever and no abdominal distention. Bowel and bladder habits were normal. Menstrual history was unremarkable. No other comorbidities were present. Family history was normal. The right groin region showed a slightly mobile inguinolabial mass with no tenderness. Although the lesion was irreducible, there was evidence of neither incarceration nor strangulation. The lesion demonstrated positive fluctuation. There was no expansible cough impulse, no peristaltic activity and no abnormal vascularity associated with the swelling. Signs of inflammation were absent. Regional lymph node examination was normal.

INVESTIGATIONS

Blood investigations were within normal limits. Ultrasonography of the right inguinal region showed an elongated, anechoic 6.3×3.4×2 cm fluid collection in the inguinal region. The cystic structure did not change in size on Valsalva manoeuvre, nor did it suggest a communication to the peritoneal cavity. To know the extent of and to confirm the lesion, contrast-enhanced CT (CECT) was performed to rule out a possible inguinal or femoral hernia. CECT of the abdomen and pelvis (figures 1 and 2) showed a well-defined, peripherally enhancing thin walled tubular cystic structure extending from the right iliac fossa along the course of the round ligament through the right inguinal canal to the ipsilateral labia majora. No solid enhancing structures were seen within. No herniation of mesentery, bowel loops or omentum was seen. An MRI for further confirmation at this point seemed unnecessary.

DIFFERENTIAL DIAGNOSIS

Based on the clinical history and the imaging findings, a provisional diagnosis of hydrocoele of the canal of Nuck was made.

TREATMENT

The patient was posted for surgery. An incision was made over the right inguinal skin crease extending through subcutaneous tissue and external oblique muscle to reach the inguinal canal. The swelling was in the inguinal canal extending from the deep inguinal ring to the superficial ring. The cyst was seen to be obliterated at the deep inguinal ring (figure 3A); another similar small cyst was found just beyond the deep inguinal ring inferior to the internal oblique. The anatomy appeared to be that of a type three variety of hydrocoele of the canal of

Figure 1 Axial CECT image of the pelvis showing a well-defined, thin walled tubular cystic structure extending from the right iliac region (A) (white arrow) along the course of the round ligament through the right inguinal canal (B) (white arrow) to the ipsilateral labia majora. CECT, contrast-enhanced CT.

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Figure 2 Coronal CECT image of the pelvis showing a well-defined, thin walled tubular cystic structure extending from the right iliac region (A) (white arrow) across the right inguinal canal (B) (white arrow) to the ipsilateral labia majora. CECT, contrast-enhanced CT.

Figure 3 Macroscopic images of the hydrocoele of the canal of Nuck. (A) Intraoperative exploration of the right groin showing the translucent cyst arising from the deep inguinal ring (white arrow). (B) Demonstration of the clear fluid present in the sac (white arrow). (C) Specimen showing thin walled sac, with the typical 'cyst within a cyst' (white arrows).

Nuck. The content of the sac was clear fluid (figure 3B). The cysts were separated from the round ligament, excised in mass and sent for histopathological examination (figure 3C). Obliteration of the deep inguinal ring was performed, confirming there was no herniation; the external oblique muscle, subcutaneous tissue and skin were enclosed in layers.

OUTCOME AND FOLLOW-UP

The postoperative period was uneventful and the patient's recovery was satisfactory. Pathological examination confirmed the specimen was hydrocoele of the canal of Nuck, with microscopic findings of the cyst showing chiefly fibrovascular tissue with a single layer of mesothelial cells on the inner surface. The patient did not complain of any symptoms on further follow-up after 2 weeks and again at 2 months.

DISCUSSION

We report a case of a rare condition of an hour-glass type of hydrocoele of the canal of Nuck that is uncommon in adult females. The importance of this type is that it contains two communicating sacs, and the inner sac may be missed during excision. Ultrasonography and CECT are useful for a preoperative diagnosis, but confirmation can only be made at surgery.

A description of the canal of Nuck was first given by Anton Nuck in 1691.¹ It is a small evagination of the parietal peritoneum that accompanies the round ligament into the inguinal canal during the first year of female development.^{2,3} It is due to the failure of obliteration of the distal portion of the canal.⁴

The aetiological factors are mostly idiopathic, but may also be due to inflammation, trauma or impairment of lymphatic drainage.⁵

Counseller and Black classified hydrocoeles of the canal of Nuck into three types: the most common type, which may be found anywhere along the course of the round ligament from the internal ring to the vulva, without any communication with the peritoneal cavity. The second type, in which there is persistent communication between the hydrocoele and the peritoneal cavity, similar to congenital hydrocoeles in males. The third type or hour-glass type, where there is a constriction at the internal ring so that the upper sac is intra-abdominal but outside of the peritoneum, and the lower sac is in the inguinal canal and simulates a hernia.⁶ Our case appeared to be of the third, hour-glass type.

Pathologically, the classic cyst of the canal of Nuck is a thin walled, clear fluid-containing cyst. It is commonly lined by a single layer of cuboidal or flattened mesothelial cells. These cysts vary in size and can measure from few millimetres to more than 5 cm in diameter.^{7,8}

The typical presentation of a hydrocoele of the canal of Nuck is a painless, translucent, irreducible swelling in the inguinolabial region. All hydrocoeles may not be readily translucent because they are covered by the fascia of the external oblique muscle.⁹ They are located along the line of the round ligament, are typically allantoid and can extend into the labium majus. They are mobile in all directions. An inguinal hernia is present in one-third of patients with a hydrocoele of the canal of Nuck.^{10 11}

Being an uncommon condition, it is commonly misdiagnosed clinically for an inguinal hernia or a femoral hernia, which are the commonest causes for groin swelling in adult females and present in one-third of cases.^{12–14} They have similar presentation to that of incarcerated and strangulated hernias, making the differentiation difficult.¹⁵ But they are not associated with the nausea and vomiting seen in hernias. The other differential diagnoses for groin masses are enlarged lymph nodes, lipomas, leiomyomas, cold abscesses, Bartholin's cysts and endometrioses of the round ligament. Other very rare entities such as ganglion cysts protruding out of the hip joint, paraspinal abscesses surfacing in the groin and intestinal incarceration can also occur.^{14 16 17} But the clinical presentation and physical examination features of these entities differ significantly from that of hydrocoele of the canal of Nuck.

High-resolution real-time sonography serves as an inexpensive and accurate modality for differentiating hydrocoele of the canal of Nuck from other entities. On ultrasound, it appears as a thin walled, tubular or dumbbell shaped, well-defined, anechoic or hypoechoic, unilocular or multilocular cystic structure. Dynamic evaluation on Valsalva shows no change in size or shape. On colour Doppler, it does not show any internal vascularity. Other differentials including enlarged inguinal nodes and leiomyomas show hypoechoic masses with internal vascularity. Inguinal hernias demonstrate hyperechoic components herniating through the inguinal canal, such as omentum or bowel loops, and often increase on Valsalva manoeuvre.^{2 5 10 18} CECT scan is a useful adjunct in the evaluation of this pathology. On CECT, it appears as a thin walled peripherally enhancing homogeneous fluid-filled unilocular cyst extending along the course of the round ligament. Extension across the inguinal canal may be demonstrated. CECT is also useful in unusual cases where visceral structures such as the ovary, fallopian tube or bladder could have herniated into the patent sac.¹⁹ MRI gives the perfect diagnosis, but if a confirmation can be made by ultrasonography and CECT, MRI could be avoided as it is more expensive than the other two.

Learning points

- Hydrocoele of the canal of Nuck occurs as a painless, fluctuant, irreducible groin mass in females.
- Even though it is a rarity, it should be included in the differentials of groin mass in adult females.
- High-resolution ultrasonography offers an efficient non-invasive investigation for diagnosis.
- Surgical excision with high ligation of the sac is the standard choice of treatment.

The final diagnosis can only be made during surgery and confirmed by pathological examination. Surgical resection of the hydrocoele and ligation of the neck of the processus vaginalis should be considered as standard therapy. An open approach is better as compared with laparoscopy as there are high chances of inguinal hernia at the same site at a later date.^{20 18 21}

In conclusion, painless, irreducible and fluctuant groin swelling in an adult female should include a differential of hydrocoele of the canal of Nuck. Even though it is a rare entity, its similarities with other conditions makes diagnosis difficult. High-resolution real-time sonography and MRI can offer accurate diagnosis. But computed tomography better helps in delineation of the anatomic boundaries and plan of treatment.

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