

# Hydrocele of the canal of Nuck - Rare differential for vulval swelling

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## Abstract

Patent canal of Nuck is one of the rare developmental entities in females, presenting clinically as an inguino-labial swelling. The usual content of this sac is fluid being secreted by the peritoneal mesothelium. In rare cases, ovary alone or with fallopian tube may prolapsed out into the sac. We report the rationale use of diagnostic algorithm in a case of ovarian hernia into the patent canal of Nuck, to differentiate it from more common clinical mimics. Furthermore, in the present case, a knowledge of the entity and targeted scrutiny, led to a correct identification of the prolapsed ovary, preventing an unwarranted oophorectomy in the garb of neoplasia.

**Key words:** Canal of Nuck; inguino-labial swelling; ovarian hernia

## Introduction

The round ligament in female is attached to the uterine cornu at one end and to the vulva at the other, traversing through the inguinal canal. A small evagination of parietal peritoneum accompanies the ligament throughout the course and is known as the "canal of Nuck"<sup>[1]</sup> (homologous to the processus vaginalis in males). In routine course, this peritoneal evagination would get completely obliterated during the first year of life;<sup>[1,2]</sup> however, an incomplete obliteration results in accumulation and encystment of fluid within.<sup>[3,4]</sup> The developmental defect causing hernia of the ovary into the canal of Nuck is of special interest due to the fact that it simulates the normal descent of the testes in the male. The gubernaculum of the ovary, which is attached to the cornu of the uterus, prevents the descent of the ovary into the inguinal canal in normal development. When this mechanism is defective, the gubernaculum may pull the ovary down into the canal of Nuck and, in some cases, into the labium majus.<sup>[5]</sup> The female gubernaculum

is formed by muscle fibers that are not of mesonephric or paramesonephric origin and their attachment to the Mullerian ducts allows or induces the fusion and adequate development of the uterus. Thus, dysfunction of the female gubernacula probably results in female genital tract malformations.<sup>[6]</sup> Renal anomalies are described in 40% of cases of Mullerian aplasia.<sup>[7]</sup> We came across, and hereby present, a case having certain unusual features which have not been described in literature to the best of our knowledge.

## Case Report

A 42-year-old woman presented to the surgical out-patient services with painless swelling in vulva. On examination, there was a soft, cystic, and non-tender swelling in left labia majora. No thrill or bruit was noted in the swelling. A clinical diagnosis of Bartholin's cyst was put forward and a contrast-enhanced computerized tomography (CECT) scan was advised for further work-up. The CECT images of abdomen and pelvis [Figure 1] showed a large, well-defined, multiloculated, hourglass-shaped cystic structure extending from the left ilio-lumbar region (larger part) across the left inguinal canal to the ipsilateral labia majora (the smaller part of the structure). This followed the exact course of the round ligament and was associated with absence of left kidney along with non-visualization of left ovary at the expected site in the left adnexa. Notably, a rounded solid tissue was also noted along one of the walls of the structure (not well seen on the presented reformatted images), which raised the

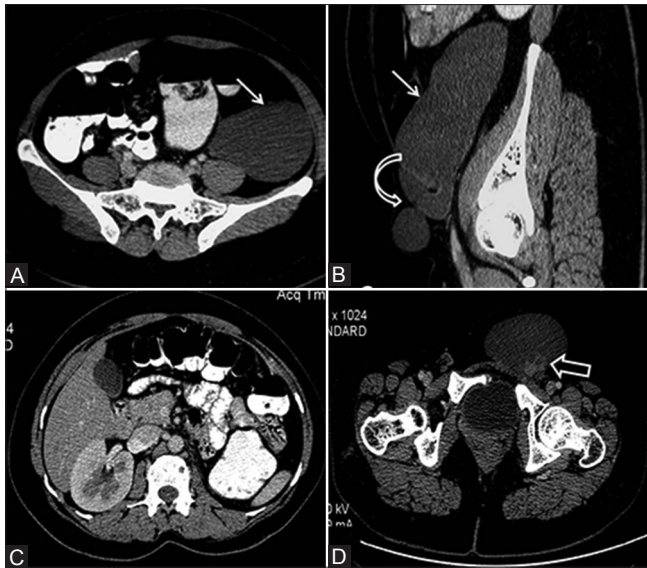
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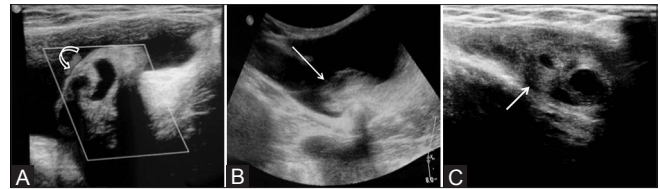


**Figure 1 (A-D):** Contrast-enhanced CT scan reconstructions in axial (A, C, D) and sagittal (B) planes, showing a large cystic lesion in the inguino-pelvic region (straight arrow). Note the narrowed neck (curved arrow) denoting the passage of lesion across the inguinal canal to the labial region. The ovary with clearly delineated follicles is seen in the part of sac outside the pelvic cavity in the inguinal region (hollow arrow in D). Note the empty left renal fossa (in C) confirming left renal agenesis

suspicion of a cystic neoplasia with mural nodule. Hence, a color Doppler USG was planned, which revealed a large, well-defined, solid cystic structure within the left inguinal canal [Figure 2], as was also seen on CECT. Focused evaluation of the solid structure within the cyst showed multiple follicles and a vascular pedicle traceable to the pelvic cavity, suggesting that the structure was the ectopic left ovary which had herniated into the patent canal of Nuck. Surgical excision was done with cosmetic correction of the vulva and repositioning of the ovary (confirmed on surgical biopsy).

## Discussion

Vulval swellings are uncommonly encountered in clinical practice.<sup>[6]</sup> The common differentials for this clinical entity are an indirect inguinal hernia, a cold abscess, or a hematoma, while rarely cystic lymphangioma, neuroblastoma metastasis to the groin, and ganglion cyst may also be noted in the region.<sup>[7-12]</sup> Hydrocele of the canal of Nuck is the cause in 5-12% cases<sup>[7,8]</sup> and is a rare vulval swelling. The latter usually presents with inguino-pelvic swelling due to the presence of an inguinal hernia of the fluid-filled sac. CECT scan is the preferred modality for evaluation of this pathology (and for inguino-pelvic swellings as such), whereby it appears as a thin-walled homogeneous fluid-filled unilocular cyst.<sup>[3,9]</sup> The communication via the inguinal canal may, at times, be difficult to identify on CT.<sup>[3,10,13]</sup> Magnetic resonance imaging (MRI) can give a more lucid depiction of the entity, including demonstration of a communication between the cystic lesion and peritoneal cavity and information on the



**Figure 2 (A-C):** Color Doppler USG images showing a vascular pedicle of the solid structure in the labial part of hernia sac (curved arrow). This pedicle could be traced to the iliac region up to the internal iliac artery. The solid component (confirmed to be the ovary during surgery) is seen along the posterior wall of the sac (straight arrow). However, high-resolution USG (straight arrow in C) also confirms the solid component to be ovary beyond doubt

anatomical relation with adjacent structures.<sup>[4,14]</sup> In addition to the above mentioned features, absence of left kidney and non-visualization of left ovary (at the expected site) were also noted, which have not been documented as such. This may be most probably due to co-existent anomaly in the development of the Wolffian duct, which evolves almost at the same time and under the influence of similar factors as the Mullerian system.<sup>[14]</sup> Though matching the description of a typical hydrocele of the canal of Nuck, herniation of ovary within the hydrocele sac was an unusual finding in the present case, with only few reports in the literature.<sup>[6]</sup> In less than one-third of patients, one or the other of visceral structures may be prolapsed within the patent sac, a part of urinary bladder being the commonest.<sup>[15]</sup> Ovary alone or fallopian tubes along with ovary may be seen as the contents in 15-20% cases.<sup>[6]</sup>

There are three types of hydrocele of canal of Nuck. The most common type is one with no communication with the peritoneal cavity, forming an encysted hydrocele along the tract of descent, from the inguinal ring to the vulva. The second type results when there is a persistent communication with the peritoneal cavity. The third type is a combination of the two as a result of the inguinal ring constricting the hydrocele like a belt, so that a part is communicating and a part is enclosed, giving this the name of hourglass type. However, any of these types of hydroceles is extremely rare in females.<sup>[12]</sup> Variants of the typical hourglass lesion include a bilocular hydrocele formed due to obliteration of the constricted segment at the internal inguinal ring.<sup>[4,16]</sup> The highlight of this case is the presence of ovary as the content of the hydrocele sac, which created an initial dilemma of a neoplastic pathology (on CT scan) and was cleared up on color Doppler. This expresses the utility of the two modalities in tandem for better evaluation of the pathology.

Hydrocele of the canal of Nuck is a rare developmental disorder, but it ought to be in the differential diagnosis list of vulval and inguinal cystic swelling in female patients. A rational algorithm consisting of Doppler USG and CECT/MRI, along with knowledge of this entity can help to differentiate the same from other conditions presenting with

swelling in the inguino-labial region. MRI is the preferred modality over CT scan as it gives better soft tissue details and is also free of radiation hazards. Association of renal and other Mullerian agenesis mandates a thorough screening of the region in patients of hydrocele of the canal of Nuck and vice versa.

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