

## CASE REPORT

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### Declaration of ethical aspects

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# Hydrocele of the canal of Nuck Hidrocele del canal de Nuck

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## ABSTRACT

Hydrocele of canal of Nuck is a rare condition in adult women which can cause inguinal-vulvar swelling. It occurs due to failure of obliteration of the vaginal process, which is the extension of the parietal peritoneum accompanying the round ligament of the uterus through the inguinal canal to the labia majora. Accumulation of serous fluid in the sac causes its appearance. Nonspecific clinical findings such as painless, fluctuating swelling extending from the superficial inguinal canal to the labia majora do not allow a preoperative diagnosis of this condition. Ultrasonography and magnetic resonance imaging can contribute to the diagnosis. The definitive diagnosis can only be made during surgery and with anatomopathological findings. Treatment consists of surgical resection of the lesion locally or laparoscopically. A case of hydrocele of canal of Nuck is presented.

**Key words:** Hydrocele, Canal of Nuck, Vagina

## RESUMEN

El hidrocele del canal de Nuck es una condición poco frecuente en mujeres adultas, a quienes puede causar tumefacción inguinal-vulvar. Ocurre debido al fallo de obliteración del proceso vaginal, que es la extensión del peritoneo parietal que acompaña al ligamento redondo del útero a través del canal inguinal hasta los labios mayores. La acumulación de líquido seroso en el saco provoca su aparición. Los hallazgos clínicos inespecíficos, como tumefacción indolora y fluctuante que se extiende desde el canal inguinal superficial hasta los labios mayores, no permiten realizar un diagnóstico preoperatorio de esta condición. La ecografía y la resonancia magnética pueden contribuir al diagnóstico. El diagnóstico definitivo solo puede hacerse durante la cirugía y con los hallazgos anatomopatológicos. El tratamiento consiste en la resección quirúrgica de la lesión por vía local o laparoscópica. Se presenta un caso de hidrocele del canal de Nuck.

**Palabras clave.** Hidrocele, canal de Nuck, Vagina

## INTRODUCTION

The canal of Nuck is the anatomical extension of the parietal peritoneum containing the round ligament of the uterus and reaching the labia majora. It is a rare anatomical variety that can lead to hydrocele or indirect inguinal hernia depending on the diameter of the canal<sup>(1)</sup>.

Hydrocele of the canal of Nuck is a rare condition caused by failure of complete obliteration of the canal which may manifest as inguinal swelling secondary to fluid accumulation. It produces a cystic lesion in the labia majora analogous to hydrocele of the spermatic cord in males<sup>(2,3)</sup>. It is more frequent in girls, although there are reports of cases in adult women<sup>(1)</sup>. Preoperative diagnosis is difficult since it does not present specific characteristics. Ultrasound and magnetic resonance imaging can be useful complementary tests for its recognition, but the definitive diagnosis is made during surgery and with the anatomopathological findings. Treatment is surgical by local or laparoscopic resection, depending on the anatomical type<sup>(4)</sup>. A case of hydrocele of the canal of Nuck is presented.

## CASE REPORT

A 28-year-old nulligesta female was referred to the gynecology office for presenting a slightly painful right inguino-vulvar tumefaction of gradual growth in approximately 4 months. The patient denied a history of trauma, abdominal pain, signs of subacute bowel obstruction, dysuria, altered bowel habits, nausea and vomiting, as well as any significant medical or surgical history.

The general physical examination was within normal limits. The gynecological examination showed a soft, smooth, irreducible, cystic tumefaction, slightly painful on palpation and approximately 8 centimeters in size. It extended from the inguinal region to the right labium majus with distension of the overlying skin but without signs of infection (Figure 1). The transillumination test was positive. The lump increased in size with standing, decreased slightly in the supine position and its content did not increase with the Valsalva maneuver. There was no evidence of inguinal adenopathy.

Laboratory tests were within normal limits. Ultrasound revealed a cystic tumor measuring 7 x 4 x 2 centimeters, well defined, elongated, hypoechoic, without solid components or internal septa and extending from the superficial inguinal ring to the right labium majus. The uterus and both adnexa were within normal limits. Color Doppler ultrasound showed no vascularization in the lesion. Computed tomography images confirmed the ultrasound findings (Figure 2). The imaging findings indicated the diagnostic possibility of hydrocele of the canal of Nuck type I, so it was decided to perform surgical resection of the lesion.

The surgical approach was done through an inguinolabial incision over the tumor. The base was exposed, proceeding to dissect the capsule until reaching the neck of the lesion, performing total resection through blunt and cutting dissection of the round ligament in the inguinal canal (Figure 3). No other structures were found in the area. A drain was placed in the space, performing closure of the subcutaneous tissue and skin with simple stitches. At 24 hours postoperatively, the drain was considered non-functional and was removed. The patient was discharged after 48 hours without postoperative complications. She had no recurrences during the 6-month follow-up.

The surgical specimen had a brownish appearance, smooth walls without solid components and yellowish serous content. Microscopic findings showed that the lesion had a single layer of flat cells of probable mesothelial origin. The definitive diagnosis was hydrocele of the canal of Nuck.

FIGURE 1. LUMP ON THE RIGHT LABIUM MAJUS.



FIGURE 2. COMPUTED AXIAL TOMOGRAPHY IMAGES. THE ARROW POINTS TO THE HYDROCELE OF THE CANAL OF NUCK IN THE INGUINAL REGION.

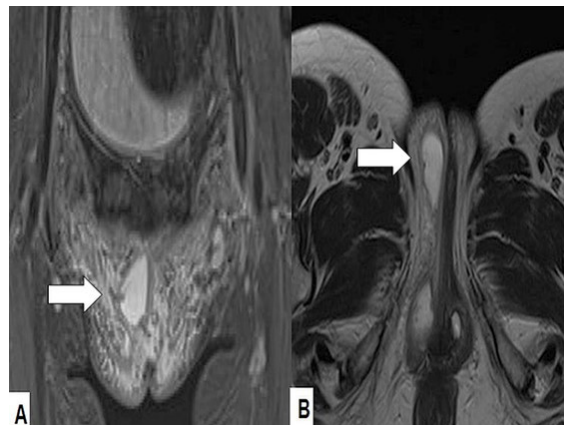
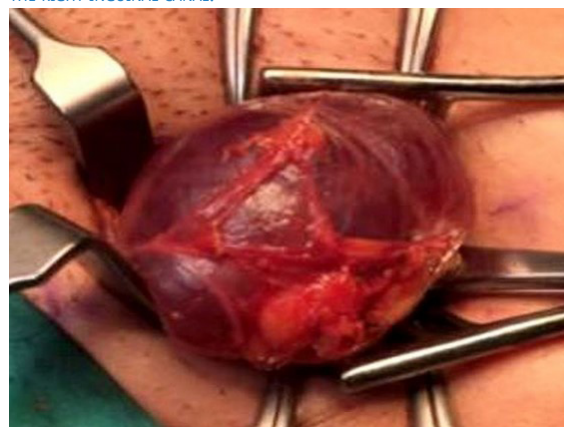


FIGURE 3. SURGICAL IMAGE OF THE HYDROCELE OF THE CANAL OF NUCK IN THE RIGHT INGUINAL CANAL.



## DISCUSSION

In females, the extension of the parietal peritoneum follows the round ligament through the internal ring and inguinal canal to the labia majora. This evagination is called canal of Nuck and usually disappears after birth in both sexes.



When this canal remains permeable, it can be a pathway for the development of indirect inguinal hernias. Partial proximal obliteration leaving the distal portion of the canal open produces the anatomical defect that leads to the development of the hydrocele of the canal of Nuck<sup>(5)</sup>. The secretory lining of the vaginal process produces peritoneal fluid due to excess secretion or absorption defect, which can lead to the formation of the cystic lesion. The etiological factors responsible are mainly idiopathic. Other proposed causes are inflammation, trauma, altered lymphatic drainage and meconium hydrocele<sup>(5,6)</sup>.

Hydrocele of the canal of Nuck in women is analogous to scrotal hydrocele in men<sup>(7,8)</sup>. Causes 5%-12% of cases of vulvar swelling in adult women<sup>(9)</sup>. Some cases may be misdiagnosed as inguinal hernias or Bartholin's abscess<sup>(10)</sup>. There are three types<sup>(4)</sup>:

- Type 1 or cystic hydrocele, which lacks communication with the peritoneal cavity; it is the most common entity and accompanies the round ligament to the vulva.
- Type 2 has free communication with the peritoneal cavity, similar to congenital hydrocele in males, and may be associated with intestinal loops.
- Type 3 is the rarest form. It appears due to partial constriction of the deep ring that allows the distal part to descend to the inguinal canal and the proximal part; it is intra-abdominal, but retroperitoneal, which gives the name 'hourglass' type.

Hydrocele of the canal of Nuck is difficult to diagnose in the preoperative period. Most cases appear as an irreducible, elastic, painless or moderately painful and elastic swelling in the inguinal area, which may extend to the labia majora. In addition, it may be transilluminated if it is sufficiently large<sup>(6)</sup>. However, it has no characteristic clinical findings<sup>(2)</sup>.

Although rare, massive and fluctuant inguinal swellings in women should be carefully evaluated for the possibility that intestinal contents, omentum and/or uterine adnexa may be present within the permeable canal of Nuck<sup>(11)</sup>. High frequency linear transducer ultrasound, computed

tomography and magnetic resonance imaging can help in the diagnosis. However, surgical exploration and anatomopathological examination confirm the diagnosis<sup>(7)</sup>. Ultrasound findings include thin-walled cystic lesion, anechoic or hypoechoic, well-defined, which maintains its size and shape with the Valsalva maneuver, superficially located in the inguinal and/or vulvar region, with posterior acoustic enhancement and absence of vascularization on color Doppler<sup>(12)</sup>. In some cases, internal septa can be observed which have been described as remnants of spontaneous obliteration attempts<sup>(6)</sup>. Magnetic resonance imaging shows a well-defined thin-walled cystic lesion which is hyperintense in T2 and hypointense in T1<sup>(13)</sup>.

Pathological evaluation of the hydrocele of the canal of Nuck shows two layers: the external layer composed of fibrous tissue of variable thickness with smooth muscle fibers and the internal layer formed by a monolayer of mesothelial cells and inflammatory cells, predominantly histiocytes<sup>(14)</sup>. The content is usually serous fluid, although there are reports of mucinous content. This change in characteristics may be due to an increase in the concentration of glycoproteins produced by mesothelial cells in response to inflammatory cytokines<sup>(3)</sup>.

Hydrocele of the canal of Nuck has several differential diagnoses including inguinal lesions of different origins. Lymphadenopathy and soft tissue tumors (lipomas, fibromas, leiomyomas, sarcomas, neuroma, inguinal cyst, inguinal or femoral hernias, Bartholinitis, femoral artery aneurysm and endometriosis of the round ligament) can cause inguinal and/or vulvar swellings. Vascular anomalies, appendicular or retroperitoneal tumors can also produce inguinal swelling<sup>(6)</sup>.

The definitive treatment is surgical resection of the lesion. The open approach is recommended for type 1, while the laparoscopic approach is useful for type 2. Type 3 canal of Nuck hydroceles should be evaluated on an individual basis, as they are challenging, and the surgical outcome depends on the surgeon's skills. If the canal is widened, mesh placement should be considered. Puncture and aspiration of the lesion is contraindicated because of the high recurrence rate<sup>(15)</sup>.



In conclusion, hydrocele of the canal of Nuck is a rare clinical entity and is a cause of groin swelling in women. This condition should be considered among the differential diagnoses in patients with inguinal and/or vulvar swelling. The definitive diagnosis is made by surgery and anatomopathologic findings. The type of surgical approach depends on the type.

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