

Hydrocele of the Canal of Nuck in Adult Females: Case Reports and Surgical Considerations

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Introduction

Hydrocele of the canal of Nuck (HCN) is a rare condition in adult females and is frequently misdiagnosed as an indirect or incarcerated inguinal hernia. Due to its nonspecific clinical presentation, accurate preoperative diagnosis is challenging.

The canal of Nuck was first described by Anton Nuck in 1691. It is the female equivalent of the processus vaginalis in male fetuses—an evagination of the parietal peritoneum that accompanies the descent of the testes into the scrotum. In females, if this evagination fails to obliterate as the uterus traverses the inguinal canal along the ovarian gubernaculum, it may result in an indirect inguinal hernia or a hydrocele of the canal of Nuck.

Case Presentation

A 48-year-old female presented with a progressively enlarging right inguinal mass, first noted in January 2022. An indirect inguinal hernia was suspected. Abdominal CT showed a fluid-filled lesion in the right inguinal canal (Type IV). She underwent laparoscopic TEP herniorrhaphy plus open excision, during which a cystic lesion and a dilated internal ring were identified. Histopathology confirmed a hydrocele of the canal of Nuck. She was discharged within 3–5 days, and showed well-healed wounds on follow-up.

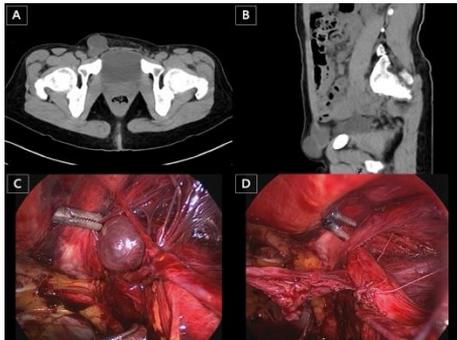


Figure Legend
 (A) Axial CT image showing a well-defined, hypodense cystic lesion in the right inguinal region.
 (B) Sagittal CT reconstruction confirming the lesion's extension toward the inguinal canal.
 (C) Intraoperative laparoscopic view demonstrating a tense, translucent cystic lesion adjacent to the round ligament, consistent with HCN.
 (D) Post-excision view showing complete removal of the cyst.

Discussion

Hydrocele of the canal of Nuck (HCN) is a rare clinical entity in adult females and is frequently misdiagnosed as an inguinal hernia or soft tissue tumor due to its nonspecific presentation and overlapping radiologic features. While Wang et al. proposed an anatomical classification with suggested operative strategies, it remains limited by the lack of standardized terminology and clinical applicability across varied presentations.

To address these limitations, we developed a **Surgical-Oriented HCN Classification** that expands upon prior systems by integrating radiologic characteristics, anatomical extent, surgical complexity, and pathological associations. This framework provides a structured decision-making tool that aligns preoperative evaluation with tailored intraoperative strategies.

Surgical oriented-HCN system		
Type	Anatomical Location	Surgical Management
Type I (Superficial-Encysted)	Cyst located entirely in the subcutaneous layer, superficial to the inguinal canal.	Anterior open excision
Type II (Inguinal Canal-Limited)	Lesion confined to the inguinal canal, beneath the external oblique.	Requires anterior dissection; laparoscopic inspection (e.g., TAPP) may aid in ruling out proximal extension.
Type III (Internal Ring-Confining)	Cyst situated at or just deep to the internal inguinal ring, with no distal component.	Laparoscopic approach (TAPP or TEP) is optimal.
Type IV (Hourglass/Trans-Canal)	Lesion traverses both internal ring and inguinal canal/subcutaneous tissue, often bilocular.	Requires a hybrid approach: Laparoscopic approach plus open excision for complete removal.
Type V (Pathologic-Associated)	HCN coexists with endometriosis, hernia, or suspicious malignancy.	Demand a tailored resection with consideration for radical excision, pathology, and mesh repair.

Each type within the S-HCN system corresponds to a recommended surgical approach—from simple anterior excision for superficial lesions to combined laparoscopic and open procedures for complex or extensive disease.

Notably, Type V accounts for cases involving coexisting conditions such as endometriosis, hernia, or malignancy, which may necessitate radical resection and mesh repair.

By linking lesion extent with individualized surgical planning, the S-HCN system aims to enhance diagnostic accuracy, optimize operative outcomes, and minimize recurrence or complications—particularly in rare and diagnostically challenging cases.