



## Case report

# Surgical treatment of a canal of Nuck cyst presenting as a femoral hernia: An unusual case report

Zarrukh Baig<sup>a,\*</sup>, Nolan Hunka<sup>a</sup>, Jeffrey Gaboury<sup>a,b</sup>

<sup>a</sup> Department of Surgery, University of Saskatchewan, Saskatoon, Canada

<sup>b</sup> College of Medicine, University of Saskatchewan, Saskatoon, Canada

## ARTICLE INFO

## Keywords:

Canal of Nuck  
Hydrocele  
Femoral hernia  
Processus vaginalis  
Hernia repair

## ABSTRACT

**Introduction and importance:** A canal of Nuck cyst forms because of a patent peritoneal fold evaginating through the inguinal canal in a female patient. It is a rare diagnosis because the canal often obliterates within the first year of a female patient's life. A persistent canal of Nuck may cause indirect inguinal hernias, or form hydroceles, termed canal of Nuck cysts. Here we report the first case of a canal of Nuck cyst discovered to be evaginating through the femoral canal.

**Case presentation:** A 70-year-old female patient initially presented with a symptomatic groin mass, and a suspected inguinal hernia on pre-operative ultrasound. Intraoperatively, she was found to have a canal of Nuck cyst terminating within the femoral canal. This was successfully repaired using a modified McVay approach, and approximation of the internal inguinal ring. She performed well post-operatively with no signs of recurrence at her six-month follow-up.

**Clinical discussion:** This case report serves to highlight the canal of Nuck cyst, a rare embryologic remnant, and the first literature-reported femoral canal of Nuck cyst. We re-affirm the diagnostic unreliability of ultrasound imaging in the workup of groin hernias. Furthermore, we describe surgical techniques to repair a canal of Nuck cyst found within the femoral canal.

**Conclusion:** To the best of our knowledge, no prior literature reports a canal of Nuck cyst presenting as a femoral hernia. This rare diagnosis may be encountered in common operations and is amenable to definitive repair using traditional hernia repair techniques.

## 1. Introduction

A canal of Nuck cyst is a rare surgical condition in females. It was initially described in 1691 and is reported in several case reports [1–3]. During embryologic development, the round ligament transverses the abdominal wall from the uterus and attaches to the labia majora. The peritoneum which follows this opening gives rise to the canal of Nuck. This peritoneum usually obliterates by the first year of life, but a patent peritoneal fold can give rise to indirect hernias and hydroceles, termed canal of Nuck cysts [1]. In a male patient, this is the embryological equivalent of a patent processus vaginalis causing a hydrocele of the testicles. The true incidence of canal of Nuck cysts is unknown given the rarity of the disease. It is often diagnosed on ultrasound, computed tomography (CT), or Magnetic Resonance Imaging (MRI) [3–5].

Canal of Nuck cysts often present as inguinal hernias [2]. Standard of care entails surgical cyst excision and re-approximation of the internal

inguinal ring [6]. Here we report a unique case of a 70-year-old female patient with a hernia sac that was protruding through the internal ring and terminating within the femoral canal, forming a femoral hernia in combination with a canal of Nuck cyst. She was treated at an academic tertiary care institution and provided definitive surgical therapy via modified McVay repair. This work has been reported in line with the SCARE criteria [7].

## 2. Case

A 70-year-old female presented to a general surgery outpatient clinic with a 2-year history of a swollen, palpable lump in the right groin. She reported that the lump was dynamic in size. The lump was larger when she had worsened ascites fifteen years ago. The patient denied a history of heavy lifting or strenuous activity. She had no prior history of groin hernias, or intra-abdominal surgeries. She denied any symptoms of

\* Corresponding author at: Department of Surgery, University of Saskatchewan, 103 Hospital Drive, Saskatoon SK S7N 0W8, Canada.

E-mail address: [Zarrukh.baig@hsph.harvard.edu](mailto:Zarrukh.baig@hsph.harvard.edu) (Z. Baig).

<https://doi.org/10.1016/j.ijscr.2021.106435>

Received 8 September 2021; Received in revised form 16 September 2021; Accepted 17 September 2021

Available online 28 September 2021

2210-2612/© 2021 Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

bowel obstruction. She denied the use of alcohol, tobacco, or any other illicit substances. Interestingly, she had a prior diagnosis of myeloproliferative disorder complicated by venous thromboembolism and Budd-Chiari syndrome. This led to chronic liver dysfunction and ascites. She also had hypertension and non-insulin dependent diabetes. Her comorbidities were well controlled with her medications which included warfarin, furosemide, spironolactone, nadolol, candesartan, and metformin. She had no family history of connective tissue disorders or any autoimmune disorders.

On exam she had a tender palpable mass around the inguinal ligament (Fig. 1). Her history and exam were in keeping with an indirect inguinal hernia, and her ultrasound astutely reported a 5 cm hydrocele that had formed because of a patent canal of Nuck. Regardless, as this patient was symptomatic from the mass, and it was felt that her comorbidities were manageable, she gave informed consent for surgery. She was seen in pre-operative assessment clinic for medical optimization. She underwent elective excision of the canal of Nuck cyst under general anesthesia by a fellowship trained general surgeon at a tertiary care hospital.

In our center, we primarily use a Lichtenstein tension-free mesh repair technique for inguinal hernias. Therefore, her repair was performed using a traditional inguinal hernia incision above the inguinal ligament [8]. Upon dissecting through the subcutaneous space, it was evident that the canal of Nuck cyst was protruding below the inguinal ligament, into the femoral canal (Fig. 2). The cyst was ligated below the inguinal ligament, and the femoral canal was repaired by approximating Cooper's ligament to the femoral sheath [9]. The round ligament was also ligated to prevent further formations of indirect hernias, along with re-approximation of the internal ring. This modified McVay technique repaired the femoral hernia defect, excised the canal of Nuck cyst, and also closed the internal inguinal ring [8].

The patient was discharged home after an uncomplicated post-operative course, with usual groin hernia repair instructions, which included a recommendation to avoid heavy lifting and strenuous activities for 6 weeks. At her 6-month virtual follow-up, she was content with the overall outcome and symptom free.

### 3. Discussion

In female embryological development, the round ligament exits the inguinal canal and attaches to the labia majora [10]. The peritoneal fold that descends with the round ligament is known as the canal of Nuck. In rare instances, it fails to obliterate, and the peritoneal fold persists into adulthood, which may result in an indirect hernia or a hydrocele. A canal of Nuck may present in three unique ways: It may appear as a peritoneal fold that exits through the inguinal canal or the labia majora but does not connect internally to the peritoneal cavity. It can also present as a hydrocele that is connected to the peritoneal cavity. The third type is a combination where there is an internal connection to the



**Fig. 1.** 70-year-old female with a swollen, palpable, tender lump above the inguinal ligament for 2 years.

peritoneal cavity, but the internal inguinal ring constricts the opening and thus prevents the spontaneous reduction of the sac, such as an incarcerated indirect hernia [10].

In this patient, pre-operative ultrasound suggested a canal of Nuck cyst where no defect was identified near the internal ring [10]. The patient however reported that the lump frequently changed in size suggesting that there may be an internal connection to the peritoneal cavity. Intraoperatively, the canal of Nuck cyst was identified within the femoral canal. It was still communicating with the peritoneal cavity, but it was not exiting through the external inguinal ring. Therefore, the cyst was ligated along with the round ligament. The femoral canal and the internal inguinal ring were both re-approximated, preventing any further communication to the peritoneal cavity. To the best of our knowledge, no previous case reports have identified a canal of Nuck cyst presenting as a femoral hernia. Given this study design, the exact incidence of canal of Nuck cysts presenting as femoral hernias remains unknown. Further reports and studies are required to grasp the burden of this disease and assess effectivity of different surgical techniques of repair.

### 4. Conclusion

Canal of Nuck cysts are rare surgical conditions that must be considered in female patients presenting with groin lumps or swellings. Here we publish the first case report identifying and treating a canal of Nuck cyst presenting as a femoral hernia. These cysts are amenable to definitive repair using traditional hernia repair techniques.

### Source of funding

There was no funding received for this article.

### Ethical approval

The study was exempt from the Research Ethics Board (REB) at the University of Saskatchewan as it is a case report written retrospectively, and the study did not influence the care of the patient.

### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Research registration

This is not a first in man study. It does not require a UIN.

### Guarantor

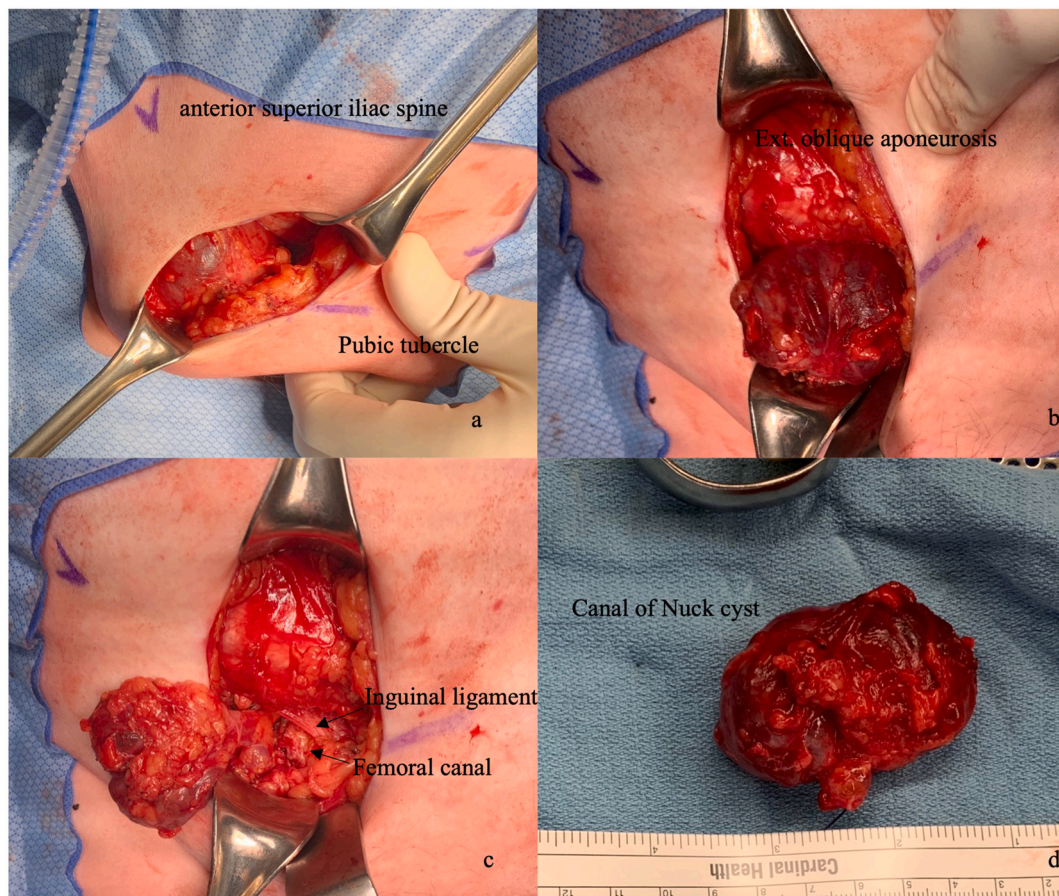
Dr. Jeffrey Gaboury and Dr. Zarrukh Baig are the guarantors of this publication and accept full responsibility for the work and/or the conduct of this study.

### Provenance and peer review

Commissioned; externally peer reviewed.

### CRedit authorship contribution statement

Dr. Zarrukh Baig (General Surgery Resident) is the primary author of the article. Dr. Nolan Hunka (General Surgery Resident) helped format the pictures, interpret the findings, and edit the manuscript. Dr. Jeffrey Gaboury (General Surgeon) is the primary investigator, the primary surgeon in the care of this patient, and helped with the study concept.



**Fig. 2.** canal of Nuck cyst identified below the inguinal ligament. (a) Cyst encountered immediately after excision of the subcutaneous fat, prior to excising the external oblique. (b) Cyst protruding below the external oblique aponeurosis. (c) Canal of Nuck cyst protruding through the femoral canal below the inguinal ligament. (d) 5.5 cm canal of Nuck cyst excised from the femoral canal.

#### Declaration of competing interest

The authors declare that there is no conflict of interest regarding the publication of this article.

#### References

- [1] H. Nasser, M. King, H.K. Rosenberg, A. Rosen, E. Wilck, W.L. Simpson, Anatomy and pathology of the canal of Nuck, *Clin. Imaging* 51 (2018) 83–92, <https://doi.org/10.1016/j.clinimag.2018.02.003>.
- [2] R.E. Block, Hydrocele of the canal of Nuck: a report of five cases, *Obstet. Gynecol.* 45 (1995) 464–466.
- [3] J.E. Bagley, M.B. Davis, Cyst of canal of Nuck, *J. Diagn. Med. Sonogr.* 31 (2) (2015) 111–114, <https://doi.org/10.1177/8756479314557277>.
- [4] I. Lai, A. Page, F. Hamidinia, R. Rahmani, Cysts of the canal of Nuck: a rare sonographic diagnosis, *J. Clin. Ultrasound* 45 (3) (2017) 175–178, <https://doi.org/10.1002/jcu.22390>.
- [5] R. Kono, H. Terasaki, N. Murakami, M. Tanaka, J. Takeda, T. Abe, Hydrocele of the canal of Nuck: a case report with magnetic resonance hydrography findings, *Surg Case Rep.* 22 (1) (2015) 86, <https://doi.org/10.1186/s40792-015-0086-5>.
- [6] T. Erol, M. Uner, D. Karakoc, E. Hamaloglu, Cyst of the canal of Nuck: a rare cause of inguinal swelling in women, *Niger. J. Clin. Pract.* 22 (10) (2019) 1457, <https://doi.org/10.4103/njcp.njcp.588.18>.
- [7] for the SCARE Group, R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, The SCARE 2020 guideline: updating consensus Surgical CAse REport (SCARE) guidelines, *Int. J. Surgery* 84 (2020) 226–230.
- [8] I.L. Lichtenstein, A.G. Shulman, P.K. Amid, M.M. Montllor, The tension-free hernioplasty, *Am. J. Surg.* 157 (2) (1989) 188–193, [https://doi.org/10.1016/0002-9610\(89\)90526-6](https://doi.org/10.1016/0002-9610(89)90526-6).
- [9] R.H. Rutledge, McVay herniorrhaphy, *Oper. Tech. Gen. Surg.* 1 (2) (1999) 116–131, [https://doi.org/10.1016/S1524-153X\(99\)80015-3](https://doi.org/10.1016/S1524-153X(99)80015-3).
- [10] V.S. Counsellor, B.M. Black, Hydrocele of the canal of Nuck, *Ann. Surg.* 113 (4) (1941) 625–630, <https://doi.org/10.1097/0000658-194104000-00012>.