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Two indirect sacs and one canal of Nuck in female inguinal hernia: a case report

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Abstract

Background Female inguinal hernias are rare to see. All inguinal hernias in females occur as indirect hernias. A single hernia sac is usually seen, but the occurrence of more than one sac in female indirect inguinal hernias is extremely rare.

Case presentation A 64-year-old female of Kashmiri ethnicity who had multiple comorbidities reported with right groin swelling. She had a diagnosis of a right indirect inguinal hernia. Intraoperatively, one canal of Nuck and two sacs of an indirect type were diagnosed.

Conclusion Occurrence of two hernia sacs of an indirect type and canal of Nuck in female inguinal hernia is an extremely rare occurrence. This is the first case report in the world of a female indirect inguinal hernia being reported having two individual hernia sacs and a single canal of Nuck present. This hernia is named "the Srinagar" hernia after its region of origin.

Keywords Female, Inguinal hernia, Canal of Nuck, Indirect hernia, The Srinagar hernia, Hernioplasty

Introduction

Inguinal hernias occur rarely in females, in around less than 5% of women [1]. Female inguinal hernia is relatively less common than in men. Almost all hernias occurring in females are of the indirect type. The incidence of inguinal hernia in females is 1.9%, with the ratio of men to women being 6:1 [2]. Female inguinal hernia is of the congenital type and may go unnoticed until old age or complications occur. Incomplete obliteration of the processus vaginalis causes a canal of Nuck or indirect inguinal hernia in females [3]. In adult women, indirect hernias are more common than direct hernias and typically occur in individuals aged 40–60 years [4].

The presentation is usually painless swelling in the groin. Normally, the hernia sac is solitary, with omentum as its content. Rarely, more than one indirect sac is present in female indirect inguinal hernia. Diagnosis is clinically or radiologically difficult for confirming more than one indirect sac. Most cases are diagnosed intraoperatively. The individual ligation of sacs or excision of the canal of Nuck is the recommended treatment in the case of more than one sac in an indirect type of inguinal hernia.The case report of "the Srinagar" hernia is being reported owing to the uniqueness of occurrence of two sacs with a single canal of Nuck in a female indirect inguinal hernia.

Case report

A 64-year-old female of Kashmiri ethnicity reported with right groin swelling for 4 years.There was gradual increase of its size in the oblique direction of the groin. She had hypothyroidism, hypertension, diabetes, and chronic bronchitis and was on levothyroxine, telmisartan/amlodipine, a combination of metformin/glimepiride, and bronchodilators. The patient had a hysterectomy 10 years prior for a benign disorder of the uterus, and

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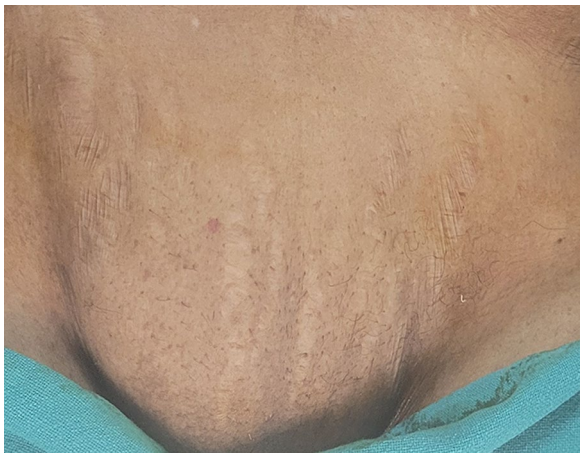

Fig. 1 Groin swelling from a right-sided female inguinal hernia

Fig. 2 Gross appearance of the indirect sac of female inguinal hernia

she had a lap cholecystectomy 5 years prior for symptomatic cholelithiasis. General physical examination was unremarkable. Systemic exam was normal. On abdominal examination, there were port site scars from the laparoscopic cholecystectomy and a lower abdominal transverse scar from the open hysterectomy present. On local examination of the right groin, she had groin swelling of a pyriform shape reaching up to the labia, which was soft, expansile on cough impulse, non-tender, and reducible (Fig. 1). Ultrasound of the abdomen confirmed diagnosis of right indirect inguinal hernia.

The patient had open surgery, with perioperative findings revealing a long sac crossing the pubic symphysis. (Fig. 2). The hernia sac was thick and wide (Fig. 3).

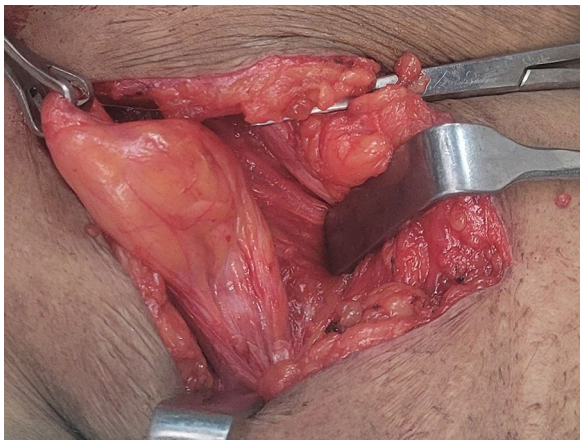

Fig. 3 Large thick sac of indirect female inguinal hernia

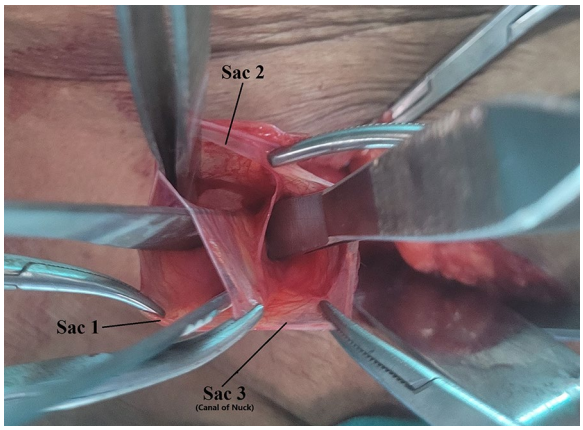

Fig. 4 Two indirect sacs (sac 1 and sac 2) and a canal of Nuck (sac 3) on medial side of indirect female inguinal hernia

The deep ring was slightly dilated. The round ligament was thinned out into a fibrous cord and was preserved. On dissection of this long thick sac, three sacs were found, and each of the sacs was adhered together by filmy adhesions. The two sacs, being laterally placed, were of an indirect type, having their own fundus, body, and neck, with each sac opening separately into the peritoneal cavity (sac 1 and sac 2). The medial sac was confirmed as a canal of Nuck (sac 3), with no communication with the peritoneal cavity and the content being clear fluid (Fig. 4). One indirect sac contained omentum as its content, and the second one contained intestine as its content. These two sacs of indirect hernia type were released from flimsy adhesions to each other and from the canal of Nuck. Both sacs of indirect type were ligated individually after transfixation and reposited back into the peritoneal cavity. The canal of Nuck was excised after ligation. Onlay mesh was placed. The follow-up period was uneventful.

Discussion

The lifetime risk in women of developing a groin hernia is reported as being 3–5.8% [5]. Older age, family history of inguinal hernia, connective tissue disorders, and physical activities leading to an increase in intra-abdominal pressure are predisposing factors for the development of groin hernia in women [6]. It is noteworthy to mention that smoking, appendectomy, abdominal surgeries, or multiple deliveries are not considered risk factors for the occurrence of inguinal hernias in females, unlike in males, where these are predisposing factors for inguinal hernia [5, 7]. In 1973, Glassow reported that direct inguinal hernias in women are "so rare that a primary inguinal hernia is considered to be indirect until proven otherwise" [8]. This is attributed to the presence of stronger transversalis fascia in the floor of the inguinal canal, bearing the stress of pregnancy and acting as a protective measure to prevent the occurrence of direct hernia [9]. It is assumed that the fascia transversalis, along with the ligamentum rotundum, is thinned out because of the hydrocele, mimicking a direct hernia in adults [7].

The female inguinal hernia is to be considered a congenital anomaly secondary to a failure of obliteration of the processus vaginalis [10]. During embryogenesis, the round ligament of the uterus drags a small evagination of parietal peritoneum through the internal ring into the inguinal canal in females. This small evagination of parietal peritoneum is known as the canal of Nuck in females, which is akin to the processus vaginalis in males. This "cyst of the canal of Nuck" was first documented in 1691 by the Dutch anatomist Anton Nuck van Leiden [11]. The canal of Nuck normally obliterates in a craniocaudal direction between month 8 of gestation and the first year of life. Failure to accomplish complete obliteration of this peritoneal evagination results in canal of Nuck or an indirect sac of hernia [12]. A patent peritoneal evagination is a precursor for an indirect inguinal hernia. The processus vaginalis may be partially obliterated at the proximal end only, while leaving the distal aspect intact, resulting in the formation of a hydrocele of the canal of Nuck. These canal of Nuck hydroceles are more often seen in children, but there is an increasing number of documented cases reported in adults [13–15].

It should be noted that a cyst of canal of Nuck is different from an inguinal hernia sac in that it contains fluid instead of adipose tissue or intestine, and it is not connected to the peritoneal cavity [16].

Hydrocele of the canal of Nuck is defined as a collection of fluid within the processus vaginalis in females and is equivalent to a hydrocele of the spermatic cord [17]. It typically presents as inguinal swelling that extends to the labia major during the Valsalva maneuver and does not usually enlarge in size, which differentiates it from an inguinal hernia. If the mass is large enough and not reducible, it might be transilluminated to reveal its contents. A cyst of the canal of Nuck is frequently misdiagnosed as inguinal hernia in females and is only correctly diagnosed intraoperatively.

On the basis of fluid distension, the canal of Nuck hydrocele is divided into three types [10].

Type 1 is called a cyst of the canal of Nuck, also known as a noncommunicating or cystic hydrocele. This type of cyst is the most common type of hydrocele of canal of Nuck. There is no communication between the hydrocele and peritoneal cavity, and the caudal portion of the canal remains open while the cranial portion is occluded. It mostly appears as an encysted mass without hernia defect. This occlusion progresses from the deep to the superficial inguinal ring, and fluid accumulates in the canal, leading to the development of a cyst. A cystic dilation may be caused by a discrepancy between the absorption and secretion of fluid, an alteration in lymphatic drainage, trauma, or infection, or it may be idiopathic [18].

Type 2 is known as a communicating hydrocele. A type 2 cyst is a communicating hydrocele characterized by its continuity with the peritoneal cavity. As a result, the size and shape of the cyst may change during the Valsalva maneuver or standing [19].

Type 3, also called the combined type, is a bilocular hydrocele. It comprises two cysts: one is an encysted part that does not communicate with the peritoneal cavity, while the other part communicates with the peritoneal cavity, forming an hourglass swelling. This bilocular appearance is caused by a narrow, deep inguinal ring that allows only partial closure [20].

Clinically, a hydrocele of the canal of Nuck may appear as a painless or uncomfortable fluctuating inguinal lump with no accompanying nausea or vomiting. According to an analysis of 105 cases, a hydrocele of the canal of Nuck most frequently develops on the right side, and it is typically nontender, nonreducible, and mobile [21]. This canal of Nuck may coexist with multiloculations diagnosed on radiology. These multiloculations are usually present in pediatric cases within the canal of Nuck [22]. Multiloculations are thin, septate, small, very fragile, and always multiple, existing in different planes. In addition, they are easily separable and do not open in the peritoneal cavity.

In the case of "the Srinagar" hernia, two individual indirect sacs were found with all the parts of a typical hernia sac and solitary canal of Nuck present. It was probably of congenital origin, as indirect hernias are almost always of congenital origin. The third sac was type 1 cyst of canal of Nuck in the case of "the Srinagar" hernia.

The contents of female inguinal hernia are varied abdominal viscera and mostly contain omentum or intestine. Rarely, in 3% of female inguinal hernia cases, ovaries or fallopian tubes may be seen as contents [23, 24]. The ovary or fallopian tube may get entrapped and misdiagnosed as an incarcerated or strangulated hernia deemed as an indication for emergency surgery [25]. Lack of awareness of occurrence of complications of female inguinal hernia with known risk factors often leads to reluctance in seeking consultation and increases the risk of complications.

A diagnosis of hernia has a correlation with age in females [26]. After an initial peak of easy diagnosis in infants, groin hernias become more prevalent with advancing age [27]. Following the same trend of bimodal distribution, complications such as incarceration, strangulation, or obstructed hernia are observed at the peaks of age. The majority of cases of female inguinal hernia are diagnosed solely on the basis of a clinical history and examination. This may present as an asymptomatic finding or present as a painless bulge in the groin. Hernias may frequently be overlooked, particularly if not assessed during a physical examination. The low incidence of groin hernias in patients with a higher body mass index probably carries a risk of bias since it is easier to detect an inguinal hernia at a lower body mass index [28]. Most hydroceles of canal of Nuck are diagnosed intraoperatively owing to very low clinical suspicion. Sometimes ultrasound is performed to narrow down the differential diagnosis [29]. The standard treatment is complete excision of the hydrocele via open surgery with mesh herniaplasty. Laparoscopic excision by the transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) approaches are being done in female inguinal hernia.

Conclusion

Female inguinal hernias usually contain a single sac. Occurrence of two indirect sacs and a single canal of Nuck in an individual female indirect inguinal hernia is extremely rare.

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None.

Author contributions
The author had the idea for the research and edited and approved the final manuscript. IW wrote the main manuscript text; performed data collection, data analyses, and the literature review; wrote the main manuscript text; and edited the manuscript.

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Availability of data and materials
The datasets generated and/or analyzed during the current study are available from the corresponding author upon request.

Declarations

Ethics approval and consent to participate
Not applicable.

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

Competing interests
None declared.

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