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Hydrocele of Canal of Nuck

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Abstract

Hydrocele of the Canal of Nuck (HCN) is a rare condition seen in adult females. Diagnosis of HCN poses a great challenge to the attending surgeon. There are various variants of embryological abnormality of the processes vaginalis manifesting in different forms. Understanding the embryological development of the processes vaginalis and the gubernaculum in female is therefore essential for determining the best surgical option for treating these rare cases.

Keywords: Hydrocele canal of Nuck, diagnosis, treatment

Introduction

The Canal of Nuck was first discovered by Anton Nuck in 1961 [1]. Normally the processes vaginalis is a rudimentary structure of least relevance in a normal adult female.

However, if there is defective embryological development of the gubernaculum in a female, it can give rise to a variety of swellings in the groin region. The pathogenesis of this abnormality, diagnosis and treatment options are presented.

Embryology

The processes vaginalis and gubernaculum are two important structures in the development of the inguinal canal. The gubernaculum is a fibromuscular structure developed in fetus between 8-12 weeks of gestation connected to inferior pole of gonad and extending down to the groin area. [2].

In males, under the influence of androgen it descends into scrotum pulling the testis along with it. However in females due to the lack of influence of androgen it stops growing, thereby allowing the gonad to be retained in the pelvic cavity. In the pelvis it is attached to the uterine cornua thereafter evolving into suspensory ligament of ovary. (Figure 1) This portion occupies the site of connection between the uterus and ovary. The distal part of the structure develops into round ligament which descends into inguinal canal getting attached to the labia majora [2, 3].

The processes vaginalis is an evagination of the parietal peritoneum which precedes the descent of the gubernaculum. Canal of Nuck therefore refers to section of processes vaginalis located in the inguinal canal in the female. (Figure 1)

Pathogenesis of Hydrocele of Canal of Nuck (HCN) Abnormalities.

Normally in humans, from the 32nd week to first year of life, the Canal of Nuck completely disappears in a cranio-caudal direction. Failure of obliteration of processes vaginalis leads to variety of disorders [4].

A patent Canal of Nuck may arise from complete failure associated with hernia and hydrocele. If the gubernaculum fails to become fixed to the uterine cornua, the ovary may then come down via the inguinal canal. Uterine herniation can also take place with the presence of fallopian tube or ovarian herniation. Ovarian herniation can lead to dangerous complications such as incarceration, strangulation and even torsion of the ovary requiring emergency treatment. Incomplete or partial closure of canal of Nuck can lead to formation of a hydrocele. The proximal portion of processes vaginalis closes while the distal portion may remain patent [4, 5].

The processes vaginalis which is peritoneal lining is formed by mesothelial cell secreting fluid which may accumulate in the potential space. Initially the swelling is elongated. However, as more fluid accumulates it assumes a rounded form.

Hydrocele of Canal of Nuck can be of 3 types-

Type 1: Encysted hydrocele, which is non-communicating with the peritoneal cavity with obliteration of the proximal part.

Type 2: Communicating hydrocele wherein the Canal of Nuck remains patent giving rise to a non-tender reducible swelling which may arise on standing or straining

Type 3: Combined type (type 1 and type 2), which has both cystic inferior part in inguinal canal as well as in the labia majora giving rise to an hour glass swelling.

Clinical Feature

Hydrocele of Canal of Nuck usually manifests clinically as a painless fluctuant inguinal swelling. Occasionally it can be painful. The swelling may extend up to labia majora though it may not enlarge with straining. Only if the peritoneal evagination is patent will it give rise to an indirect inguinal hernia.

In majority cases, hydrocele of canal of Nuck has a obliterated proximal part of processes vaginalis with a patent distal portion. This condition should be differentiated from inguinal hernia, which typically exhibits reducibility and an expansile impulse on coughing.

Investigations

Ultrasonography (USG) is the initial preferred method of imaging [6]. Hydrocele of the Canal of Nuck appears as a well-defined hypoechoic lesion with posterior acoustic enhancement. The lesion may exhibit echoes due to the high protein content.

Complicated HCN may exhibit thickened wall or internal septations. Incarcerated bowel loops will confirm continuity of content with the peritoneal cavity [6].

MRI: If the USG findings are inconclusive then MRI can detect herniation's. HCN is hypointense on T1 weighted images and hyperintense on T2 weighted images. Internal septations may be found if associated with infection. Differentiation from soft tissue masses can be made by MRI [7].

CT-scan may not be necessary in majority of cases. However patients presenting in an acute emergency may have incarcerated bowel loops which can be picked up very well by CT [6,7,8].

Treatment

Surgery is the mainstay of treatment [9]. Definitive pre-operative diagnosis, the size of HCN and the presence of an inguinal hernia determine the choice of surgical procedure.

Through an inguinal incision the HCN needs to be dissected all around as well as proximal and distally [9]. Complete resection is necessary. If associated with a hernia then mesh repair is necessary. Laparoscopic approach in the form of transabdominal preperitoneal repair (TAPP) can also be adopted [10]. Open approach is simple with excellent delineation of the swelling. It also has a short operating time. However if associated with incarcerated intestines it may be difficult to evaluate the proximal intraabdominal portion of the gut necessitating an exploratory laparotomy [11].

Laparoscopic approach enables an accurate diagnosis especially when intraperitoneal organs are suspected to be incarcerated in the hernia sac. However, the inferior epigastric may preclude a good surgical field of vision [10].

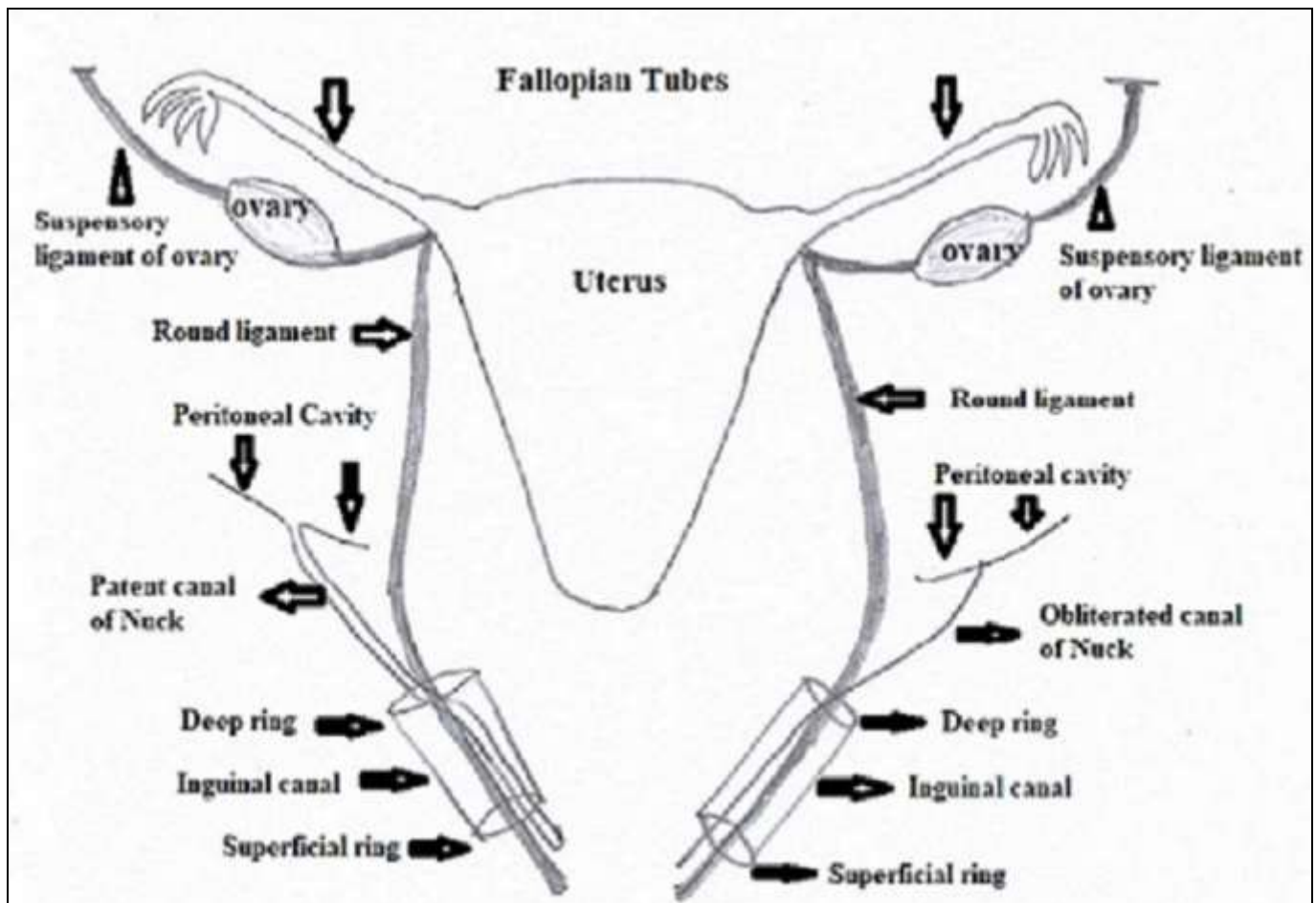


Fig 1: Surgical anatomy of the Canal of Nuck

Conclusion

Pre-operative diagnosis of HCN is pivotal for making the right choice of surgical intervention. The choice between an open and laparoscopic procedures depends on the individual expertise of the attending surgeon.

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