The Canal of Nuck: A Rare Defective Obliteration in Females
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Introduction
- Inguinal groin masses are a common presentation with a wide range of differential diagnoses.
- The processus vaginalis in females should close by 40 weeks of gestation, although in rare cases it fails to close, developing an abnormality called the Canal of Nuck.
- The Canal of Nuck creates an outpouching that leaves an opening at the inguinal internal ring, allowing structures of the reproductive system to herniate through to the labia majora.
- One third of patients also have an inguinal hernia at the time of presentation. These abnormalities may be misdiagnosed which can lead to strangulation, ovarian torsion, and infertility.
- Diagnosis using ultrasound and Magnetic Resonance Imaging (MRI) will show dilation at the inguinal canal with an associated distal cystic lesion.
- Due to the extremely rare occurrence and frequent misdiagnosis, the prevalence is currently unknown, but occurrence in infants has shown to be more common.

Table 1. Differential Diagnosis

| Femoral hernia | Inguinal hernia | Bartholin gland cyst | Lipoma | Abscess |

Case Description

<table>
<thead>
<tr>
<th>History</th>
<th>Objective Findings</th>
<th>Diagnostic Results</th>
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<tbody>
<tr>
<td>A 35-year-old female presented with constant, worsening left groin pain with an associated mass that started 4 months ago</td>
<td>Blood pressure: 118/79 mmHg</td>
<td>CBC, BMP unremarkable</td>
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<td>Pain increased with prolonged standing. No relieving factors.</td>
<td>Well-appearing, in no acute distress</td>
<td>Ultrasound</td>
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<td>Denied any radiating pain, erythema, nausea, vomiting, vaginal discharge obstruction, recent STDs, or fevers.</td>
<td>Abdomen soft, non-tender, non-distended. No guarding</td>
<td>- Rim enhancing cystic structure measuring 2.8 cm x 4.2 cm x 7.5 cm in the left inguinal canal.</td>
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<tr>
<td>No significant past medical history, surgical history, or family history.</td>
<td>Flucent, irredicible, non-erythematous protrusion over the left labia majora that was tender to palpation and did not transilluminate. No adnexal or cervical motion tenderness.</td>
<td>Magnetic Resonance Imaging pelvis with IV contrast</td>
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<td>Medications: Vitamin D PO 1000 IU/day.</td>
<td>Dull and sharp touch of all extremities intact</td>
<td>- Cystic structure centered in the left anterior pelvic region extending along the round ligament into the left inguinal canal. Findings favored to reflect a Canal of Nuck cyst.</td>
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<td>OBGYN: Last month period 1 week ago. Up to date on annual appointments.</td>
<td>Rest of exam within normal limits</td>
<td></td>
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<tr>
<td>Social history: Married in a monogamous relationship.</td>
<td>Tissue biopsy</td>
<td>Tissue lined by focally hyperplastic mesothelial cells and demended reactive fibroelastic tissue involving fibroadipose tissue and skeletal muscle consistent with patent canal of Nuck. Focus of endometriosis.</td>
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Fig. 1 Canal of Nuck Anatomy

Discussion

Laparoscopic Versus Open Surgical Approach
- The laparoscopic approach has shown to be superior to the open approach.
- Laparoscopic approach provides direct visualization leading to a more efficient diagnosis and cyst excision.
- Excludes other intraabdominal pathologies that may be present.

Clinical Outcome
- Patient tolerated excision of left Canal of Nuck cyst and repair with mesh very well.
- Although numbness and tingling were experienced post operatively in the PACU, symptoms resolved shortly after.
- At 1 week follow-up incisions were clean, dry, and intact and patient denied any symptoms.

Conclusions
- This rare developmental disorder is important for providers to consider within their differential diagnosis when examining a female with an inguinal mass.
- Reproductive contents can herniate through the internal ring into the labia majora and are often misdiagnosed as more common conditions such as inguinal hernias, cysts, and abscesses.
- Out of the minimal cases reported, most were found intraoperatively, and the diagnostic imaging needed to diagnose the condition were not utilized during initial work-up.
- If misdiagnosed, women can suffer from infertility, ovarian torsion, necrosis, or infection.

Fig. 2 Hospital Course

Referred to general surgery by primary care
Inconclusive ultrasound required further imaging using MRI
Definitive laparoscopic surgical treatment for Canal of Nuck cyst
Observation for leg numbness and tingling likely due to obturator nerve involvement
Discharged with resolution of all symptoms and follow-up

Fig. 4. Ultrasound of Left Inguinal Canal

Fig. 5. MRI of Left Inguinal Canal with Contrast

References

Fig 3. Canal of Nuck Cyst Specimen