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CASE REPORT

From Pelvis to Groin: Non-Communicating Rudimentary Uterine Horn and Endometriosis Presenting as an Inguinal Hernia in a Woman with a Solitary Pelvic Kidney

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Background: Müllerian anomalies complicated by extrapelvic endometriosis are uncommon, and herniation of Müllerian remnants into the inguinal canal is exceptionally rare. These complex presentations pose significant diagnostic challenges arising from intricate embryological maldevelopment, necessitating multidisciplinary collaboration to optimize both patient safety and fertility preservation.
Case Report: We report a case in which a non-communicating rudimentary uterine horn and endometriotic tissue presented as an incarcerated inguinal hernia in a woman with a solitary pelvic kidney. Multimodal imaging (3D ultrasound, CT with 3D reconstruction, and MRI) enabled preoperative mapping and guided a one-stage laparoscopic approach. Postoperative GnRH-agonist therapy was initiated for adjuvant suppression, and longer-term follow-up is ongoing.
Conclusion: This case underscores the importance of considering Müllerian anomalies and endometriosis in the differential diagnosis of inguinal masses in women with genitourinary malformations. Multidisciplinary integration of gynecological, urological, radiological, and surgical expertise is essential for accurate diagnosis and safe, fertility-sparing management.
Keywords: Müllerian anomaly, inguinal hernia, endometriosis, unicornuate uterus, multidisciplinary team

Introduction

Müllerian anomalies encompass a spectrum of congenital disorders resulting from non-development, defective fusion, or absorption of the paramesonephric ducts during embryogenesis.[1,2] Their prevalence in the general female population is estimated at 4–6%, with unicornuate uterus accounting for approximately 0.1% of all Müllerian malformations.[2] These anomalies frequently coexist with urological defects—most commonly ectopic or absent kidneys—because of the shared embryonic origin of the paramesonephric and mesonephric systems.[3] Extrapelvic endometriosis, defined as endometrial-like glands and stroma outside the peritoneal cavity, occurs in 5–12% of all endometriosis cases. Inguinal involvement is rare (<1% of extrapelvic sites) and typically presents as a painful, cyclical mass that may mimic hernia, lymphadenopathy, or neoplasia.[4] The pathogenesis remains debated; proposed mechanisms include metaplastic transformation of coelomic epithelium, lymphovascular dissemination, or iatrogenic implantation. The coexistence of Müllerian remnants and extrapelvic endometriosis within an inguinal hernia is exceptionally uncommon, with fewer than 20 cases reported in the English-language literature.[5,6] Embryologically, traction along the round ligament (female gubernaculum) and persistence of Müllerian remnants have been proposed to facilitate uterine or adnexal migration toward the inguinal canal, although the exact mechanism remains uncertain. In the present patient, the absence of prior pelvic surgery makes iatrogenic implantation less likely, and a combination of Müllerian maldevelopment with local metaplasia and/or lymphovascular spread may be most plausible. The aberrant anatomy imposed by a unicornuate uterus and ectopic

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pelvic kidney further complicates pre-operative assessment and increases the risk of inadvertent injury to the ureter, gonadal vessels, and renal vasculature.[7] Consequently, accurate diagnosis and safe management demand a multidisciplinary approach that integrates gynecologic, urologic, radiologic, and general surgical expertise. Herein, we describe a case in which a non-communicating rudimentary uterine horn and endometriotic tissue presented as an incarcerated inguinal hernia in a woman with a left ectopic pelvic kidney, and we highlight the diagnostic pitfalls, embryologic background, and multidisciplinary management required for such complex presentations.

Case Report

A 35-year-old nulligravida presented to our department with a 4-month history of intermittent left-lower-quadrant pain. The discomfort was dull in nature, exacerbated by coughing or prolonged standing, and characteristically relieved by changing posture. Three days prior to admission, the pain recurred and intensified, becoming paroxysmal in nature. It was aggravated by coughing and accompanied by nausea, but without vomiting. The patient sought medical attention at a community clinic, where she was prescribed oral levofloxacin (1 tablet daily); however, her symptoms did not improve. She denied any history of menstrual irregularities, cyclic hematuria, or prior pelvic surgery. Her menstrual cycles remained regular, occurring every 25–30 days and lasting 5–6 days with a moderate flow, and were consistently accompanied by dysmenorrhea. Her last menstrual period was approximately two weeks before presentation. The patient had been in good general health. A routine examination in 2018 incidentally revealed a left ectopic pelvic kidney. She was allergic to cephalosporins and penicillin. Her surgical history included excision and skin grafting for a right-hand hemangioma in 2012 and a hemorrhoidectomy in 2021. She had engaged in unprotected intercourse for five years without conception. On abdominal examination, the abdomen was soft with mild tenderness in the left iliac fossa. A firm, tender, cord-like mass measuring approximately 3×2 cm was palpable within the left inguinal canal. Gynecologic examination revealed a normal vaginal canal and a smooth cervix without motion tenderness. The uterus was full in contour and slightly deviated to the right side of the pelvis, without tenderness. No distinct mass was palpated in the left adnexal region, though mild tenderness was noted on deep palpation.

Laboratory tests were unremarkable except for mild iron-deficiency anaemia (Hb 108 g/L), without hemodynamic instability or evidence of acute bleeding, and it was managed as a baseline perioperative finding. Three-dimensional ultrasound revealed that the left ovary was located more laterally than usual, positioned anterior to the left psoas major muscle near the pelvic sidewall, measuring approximately 5.5×1.8 cm (Figure 1A). A cystic-solid mass measuring 3.8×1.5 cm was observed in the left inguinal region, connected superiorly to the fallopian tube, suggesting an inguinal

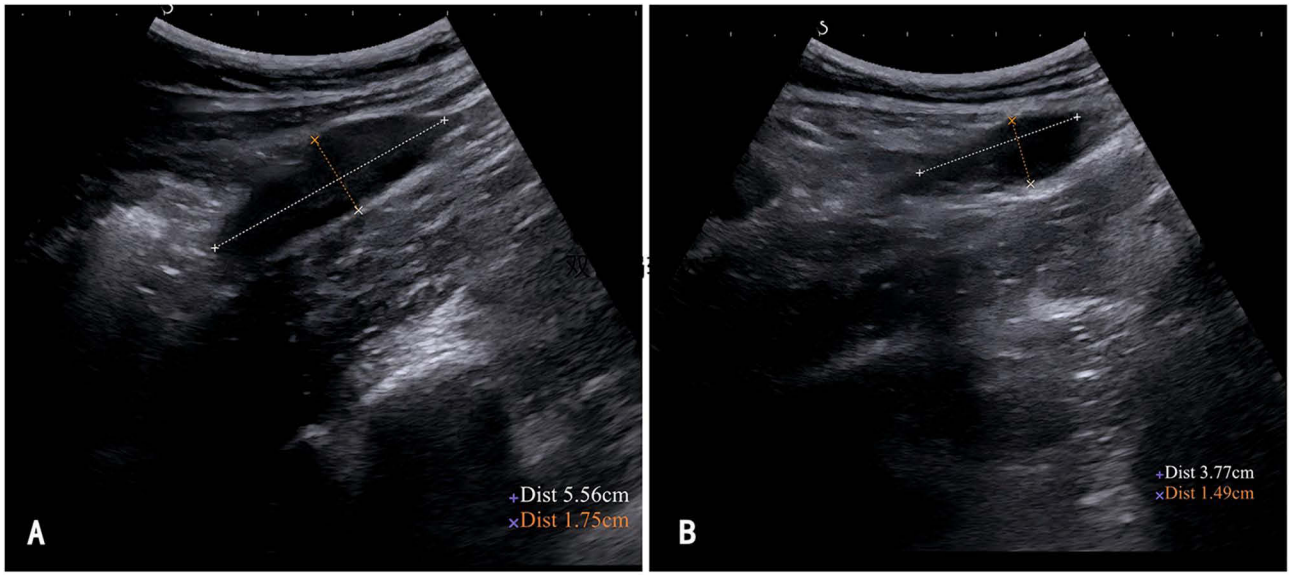

Figure 1 (**A**) Ovarian ultrasound image. (**B**) Inguinal region ultrasound image.

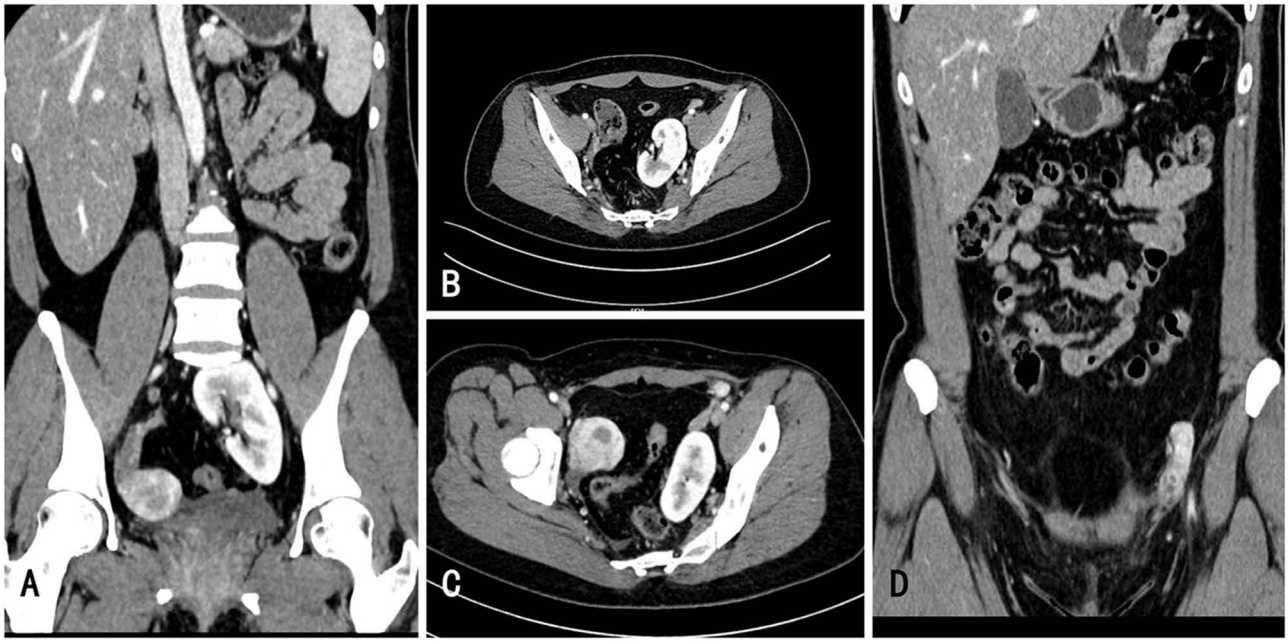

Figure 2 (**A**) Upright abdominal CT reconstruction showing an ectopic kidney located in the left pelvic cavity. (**B**) Three-dimensional CT reconstruction confirming the ectopic pelvic kidney on the left side. (**C**) Three-dimensional reconstruction of the abdominal CT image demonstrates a unicornuate uterus, a pelvic kidney, and inguinal-region contents. (**D**) Upright abdominal CT reconstruction depicting the inguinal region contents.

hernia with the left adnexa as its likely content (Figure 1B). Pelvic CT revealed an ectopic kidney located on the left side of the pelvis (Figure 2A and B). A strip-like soft tissue density was observed along the course of the left pelvic peritoneum, with a nodular component herniating into the left inguinal canal. These findings were suggestive of developmental variation of the ovarian tissue with formation of an associated inguinal hernia (Figure 2C and D). Pelvic MRI further confirmed the presence of a pelvic kidney and a unicornuate uterus with normal myometrial signal intensity. The endometrium was thickened, measuring approximately 1.3 cm in diameter, without abnormal signal changes. The left ovary was located within the left iliac fossa, connected by a cord-like structure to a thick-walled cystic lesion in the left inguinal region. The cystic lesion measured approximately 20 mm in diameter and demonstrated high signal intensity on T1-weighted imaging (Figure 3A and B). These findings indicate that a portion of the

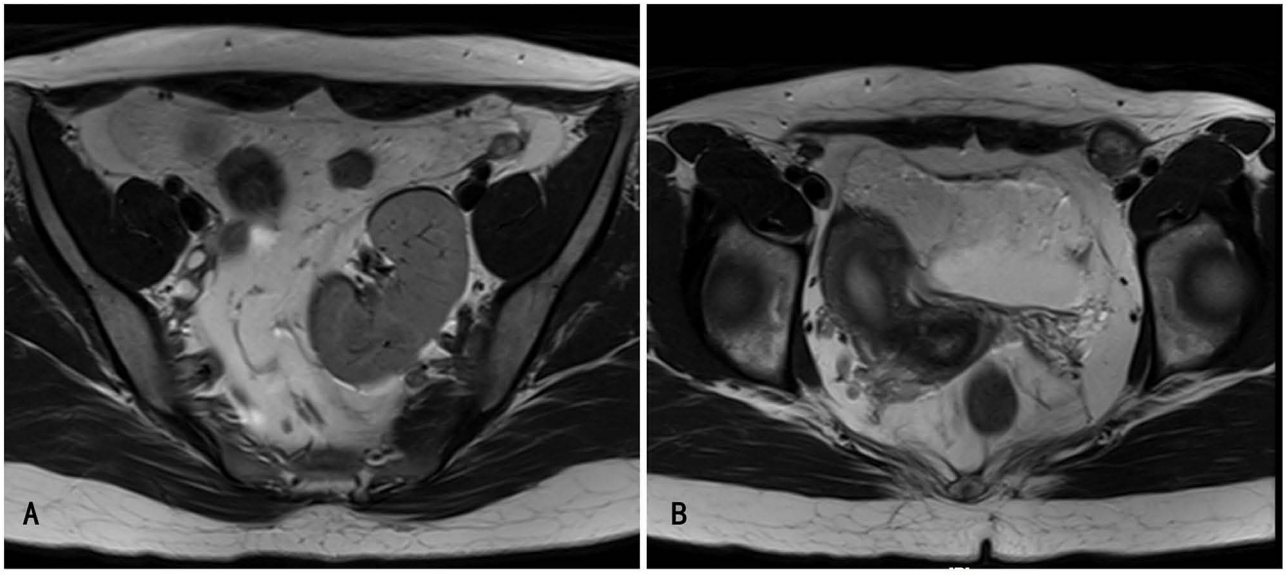

Figure 3 (**A**) Pelvic kidney on MRI. (**B**) Pelvic MRI reveals a unicornuate uterus and an inguinal-region mass.

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endometriotic (chocolate) cyst originating from the left adnexa had herniated into the left inguinal canal. Laparoscopic exploration revealed a rudimentary uterine-like mass measuring approximately 3×1 cm located along the left round ligament, adherent to the left ovary and incarcerated within the left inguinal hernia sac with dense adhesions. The left fallopian tube was partially absent, with only the fimbrial end identifiable. A normal-sized unicornuate uterus was observed in the right pelvis, and a fibrous band connected it to the rudimentary uterine mass on the left side. The right adnexa appeared normal in size and morphology. Deep infiltrating endometriosis was noted in the rectouterine pouch (Douglas pouch) adjacent to the right unicornuate uterus (Figure 4A–C).

The patient underwent laparoscopic resection of the rudimentary uterine horn, excision of pelvic endometriotic lesions, and tension-free mesh repair of the inguinal hernia. Histopathology confirmed endometriotic tissue and a rudimentary uterine horn within the hernial contents (Figure 5A–C). Post-operatively, gynaecology promptly instituted a six-month GnRH-agonist therapy to suppress residual endometriosis.

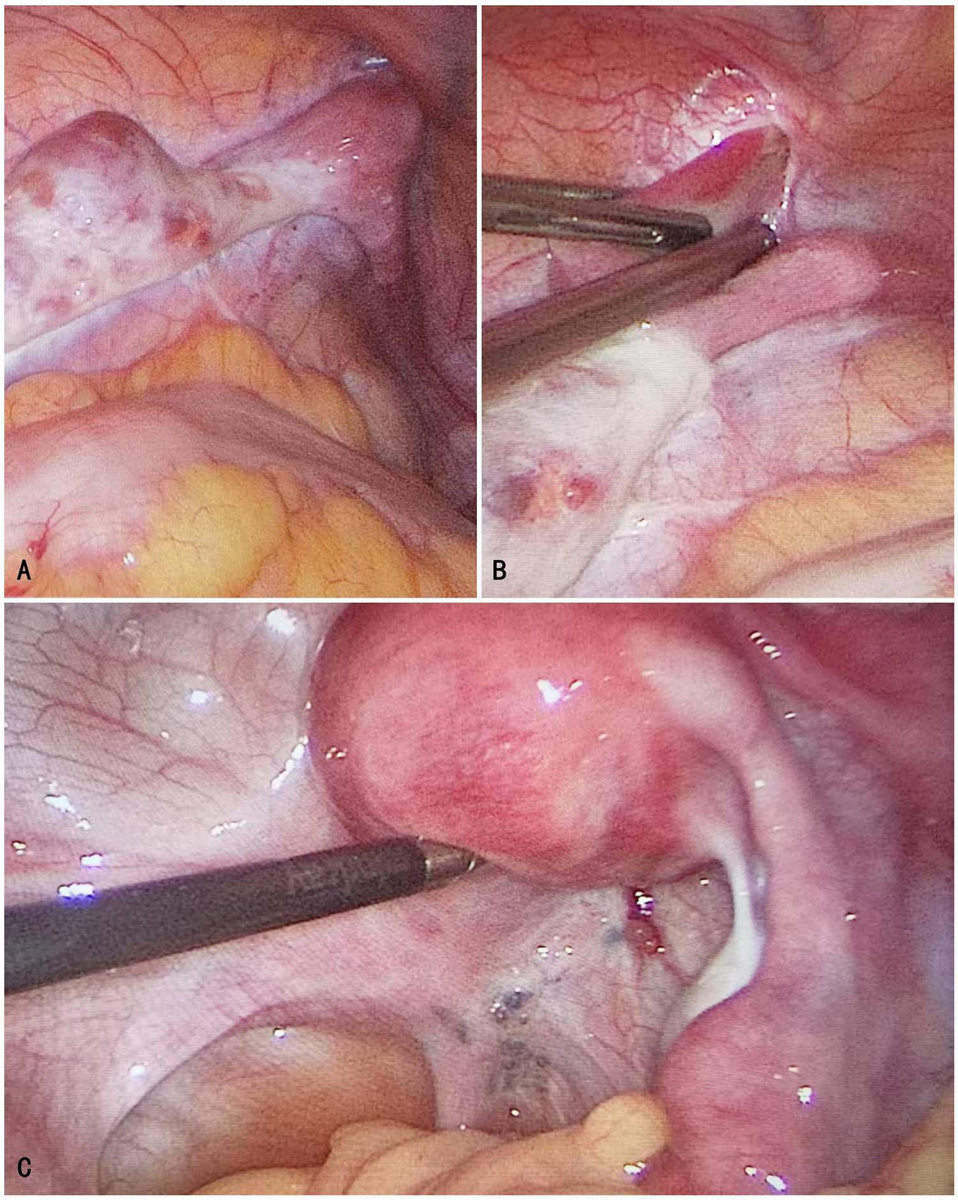

Figure 4 (**A**) Laparoscopic exploration showing a left inguinal hernia with incarcerated contents. (**B**) Laparoscopic traction was applied in an attempt to reduce the hernia contents, but reduction was difficult. (**C**) Deep infiltrating endometriosis was found in the Douglas pouch.

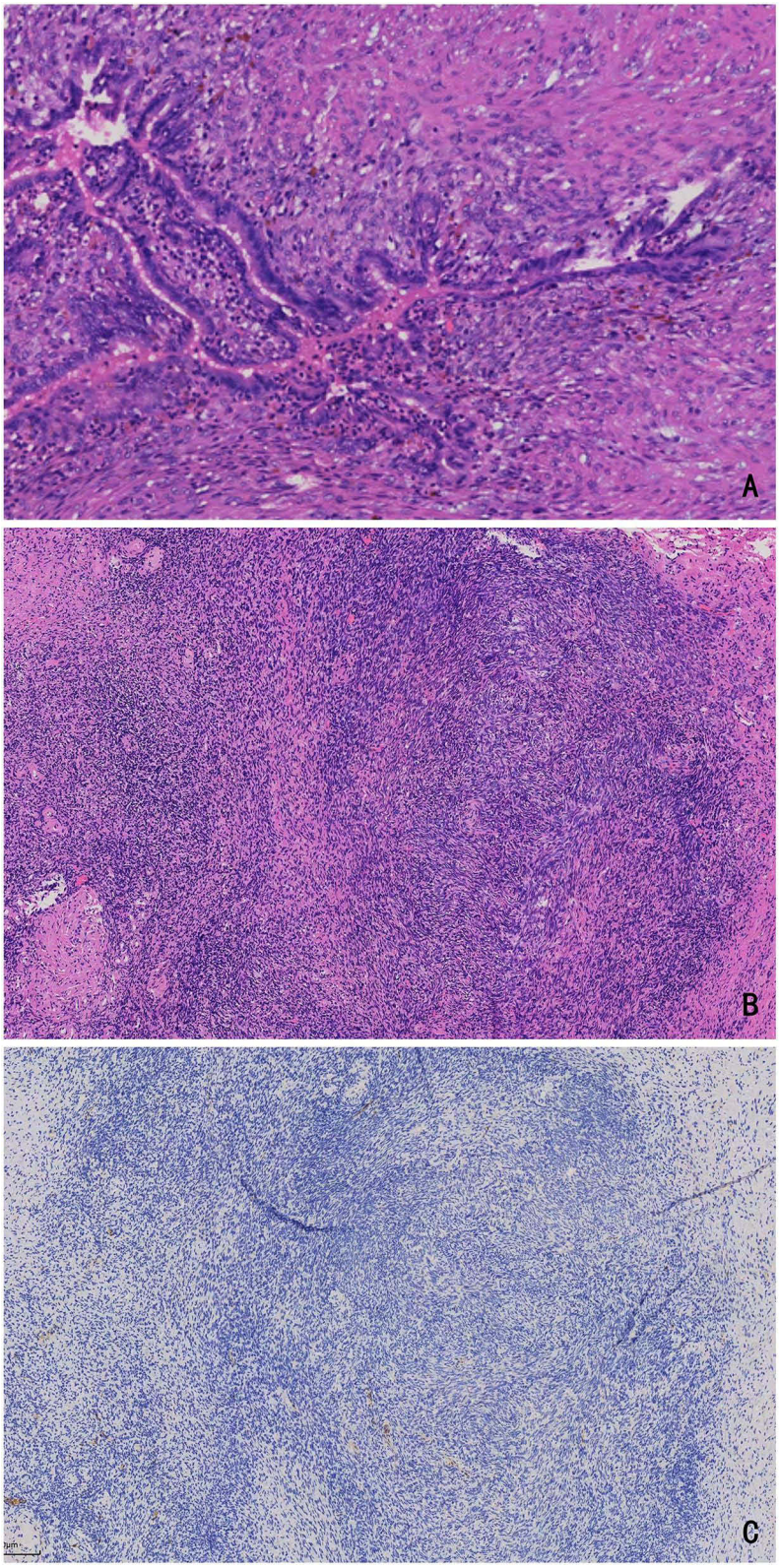

Figure 5 (**A**) Endometriotic lesion in the inguinal region: endometrial glands and old hemorrhage are seen within fibrous tissue. HE, ×100. (**B**) Rudimentary horn of the uterus. HE, ×100. (**C**) Rudimentary uterine horn shows proliferating spindle cells; no endometrial glands or stroma are identified. CD10 negative. ×100.

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Discussion

The present case exemplifies how a single, seemingly straightforward groin mass can become a microcosm of overlapping surgical, gynaecological, urological and radiological challenges. Rather than treating each specialty's concerns in isolation, we found that an integrated, step-wise approach was essential for both diagnosis and therapy. Each specialty played a pivotal role in diagnosis, surgical planning, and postoperative management, highlighting the indispensable value of a multidisciplinary team (MDT) approach.

From the very beginning, the gynecology team provided the theoretical foundation for clinical decision-making. When a woman known to have a unicornuate uterus and an ipsilateral ectopic kidney presented with a left inguinal mass, the gynecologists immediately considered the possibility of a Müllerian duct anomaly. This prompted heightened clinical vigilance that the hernia sac contents might represent uterine or adnexal remnants rather than typical herniated viscera. The differential diagnosis for a female groin mass includes incarcerated inguinal/femoral hernia containing bowel or adnexa, hydrocele of the canal of Nuck, round-ligament leiomyoma, lymphadenopathy, abscess, and soft-tissue tumors. Multimodal imaging was critical to delineate the lesion's continuity with Müllerian structures and its relationship to the inguinal canal, thereby reducing the risk of misdiagnosis and inadvertent injury during hernia repair.[8,9] The integration of multimodal techniques—including ultrasound, CT, and MRI—was essential. CT scanning clearly identified both the inguinal hernia and the ectopic kidney, while MRI precisely delineated the lesion's tissue composition and ultimately confirmed that the mass represented a herniated endometriotic cyst associated with Müllerian remnants. Three-dimensional reconstruction further mapped the spatial relationships among the uterus, adnexa, kidney, and hernia sac, thereby preventing inappropriate surgical planning.[10] This case strongly demonstrated the superior diagnostic value of MRI in distinguishing complex pelvic and extrapelvic lesions in women. Existing literature reports that approximately 30% of patients with ectopic kidneys have concurrent genital tract malformations, reflecting their shared embryologic origin.[11] The aberrant location and vascular configuration of the ectopic kidney can distort normal pelvic anatomy, increasing both diagnostic uncertainty and operative difficulty.[12] The urology team played a critical role in preoperative localization of the renal vasculature and ureter, effectively preventing inadvertent injury during pelvic dissection and mesh placement. Intraoperatively, precise recognition of the anomalous anatomy—particularly the low origin of the renal artery and the close proximity of the ureter to the internal inguinal ring—was vital to avoid vascular or ureteral injury. Postoperatively, the urology team continued to monitor renal function through serum creatinine and urine output surveillance, ensuring the absence of iatrogenic complications. For the general surgery team, the case initially resembled a conventional incarcerated inguinal hernia. However, imaging findings and gynecologic consultation redirected the diagnostic focus toward a rare Müllerian-structure herniation. The operative challenge lay in achieving complete excision of the rudimentary uterine horn and associated endometriotic tissue while ensuring a durable, tension-free hernia repair. The surgeons faced dual risks: dense adhesions within the inguinal canal increased the likelihood of bleeding and field contamination, while the hernia sac carried the potential for spillage of endometriotic tissue. After careful assessment of the contamination risk, a lightweight mesh repair was selected, accompanied by targeted antibiotic prophylaxis. Although a lightweight synthetic mesh was selected to reduce foreign-body burden, long-term considerations include chronic groin pain, infection, and recurrence. In the setting of endometriosis, residual disease near the repair may theoretically contribute to persistent inflammatory symptoms, underscoring the importance of thorough excision and tissue separation and symptom-based follow-up. Preoperative imaging confirmed that the ectopic pelvic kidney was confined to the pelvis and was spatially separate from the inguinal repair field, minimizing the likelihood of direct mesh–kidney interaction. Intraoperative collaboration between general surgeons and gynecologists during laparoscopy enabled simultaneous management of both the hernia and the pelvic pathology in a single minimally invasive procedure. Guided by gynecologic expertise, the surgical team successfully differentiated between functional and non-functional uterine tissue, preserving normal reproductive structures and avoiding unnecessary resection that could compromise fertility. Postoperative hormonal suppression is commonly used to reduce symptom recurrence and lesion recurrence after surgical treatment of endometriosis in patients who are not pursuing immediate conception. This approach is supported by guideline recommendations and by evidence syntheses reporting a reduced risk of recurrence with postoperative suppression compared with expectant management.[13,14] Therefore, a GnRH-agonist regimen was initiated as adjuvant

suppression in our patient. As a single-case report, generalizability is limited and long-term outcomes (pain recurrence, mesh-related complications, and fertility outcomes) remain under follow-up.

In summary, this case vividly illustrates how a seemingly simple inguinal mass can conceal a complex interplay of embryologic, gynecologic, and surgical phenomena. Through structured multidisciplinary collaboration, what initially appeared to be a high-risk, multifaceted condition was transformed into a safe, definitive, one-stage laparoscopic solution. For women presenting with inguinal masses associated with uterine, tubal, or renal malformations, multidisciplinary evaluation should begin at the time of admission. Only by integrating subspecialty expertise with advanced imaging can clinicians achieve accurate diagnosis, complete lesion excision, and preservation of both fertility and organ function.

Ethical Approval

Written informed consent was obtained from the patient for publication of the clinical details and intraoperative images, and all identifying information was removed. Institutional approval for publication of this case report was required and was obtained from the Human Research Ethics Committee of Aerospace Center Hospital (Beijing, China).

Informed Consent

Written informed consent was obtained from the patient for the publication of this manuscript and any accompanying images.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no competing interests in this work.

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