

Renal Endometriosis Mimics Renal Cell Carcinoma in a Hypoplastic Kidney: A Case Report

Review began 01/29/2024
Review ended 02/22/2024
Published 02/29/2024

© Copyright 2024
Katsikatsos et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Panagiotis Katsikatsos¹, Konstantinos Douroumis¹, Dimitrios Goutas², Harikleia Gakiopoulou², Periklis Anastasiou³, Ioannis Anastasiou¹

1. Urology, Laiko General Hospital, Athens, GRC 2. Pathology, National and Kapodistrian University of Athens School of Medicine, Athens, GRC 3. Medicine, University Hospital of Ioannina, University of Ioannina, Ioannina, GRC

Corresponding author: Panagiotis Katsikatsos, pkatsikatsos@gmail.com

Abstract

Renal endometriosis is a rare disorder of cases of urinary tract endometriosis. A 42-year-old woman presented at our outpatient department with an incidental painless mass on her left hypoplastic kidney revealed on an abdominal ultrasound. Abdominal and pelvic examinations revealed no abnormal findings. A computed tomography (CT) scan revealed an anterolateral slightly enhanced left renal mass that measured 1.2 cm in diameter. Furthermore, CT did not reveal any evidence of abdominal or thoracic metastasis. There are a few case reports in the literature of tumors in specimens from patients who underwent nephrectomy for hypoplastic kidneys, but discriminating between benign and malignant masses is difficult unless a nephrectomy is performed. Given the radiological findings and the impaired function of the hypoplastic kidney, laparoscopic radical nephrectomy was recommended. The procedure was performed under general anesthesia without intraoperative or postoperative complications. Microscopic examination revealed several findings consistent with a diagnosis of renal endometriosis. The patient had no symptoms at her last follow-up visit. This case highlights that renal endometriosis can mimic renal cell carcinoma and awareness of this entity should be raised, as it can be asymptomatic, especially when located in a hypoplastic kidney.

Categories: Urology

Keywords: case report, renal endometriosis, renal hypoplasia, renal tumour, endometriosis

Introduction

Endometriosis is a common gynecologic condition characterized by the implantation of endometrial tissue in extrauterine sites. It is broadly divided into endopelvic and extrapelvic diseases [1]. The incidence of endometriosis varies from approximately 6% to 10% in women of reproductive age, and it commonly manifests as chronic pelvic pain [2]. Extrapelvic sites of endometriosis include the abdominal wall, thorax, gastrointestinal tract, and urinary tract. Endometriosis in the urinary tract is rare and accounts for 1-2% of all cases. The bladder and ureter are the most commonly affected organs, with a prevalence of 85% and 15%, respectively, while the kidney and urethra account for less than 1% [3]. The most common presentations of renal endometriosis are flank pain and gross haematuria, although many cases present with vague, nonspecific symptoms. Hypoplastic kidneys result from multiple contributing factors, such as congenital hypoplasia, chronic urinary tract infections, renovascular ischemia, urological interventions, and surgeries [4]. There are a few case reports in the literature of tumors in specimens from patients who underwent nephrectomy for hypoplastic kidneys. The incidence rate is low, varies among studies, and is associated with patient characteristics [5-7]. We report the case of a 42-year-old woman who underwent laparoscopic left radical nephrectomy for renal endometriosis that was preoperatively misinterpreted as a malignant renal tumor. This report aims to share our experience and raise awareness that pelvic pain in women of childbearing age should be approached with a high level of suspicion to avoid misdiagnosis of renal endometriosis.

Case Presentation

A 42-year-old woman presented to our outpatient clinic for a left kidney mass detected on an abdominal follow-up ultrasound for the atrophic kidney. Her medical history included hypertension and depression, for which she was on medication. Her surgical history was notable for thyroidectomy for papillary thyroid cancer and cervical lymph node dissection for a metastatic lymph node five years ago. The gynecological history was uneventful, with a normal menstruation cycle and no symptoms of dysmenorrhea or dyspareunia. Her family history was remarkable for hypertension and diabetes mellitus from the paternal side and unremarkable on the maternal side. The patient's medical history included an incidental diagnosis of left kidney hypoplasia 17 years ago on an abdominal ultrasound scan.

A CT scan following the incidental renal hypoplasia finding did not reveal any pathological findings. A dimercaptosuccinic acid (DMSA) scan showed left kidney involvement in renal function of 8%. Patient follow-up included a yearly ultrasound scan.

How to cite this article

Katsikatsos P, Douroumis K, Goutas D, et al. (February 29, 2024) Renal Endometriosis Mimics Renal Cell Carcinoma in a Hypoplastic Kidney: A Case Report. *Cureus* 16(2): e55280. DOI 10.7759/cureus.55280

In the 2022 follow-up ultrasound, a small left renal mass with a diameter of 1 cm was observed. On presentation, the patient did not complain of haematuria, fever, or flank pain. Abdominal and pelvic examinations (transvaginal ultrasound) revealed no abnormal findings from female reproductive organs. The estimated glomerular filtration rate was 69 mL/min/1.73 m². Chest and abdominal CT with an IV contrast agent was ordered.

The CT scan showed an anterolateral slightly enhanced mass on the left hypoplastic kidney measuring ~1.2×1.1×0.9 cm (Figures 1-2). The mass was positioned in the renal midline. The central region was measured at 23 Hounsfield units (HU) and was enhanced to 94 HU in the arterial phase. The lesion was categorized as Bosniak IV, according to the Bosniak classification system of renal cystic masses [8]. Furthermore, CT did not reveal any pathological findings from the ovaries and uterus or evidence of abdominal and thoracic metastasis.

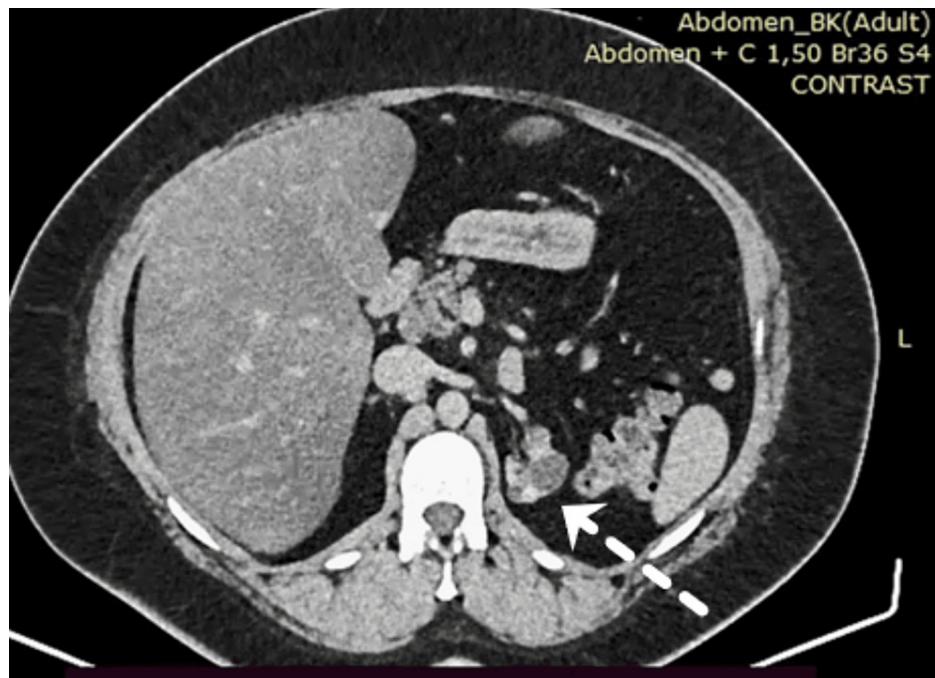


FIGURE 1: Computed tomography axial view shows a slightly enhanced mass of 1.2 × 1.1 × 0.9 cm on the left hypoplastic kidney, positioned in the renal midline (arrow).

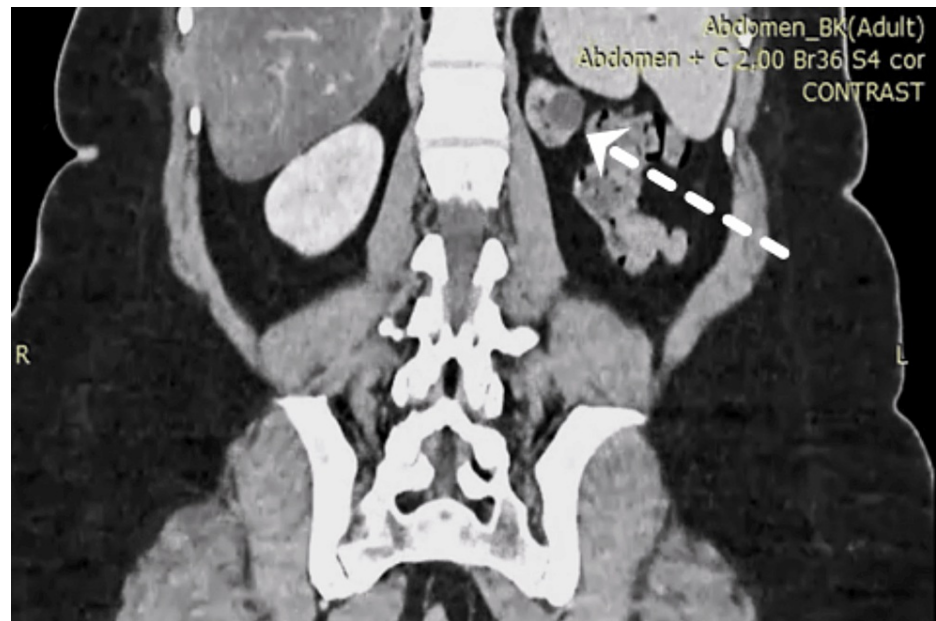


FIGURE 2: Computed tomography coronal view showing the mass on the left hypoplasic kidney (arrow)

A review of the diagnostic findings was presented at a multidisciplinary tumor board meeting. Treatment options included renal biopsy and partial and radical nephrectomy. Given the radiological findings and impaired function of the hypoplasic kidney, laparoscopic radical nephrectomy was recommended.

A laparoscopic left radical nephrectomy was performed under general anesthesia. The patient was placed in a modified flank position, and standard left-sided laparoscopic kidney port placement was performed [9]. The nephrectomy was performed without major intraoperative complications, and the kidney was excised along with Gerota's fascia. The operation time was 128 minutes. The total blood loss was 133 cc. The specimen was sent for pathologic analysis without being incised intraoperatively. Furthermore, there were no signs of endometriosis in the abdominal cavity during surgery.

The postoperative course was uneventful. On postoperative day one, the Foley catheter and redon drainage tube were removed. The patient was discharged on postoperative day two. Microscopic examination of the specimen revealed multiple nodular foci of endometrial glandular and cystic formations lined by a single cell layer of columnar cells and surrounded by endometrial stroma (Figure 3). Immunohistochemical evaluation revealed diffuse and strong nuclear positivity for hormonal receptors (ER and PR) in the benign endometrial glandular epithelium and patchy positive staining in the endometrial stroma (Figure 4), while CD10 staining revealed focal cytoplasmic staining in endometrial stromal cells (Figure 5). These morphologic and immunophenotypic findings were consistent with a diagnosis of renal endometriosis. According to the findings, the patient was subjected to a follow-up protocol, which included a physical examination and an abdominal ultrasound every six months for the first year. At her last visit, the patient remained free of symptoms.

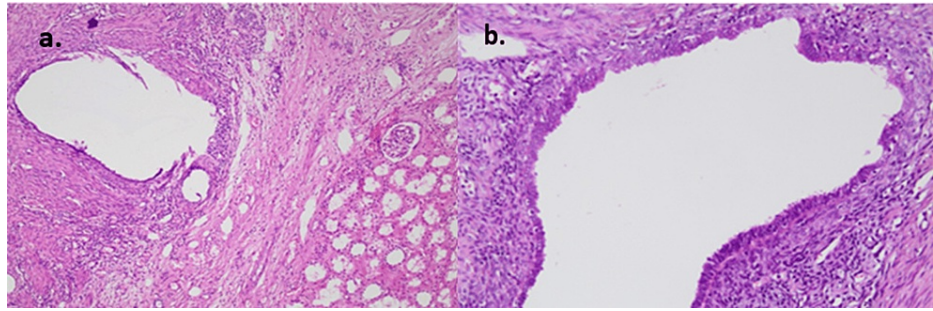


FIGURE 3: a) Benign endometrial-type glands and stroma adjacent to the renal cortex (H/E x100). b) The benign endometrial type gland is lined by a single layer of columnar cells and endometrial stroma with a fine capillary network (H/E x200)

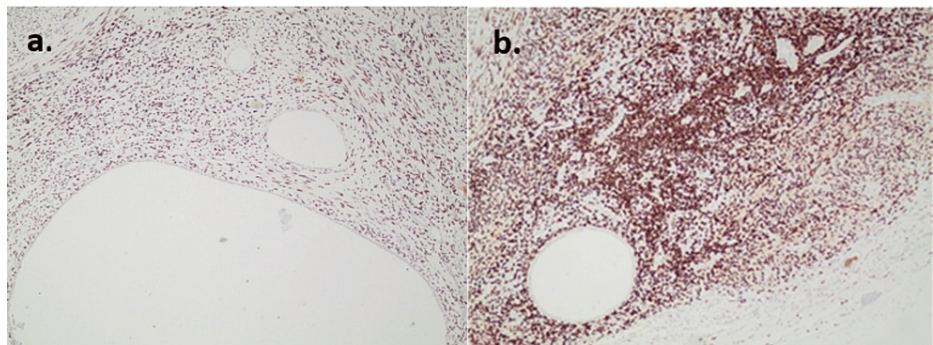


FIGURE 4: a) Oestrogen receptor (ER) and b) progesterone Receptor (PR) show strong nuclear staining in endometrial stroma and patchy positive staining in benign endometrial glands (x100).

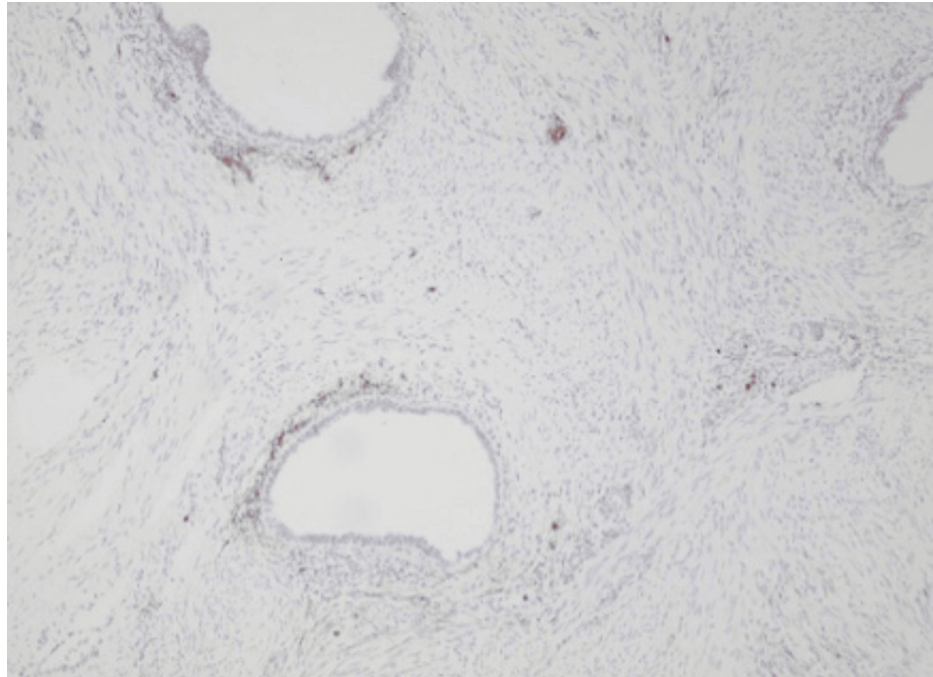


FIGURE 5: Focal cytoplasmic CD10 staining in endometrial stromal cells (x100)

Discussion

The pathogenesis of extrapelvic endometriosis remains controversial, and several hypotheses, including the ectopic transplantation theory, metaplasia of the coelomic epithelium, autoimmunity, blood lymphatic embolism, and the embryonic theory, have been proposed [10]. The ectopic transplantation theory, as proposed by Sampson in 1927, is generally accepted as the main cause of endometriosis [11], but in some cases such as Mayer-Rokitansky-Kuster-Hauser syndrome, ovarian endometrioma, and peritoneal endometriosis, the coelomic metaplasia theory may be a suitable explanation [10-12]. In the coelomic metaplasia theory, the coelomic epithelium undergoes metaplasia and forms endometrial stroma and glands [13]. The case reported here is difficult to explain by any specific theory.

The presence of genitourinary symptomatology depends on the extent, depth, and location of the ectopic endometrium. Symptoms include the typical triad of renal cell carcinoma (RCC) symptoms, lumbar pain, gross haematuria, and palpable lumbodorsal mass; thus, misdiagnosis can occur in many cases. One specific characteristic of renal endometriosis is repeated periodic pain and haematuria in parallel with the patient's menstrual cycles [14]. In this case, the patient did not present with any symptoms because the mass was small and confined to the renal cortex with no involvement of the calyces.

The diagnosis of endometriosis is often complicated by the lack of characteristic features on CT and magnetic resonance imaging (MRI), as it shares many similarities with cystic malignancies [13]. According to a literature review by Yang et al. [14] published in 2021, in 16 case reports of renal endometriosis, the preoperative diagnosis ranged from pyelonephritis, hematoma, and renal cyst to renal mass. Clinicians were unable to make a diagnosis in any of these cases without histopathology, revealing the difficulty in identifying this rare entity purely with clinical and imaging criteria [13-30]. In our case, CT failed to distinguish the lesion and showed slight enhancement in the central parts of the lesion. Renal endometriosis should be suspected in young women of reproductive age with incidental masses who present with symptoms that change during the menstrual cycle. In patients with a high clinical suspicion of renal endometriosis, a biopsy via fine-needle aspiration can be performed to alter treatment decisions, with the potential risk of tumor seeding via needle tracks [31].

Close active surveillance can be pursued in patients without symptoms diagnosed via biopsy [15]. For symptomatic endometriosis, medical or surgical treatment is needed to alleviate symptoms. Medical treatment seems to be the best option for patients of reproductive age and reduces pain. The agents that can be used are oral contraceptives and GnRH agonists [20,23,26]. Definitive treatments for renal endometriosis include ablation or partial nephrectomy to alleviate symptoms [16]. In this case, the patient was asymptomatic, and thus, renal endometriosis was not suspected. Due to the high suspicion of renal tumor on the CT scan and the hypoplastic left kidney with minimal participation in renal function, laparoscopic radical nephrectomy was proposed. Discriminating between a benign mass and a malignancy is difficult

unless a nephrectomy is performed. A definitive diagnosis was made after the histopathological examination, as in all the abovementioned cases.

After surgical treatment, a follow-up protocol should be established. According to several cases of urinary tract endometriosis [32,33], long-term surveillance with physical examination and abdominal ultrasound should be pursued to evaluate symptom recurrence or anatomic relapse. In our case, we performed a physical examination and abdominal ultrasound every six months for the first year and subsequently every 12 months for the next two years.

Renal endometriosis is a challenging diagnosis that should be suspected in women of childbearing age who exhibit symptoms that change with the menstrual cycle. Radiologic findings are not definitive in the differential diagnosis, and a biopsy should be performed if there is a high suspicion. Especially in cases of hematuria, a suspicion of urothelial carcinoma or a coexistence of RCC with urothelial carcinoma should be suspected [34]. Nephron-sparing techniques, such as ablation and partial nephrectomy, should be performed in these patients, as most of these patients are young, and renal endometriosis is a benign disease.

Conclusions

We report the case of a woman who presented with a cystic mass in her left hypoplastic kidney that was determined to be renal endometriosis. As imaging fails to diagnose renal endometriosis effectively, the final diagnosis requires histological confirmation. This case shows that renal endometriosis can mimic renal cell carcinoma and awareness of this entity should be raised, as it can be asymptomatic, especially when located on a hypoplastic kidney.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Panagiotis Katsikatsos, Konstantinos Douroumis, Dimitrios Goutas, Harikleia Gakiopoulou, Ioannis Anastasiou

Acquisition, analysis, or interpretation of data: Panagiotis Katsikatsos, Konstantinos Douroumis, Periklis Anastasiou

Drafting of the manuscript: Panagiotis Katsikatsos, Konstantinos Douroumis, Periklis Anastasiou

Critical review of the manuscript for important intellectual content: Panagiotis Katsikatsos, Konstantinos Douroumis, Dimitrios Goutas, Harikleia Gakiopoulou, Ioannis Anastasiou

Supervision: Panagiotis Katsikatsos, Ioannis Anastasiou

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Machairiotis N, Stylianaki A, Dryllis G, et al.: Extrapelvic endometriosis: A rare entity or an under diagnosed condition?. *Diagn Pathol.* 2013, 8:194. [10.1186/1746-1596-8-194](https://doi.org/10.1186/1746-1596-8-194)
2. Simoglou C, Zarogoulidis P, Machairiotis N, et al.: Abdominal wall endometrioma mimicking an incarcerated hernia: A case report. *Int J Gen Med.* 2012, 5:569-71. [10.2147/IJGM.S32904](https://doi.org/10.2147/IJGM.S32904)
3. Acién P, Velasco I: Endometriosis: A disease that remains enigmatic. *ISRN Obstet Gynecol.* 2015, 2015:242149. [10.1155/2015/242149](https://doi.org/10.1155/2015/242149)
4. Gadelkareem RA, Mohammed N: Unilateral hypoplastic kidney in adults: An experience of a tertiary-level urology center. *World J Nephrol.* 2022, 11:30-8. [10.5527/wjn.v11.i1.30](https://doi.org/10.5527/wjn.v11.i1.30)
5. Zengin K, Tanik S, Sener NC, et al.: Incidence of renal carcinoma in non-functioning kidney due to renal pelvic stone disease. *Mol Clin Oncol.* 2015, 3:941-3. [10.3892/mco.2015.550](https://doi.org/10.3892/mco.2015.550)
6. Vaudreuil L, Bessede T, Boissier R, et al.: De novo renal carcinoma arising in non-functional kidney graft: A national retrospective study. *Int Urol Nephrol.* 2020, 52:1235-41. [10.1007/s11255-020-02422-0](https://doi.org/10.1007/s11255-020-02422-0)
7. Yeh CC, Lin TH, Wu HC, Chang CH, Chen CC, Chen WC: A high association of upper urinary tract transitional cell carcinoma with nonfunctioning kidney caused by stone disease in Taiwan. *Urol Int.* 2007,

- 79:19-25. [10.1159/000102907](https://doi.org/10.1159/000102907)
8. de Miranda CM, Maranhão CP, Dos Santos CJ, Padilha IG, de Farias LPG, da Rocha MS: Bosniak classification of renal cystic lesions according to multidetector computed tomography findings. *Radiol Bras*. 2014, 47:115-21. [10.1590/S0100-39842014000200015](https://doi.org/10.1590/S0100-39842014000200015)
 9. Jindal T, Mukherjee S, Koju R, S N, Phom D: Simplifying laparoscopic nephrectomy for beginners: Double window technique with en bloc hilar stapling. *Cureus*. 2021, 15:e16090. [10.7759/cureus.16090](https://doi.org/10.7759/cureus.16090)
 10. Signorile PG, Baldi A: Endometriosis: New concepts in the pathogenesis. *Int J Biochem Cell Biol*. 2010, 42:778-80. [10.1016/j.biocel.2010.03.008](https://doi.org/10.1016/j.biocel.2010.03.008)
 11. Konrad L, Dietze R, Kudipudi PK, Horné F, Meinhold-Heerlein I: Endometriosis in MRKH cases as a proof for the coelomic metaplasia hypothesis?. *Reproduction*. 2019, 158:R41-7. [10.1530/REP-19-0106](https://doi.org/10.1530/REP-19-0106)
 12. Lamceva J, Uljanovs R, Strumfa I: The main theories on the pathogenesis of endometriosis. *Int J Mol Sci*. 2023, 24:4254. [10.3390/ijms24054254](https://doi.org/10.3390/ijms24054254)
 13. Signorile PG, Baldi A, Viceconte R, Ronchi A, Montella M: Pathogenesis of endometriosis: Focus on adenogenesis-related factors. *In Vivo*. 2023, 37:1922-30. [10.21873/invivo.13288](https://doi.org/10.21873/invivo.13288)
 14. Yang J, Song RJ, Xu C, Zhang SQ, Zhang W: Renal endometriosis tends to be misdiagnosed as renal tumor: A rare case report. *Int Surg*. 2015, 100:376-80. [10.9738/INTSURG-D-13-00190.1](https://doi.org/10.9738/INTSURG-D-13-00190.1)
 15. Yang Y, Zhao X, Huang Y: Renal endometriosis mimicking cystic renal tumor: Case report and literature review. *Front Med (Lausanne)*. 2021, 8:684474. [10.3389/fmed.2021.684474](https://doi.org/10.3389/fmed.2021.684474)
 16. Giambelluca D, Albano D, Giambelluca E, et al.: Renal endometriosis mimicking complicated cysts of kidney: Report of two cases. *G Chir*. 2017, 38:250-255.
 17. Badri AV, Jennings R, Patel P, Eun DD: Renal endometriosis: The case of an endometrial implant mimicking a renal mass. *J Endourol Case Rep*. 2018, 4:176-8. [10.1089/cren.2018.0070](https://doi.org/10.1089/cren.2018.0070)
 18. Hajdu SI, Koss LG: Endometriosis of the kidney. *Am J Obstet Gynecol*. 1970, 106:314-315. [10.1016/0002-9378\(70\)90284-x](https://doi.org/10.1016/0002-9378(70)90284-x)
 19. Gauperaa T, Stalsberg H: Renal endometriosis. A case report. *Scand J Urol Nephrol*. 1977, 11:189-91. [10.3109/00365597709179714](https://doi.org/10.3109/00365597709179714)
 20. Bazaz-Malik G, Saraf V, Rana BS: Endometrioma of the kidney: Case report. *J Urol*. 1980, 123:422-423. [10.1016/s0022-5347\(17\)55965-0](https://doi.org/10.1016/s0022-5347(17)55965-0)
 21. Hellberg D, Fors B, Bergqvist C: Renal endometriosis treated with a gonadotrophin releasing hormone agonist. Case report. *Br J Obstet Gynaecol*. 1991, 98:406-7. [10.1111/j.1471-0528.1991.tb13434.x](https://doi.org/10.1111/j.1471-0528.1991.tb13434.x)
 22. Benchekroun A, Nouini Y, Zennoud M, et al.: Renal endometriosis. Case report [Article in French]. *Ann Urol*. 2001, 35:266-269. [10.1016/s0003-4401\(01\)00041-9](https://doi.org/10.1016/s0003-4401(01)00041-9)
 23. Gupta K, Rajwanshi A, Srinivasan R: Endometriosis of the kidney: Diagnosis by fine-needle aspiration cytology. *Diagn Cytopathol*. 2005, 33:60-1. [10.1002/dc.20228](https://doi.org/10.1002/dc.20228)
 24. Dutta P, Bhat MH, Bhansali A, Kumar V: A young woman with endometriosis of kidney. *Saudi Med J*. 2006, 27:244-6.
 25. Yaqub U, Hassan SE, Yusaf Z, Yusuf AW: Endometriosis in the renal area. *J Coll Physicians Surg Pak*. 2008, 18:174-5.
 26. Dirim A, Celikkaya S, Aygun C, Caylak B: Renal endometriosis presenting with a giant subcapsular hematoma: Case report. *Fertil Steril*. 2009, 92:391.e5-7. [10.1016/j.fertnstert.2009.04.013](https://doi.org/10.1016/j.fertnstert.2009.04.013)
 27. Jiang YH, Kuo HC, Hsu YH: Renal endometriosis mimicking an angiomyolipoma. *Urol Sci*. 2013, 24:24-26. [10.1016/j.urols.2013.01.001](https://doi.org/10.1016/j.urols.2013.01.001)
 28. Cheng CH, Kuo HC, Su B: Endometriosis in a kidney with focal xanthogranulomatous pyelonephritis and a perinephric abscess. *BMC Res Notes*. 2015, 8:591. [10.1186/s13104-015-1574-1](https://doi.org/10.1186/s13104-015-1574-1)
 29. Umair M, Nawaz M, Murtaza B, Ali A, Khan FB, Wahab AU: Renal endometriosis mimicking a renal tumor in a pregnant patient. *Urol Case Rep*. 2020, 35:101374. [10.1016/j.eucr.2020.101374](https://doi.org/10.1016/j.eucr.2020.101374)
 30. Bolze PA, Paparel P, Golfier F: Urinary tract involvement by endometriosis. Techniques and outcomes of surgical management: CNGOF-HAS endometriosis guidelines [Article in French]. *Gynecol Obstet Fertil Senol*. 2018, 46:301-8. [10.1016/j.gofs.2018.02.016](https://doi.org/10.1016/j.gofs.2018.02.016)
 31. Macklin PS, Sullivan ME, Tapping CR, et al.: Tumour seeding in the tract of percutaneous renal tumour biopsy: A report on seven cases from a UK tertiary referral centre. *Eur Urol*. 2019, 75:861-7. [10.1016/j.eururo.2018.12.011](https://doi.org/10.1016/j.eururo.2018.12.011)
 32. Seracchioli R, Mabrouk M, Montanari G, Manuzzi L, Concetti S, Venturoli S: Conservative laparoscopic management of urinary tract endometriosis (UTE): Surgical outcome and long-term follow-up. *Fertil Steril*. 2010, 94:856-61. [10.1016/j.fertnstert.2009.04.019](https://doi.org/10.1016/j.fertnstert.2009.04.019)
 33. Saavalainen L, Heikinheimo O, Tiitinen A, Härkki P: Deep infiltrating endometriosis affecting the urinary tract-surgical treatment and fertility outcomes in 2004-2013. *Gynecol Surg*. 2016, 13:435-44. [10.1007/s10397-016-0958-0](https://doi.org/10.1007/s10397-016-0958-0)
 34. Symeonidis A, Tsikopoulos I, Symeonidis EN, et al.: More than meets the eye: A case of synchronous ipsilateral clear cell renal cell carcinoma and urothelial carcinoma of the pelvicalyceal system and literature review. *Acta Biomed*. 2022, 92:e2021380. [10.23750/abm.v92i6.11768](https://doi.org/10.23750/abm.v92i6.11768)