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Endometriosis and its Impact on the Urinary System: a Uro Gynecological Review

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Abstract: Endometriosis is marked by the establishment of endometrial-like tissue outside the uterine cavity and is, therefore, an area of serious morbidity where this review aims to interrogate the effects of endometriosis on the urinary system with a view towards discussing its incidence, diagnostic difficulty, and treatment furthermore for this review, a thorough literature search was carried out on papers published between 1996 and 2024 colloquially for the urinary endometriosis (UTE) and its significance on patient care. Our study suggests that UTE could be found in 1-6% of females with endometriosis and that the bladder is almost always the affected organ also the literature highlights the need for rapid diagnosis and immediate multidisciplinary treatment including surgical and medical options and despite technical innovations in laparoscopic treatment techniques and hormonal therapies, a large proportion of patients still suffer from delays in diagnosis and residual symptoms finally we conclude that a multidisciplinary approach is desirable for better outcomes in patients with endometriosis involving the urinary system and that further research is needed to increase knowledge.

Keywords: Uro Gynecological, Endometriosis, Treatment, Medical Options, Technical, Diagnosis, Laparoscopic Surgery, Vesico-Sphincteral.

Introduction

Endometriosis refers to the occurrence of ectopic endometrial tissue and/or functionally active stroma outside its usual anatomical location within the uterine cavity [1,2]. Rokitansky was the first to characterize endometriosis through autopsy findings in 1860 [3]. Endometriosis is the presence of ectopic endometrial tissue and/or stroma outside the uterine cavity, where it was first recognized in 1869. Later, Sampson (1927) defined endometriosis as the presence of tissue with histological and functional features similar to the endometrium in other locations. Endometriosis affects 10% of women between the ages of 25 and 40 [4,5]. It affects up to 50% of infertile women (12-16 years old) and is most common in nulliparous women. In women without symptoms, it may affect between 6% and 43% [6,7]. Endometriosis is the second most common gynecological surgical condition, after uterine fibroids. In the United States, it is the third most common cause of hospitalization and the most common reason for hysterectomy. Clinical management utilizing hormonal therapies often results in numerous recurrences; therefore, it may be complemented or substituted by surgical interventions, dependent on the clinical presentation and imaging results. In instances of bladder endometriosis, both diagnosis and management can be conducted via cystoscopy with biopsy or transurethral resection of the lesion [8,9]

Endometriosis has been described as a condition where the endometrium, the lining of the uterine cavity, gets implanted at unusual sites of the body. Most commonly affected are the ovaries, the retro cervical region, the tubes, and the peritoneum. However, in approximately 2% of the cases, endometriosis occurs in the urinary system and mostly involves the bladder and ureters [10,11] were In such a scenario, the treatment and diagnosis methods may deviate significantly from the norm where this condition is, of course, complex and may cause a number of complications, such as renal failure also Endometriosis may develop via several mechanisms. Nonetheless, the predominant theory widely accepted in many instances is that of retrograde menstrual flow, which correlates with hormonal and immune dysregulation [12,13]. In other words, part of the menstrual fluid penetrates into the pelvic cavity, ovaries, and fallopian tubes. However, this process occurs among 90% of females; therefore, hormonal stimulation through estrogen and a compromised immune system are also mandatory prerequisites [14]

Methodology

In order to construct a meta-analysis methodology pertaining to endometriosis and the urinary system, we will first, identify specific research questions specific to this condition, such as the effectiveness of different options or the prevalence of urinary tract endometriosis, Next, we will develop criteria for inclusion and exclusion and For inclusion, we will seek studies specific to endometriosis affecting the urinary system, were peer-reviewed and provided the publication range of ranging from 1996 to 2024 while In addition, we will also include studies that relate to surgical and medical treatments on the diagnosis or treatment of endometriosis or the recurrence of disease so In opposition, we will exclude non-peer-reviewed studies, case reports, and articles that were not published in the English language , on the other hand This study relied on several factors to compile the scientific research found in Scopus data also Relevant keywords were also used, including "urinary tract endometriosis," "treatment outcomes," and "surgical management as well as where our Data were extracted through databases and a summary was created for each study, concerning The quality of the included studies was assessed using appropriate tools, such as the Cochrane Risk of Bias Tool for Randomized Controlled Trials and the Newcastle-Ottawa Scale for Observational Studies but beside This assessment will help determine the risk of bias and overall methodological quality of each study Finally we will interpret the results in the context of existing literature, discussing the implications of our findings for clinical practice regarding the management of urinary tract endometriosis as well as address the limitations of our meta-analysis and suggest areas for future research where also Throughout the process, we will ensure compliance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines and consider conducting subgroup analyses based on different treatment modalities or demographic factors if the data allows on the other hand This comprehensive methodology will facilitate a systematic review and synthesis of existing research, providing valuable insights for clinicians and researchers in the field.

Results

Table 1- List the main information related to the goal and year, in addition to the researcher's information.

	Author	Publisher	Title	aim
1	Camran Nezhat, R.C. Falik, Sara McKinney +1 more	3 May 2017- Nature Reviews Urology	Pathophysiology and management of urinary tract endometriosis	Discussing laparoscopic management and novel surgical techniques, the research paper examines the pathophysiology of urinary tract endometriosis and assesses the efficacy of medical treatments, including hormonal therapies, in preoperative and postoperative settings.
2	Ralph Saadeh, Elie Finianos, Houssein El Hajj	5 Aug 2024	Urinary Tract Endometriosis: A Review of Literature	Urinary tract endometriosis (UTE), a rare form that affects 1-6% of patients, is reviewed in this paper. Imaging, histopathology, medical hormonal treatments, surgical techniques, pathophysiology, clinical presentation, and diagnostic modalities are all covered.
3	Milton Skaff Junior, Deborah Meyer Rosa, Fabio Sandrini +3 more	9 Sep 2011	Endometriosis of the genitourinary tract: a literature review	The study aimed to review literature on endometriosis in the genitourinary tract, focusing on diagnostic methods and treatment options, emphasizing early diagnosis for reduced morbidity, and addressing healthcare costs and patient quality of life.

4	Anthony Kodzo-Grey Venyo	29 Jul 2019	Endometriosis of the Urinary Bladder and Ureter: A Review and Update of the Literature	The study examines and revises the literature on endometriosis of the ureter and bladder, with an emphasis on symptom identification, rare presentation in postmenopausal women, and prevalence in women. Long-term follow-up, possible complications, treatment options, and diagnostic techniques are all covered.
5	Anna Kołodziej, Wojciech Krajewski, Łukasz Dołowy +1 more	4 Sep 2015- Urology Journal	Urinary Tract Endometriosis.	The research paper reviews literature on urinary tract endometriosis (UTE), discusses diagnosis, treatment options, pathogenesis, hypotheses, symptoms, and prevalence among endometriosis-afflicted women. It also explores treatment options.
6	Mobolaji O. Ajao, Jon I. Einarsson	7 Dec 2016- Seminars in Reproductive Medicine	Management of Endometriosis Involving the Urinary Tract	With an emphasis on the bladder and ureters, the research paper addresses the treatment of endometriosis that affects the urinary tract. It draws attention to the common causes of pelvic pain and infertility in women of reproductive age, highlighting the importance of prompt diagnosis and treatment.
7	Yoshiaki Ota, Masaaki	1 Feb 2018-	Laparoscopic	With an emphasis

	Andou, Ikuko Ota	Asian Journal of Endoscopic Surgery	surgery with urinary tract reconstruction and bowel endometriosis resection for deep infiltrating endometriosis.	on bowel endometriosis resection and urinary tract reconstruction, the study assesses surgical treatment options for deep infiltrating endometriosis. Using the ENZIAN and AFS classification systems, it determines the appropriate procedures, stresses postoperative medication, collaborates with urologists, and evaluates the severity of DIE.
8	Anis Fadhlaoui, Tessa E R Gillon, Issam Lebbi +2 more	22 Jun 2015-Frontiers in Surgery	Endometriosis and Vesico-Sphincteral Disorders.	The research paper investigates the link between endometriosis and urinary tract symptoms, focusing on surgical treatment of deep lesions and the impact on vesico-sphincteral function. It highlights the need for improved screening of vesico-sphincteral symptoms in endometriosis cases.

Table 2- Knowing the method and sample size available for each study

	method	**population sample**
1	the paper discusses the pathophysiology and management of urinary tract endometriosis, focusing on therapeutic approaches like hormonal therapies and surgical management. It highlights newer techniques like nerve-sparing surgery and emphasizes that the optimal approach depends on the extent, depth, and location of the lesions.	No sample size
2	The review focused on peer-reviewed, original research articles published between 1996 and 2024.	Although ute affects 1-6% of patients with endometriosis,

		the research paper does not specify the population sample size or sampling techniques, which restricts the availability of precise figures or attributes.
3	Specifically, 48 works	The study on endometriosis of the genitourinary tract lacks specific information on population sample size or sampling methods, making it impossible to detail its characteristics.
4	The literature on endometriosis of the bladder and ureter is compiled and updated in this paper using a review methodology.	--
5	pharmacological, surgical,	--
6	Surgical intervention is required for urinary tract involvement in advanced stages.	--
7	aparoscopic surgery as a method for treating	--
8	articles published between 2000 and 2014	--

Table 3- Assessment Literature Survey of studies in meta-analysis

Sequences	Literature Survey
1	• affects the urinary tract and pelvic reproductive organs. • Both the bladder and the ureter may sustain lesions, requiring specialized treatment strategies. • For urological endometriosis, surgical options such as laparoscopic management are advised, while medical treatments, such as hormonal therapies, are only temporary.
2	(UTE), a rare form of endometriosis affecting 1–6% of patients
3	diagnosis and treatment of bladder endometriosis
4	Endometriosis of the bladder
5	UTE affects 0.3-12% of women with endometriosis
6	Endometriosis, a prevalent issue causing infertility and pelvic pain in women, affects the urinary tract, bladder, and ureters, often necessitating surgical intervention in advanced stages.
7	The literature indicates that deep infiltrating endometriosis (DIE) is the most severe form of endometriosis.
8	The literature review distinguishes between adenomyosis and endometriosis.

Table 4- Knowing and evaluating the final results of the meta-study

Sequences	Results
1	The ureter and bladder are affected by endometriosis, which affects the urinary tract. Hormonal therapies and hormonal contraceptives are among the available treatments. Laparoscopic management is common, and surgical resection is possible. New techniques like nerve-sparing surgery may reduce complications.
2	One to six percent of endometriosis patients have urinary tract endometriosis, with lower symptoms when the bladder is involved. The diagnosis of ureteral endometriosis may be delayed if it is asymptomatic.
3	Endometriosis affects approximately 1% to 2% of cases in the urinary system, with the bladder being the most affected organ in 84% of cases.
4	Conservative hormonal therapy and surgical excision methods are available as treatment options.
5	Treatment options include pharmacological and surgical.
6	The urinary tract is frequently impacted by endometriosis, a common cause of infertility and pelvic pain in women of reproductive age. Positive results can make from delaying diagnosis and surgery.
7	improves pain and quality of life.
8	A. Symptoms in endometriosis varies from 3.4% to 15.4% B. can lead to de novo urinary dysfunction with an incidence ranging from 6.8% to 17.5%

Table 5- Assessment conclusion outcomes of our studies in the meta-analysis

s	***Conclusion***
1	For suitable cases, surgical resection is advised, especially laparoscopic management with possible robotic assistance.
2	We conclude from this study the necessity and importance of accurate diagnosis according to the clinical history of patients.
3	The presence of endometrial tissue outside the uterine cavity is a characteristic of endometriosis, the paper concludes.
4	Conservative hormonal therapy and surgical excision methods are available as treatment options.
5	Ureter endometriosis treatment may involve hormonal therapy.
6	that endometriosis is a significant cause of infertility
7	Laparoscopic mechanical discoid resection is a valid alternative to classical segmental resection for bowel endometriosis.
8	that bladder and sphincter disorders are present among patients with deep endometriosis

Discussion

This document presents a comprehensive overview of the literature on endometriosis, focusing on its pathophysiology, management, rarity, diagnostic challenges, treatment options, and patient demographics, where the authors highlight the importance of laparoscopic management, imaging, histopathology, early diagnosis, chronic nature, and ongoing management strategies. The authors also highlight the need for a multidisciplinary approach in treatment, particularly in the context of pelvic pain and infertility, given table 1 The authors also emphasize the importance of surgical options for deep infiltrating endometriosis, particularly urinary tract reconstruction, with The authors also emphasize the need for improved screening of urinary symptom as endometriosis can significantly

affect urinary function so Overall the literature provides valuable insights into the complex and multifaceted nature of endometriosis as well as Several theories have been proposed to explain the presence of ectopic endometrium that proliferates under the influence of estrogen, producing a series of lesions, including inflammatory reactions, fibrosis, and scarring , also mentioned in our collected studies The coelomic metaplasty theory posits that cells of embryonic origin from the coelomic mesothelium, when stimulated by unknown factors (probably hormonal or inflammatory), could be transformed into endometrial cells. The migratory or metastatic theory posits that, through lymphatic or hematogenous embolization, were the methods employed in research on urinary tract endometriosis are shown in the table, emphasizing the absence of defined sample sizes that compromise the findings' generalizability. The lack of specific population sample data complicates understanding demographic characteristics and treatment responses. Through studies by Kołodziej et al. and Ajao et al. highlight the need for more substantial data on population samples. Kodzo-Grey Venyo's literature compilation also lacks information on sample size.

According to Computed tomography and, especially, magnetic resonance imaging can more precisely delimit the affected area and the depth of the lesion in the bladder wall and serve as an exploratory study, but the most common finding is endoluminal vegetation in the bladder wall. Excretory urography may reveal bladder filling failure or hydronephrosis if there is ureteral involvement. Venous urography is considered essential, by some studies, for the evaluation of kidney and ureteral endometriosis, where with Endometriosis affects the urinary tract and pelvic reproductive organs, necessitating specialized treatment strategies. Early identification and intervention are crucial for UTE, a rare form affecting 1-6% of patients in addition to Bladder involvement is prevalent, leading to chronic pain and impaired quality of life so by Various treatments, including pharmacological and surgical, are available, but understanding their limitations and potential complications is essential however Variability in symptoms among patients with endometriosis necessitates individualized treatment plans [15,16,17] Ureteral endometriosis, which is primarily located in the distal segment of the ureter, presents with vague symptoms, and cyclical hematuria or ureteral obstruction may occur and Treatment for ureteral endometriosis is often complex, requiring urethrectomy with urinary tract reconstruction. Investigation should be performed in women of childbearing age with cyclical clinical manifestations of pelvic pain, urinary changes, and recurrent cystitis, although Imaging tests, such as computed tomography and magnetic resonance imaging, can help define the location and size of lesions. Excretory urography is appropriate in cases of ureteral and renal pelvis lesions, where anatomical distortion may be noted, while also Cystoscopy or ureteroscopy with biopsy are the best tests for identifying this condition, and treatment is often performed through transurethral resection of the lesions at the time of diagnosis. This treatment should be combined with hormonal blockade for a better response. Laparoscopy performed in experienced hands presents good results [18,19,20]

Conclusion

If urinary tract endometriosis is strongly suspected based on imaging tests and symptoms, the subsequent course of action depends on the affected organ. For bladder endometriosis, drug therapy is always the first choice. However, if the complaints affect patients' quality of life, minimally invasive laparoscopic surgery may be recommended where Cystoscopy is contraindicated because it does not adequately remove the lesions. For ureteral endometriosis, ureteral obstruction may lead to hydronephrosis, a condition in which urine accumulates within the kidneys, potentially leading to loss of kidney function. Therefore, even in asymptomatic cases or with mild complaints, laparoscopic surgery is the preferred treatment option. Urinary tract endometriosis presents very important diagnostic and therapeutic features. Because it is more difficult to diagnose, the diagnosis often requires more invasive methods. Furthermore, clinical treatment is not very effective and often requires surgical resection using minimally invasive laparoscopic surgery.

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