


Uretero-vaginal fistulas — clinical presentation, treatment and literature overview

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ABSTRACT

A uretero-vaginal fistula (UVF) describes an abnormal connection between the ureter and vagina causing urinary incontinence, frequent infection, and discomfort. Although UVF might be diagnosed after vaginal delivery, infertility treatment or pelvic radiation therapy, gynecological operations, especially total abdominal hysterectomy, remain the leading cause of ureteral injury and formation of UVF. Traditional ureteroneocystostomy was usually the treatment of choice in patients with UVF. Nevertheless, it is now frequently replaced by less invasive endoscopic and percutaneous procedures which are also highly effective and feasible. That is why, ureteral stenting became the first-line treatment in uncomplicated UVF. The aim of this review is to present clinical presentation of UVF and to assess the current state of knowledge about the diagnosis and management of uretero-vaginal fistula with special interest on minimally-invasive methods.

Key words: uretero-vaginal fistula; post-operative; complication; minimally-invasive

Ginekologia Polska 2022; 93, 6: 501–505

INTRODUCTION

A uretero-vaginal fistula (UVF) describes an abnormal connection between the ureter and vagina causing urinary incontinence, frequent infection, and discomfort [1]. Although UVF might be diagnosed after vaginal delivery, infertility treatment or pelvic radiation therapy, gynecological operations, especially total abdominal hysterectomy, remain the leading cause of ureteral injury and formation of UVF [2–6]. Apart from mechanical injury of the ureter, thermal effects of electrocoagulation of the ovarian vessels may result in UVF [7]. Authors also report an increase of ureteric injuries resulting in creation of UVF since the introduction of laparoscopic surgery. According to Parpala-Spärman et al. [8], gynecological laparoscopic procedures

account for more than half of the ureteric injuries, especially its lower part. Traditional ureteroneocystostomy was usually the treatment of choice in patients with UVF [9]. Nevertheless, it is now frequently replaced by less invasive endoscopic and percutaneous procedures which are also highly effective and feasible [10]. Selzman et al. [10] who described his 20 years of experience with management of patients with UVF concluded that every effort should be made to avoid an open operation. That is why, ureteral stenting became the first-line treatment in uncomplicated UVF.

Objectives

The aim of this review is to present clinical presentation of UVF and to assess the current state of knowledge about

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Received: 11.11.2021 Accepted: 28.12.2021 Early publication date: 17.03.2022

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the diagnosis and management of uretero-vaginal fistula with special interest on minimally-invasive methods.

CLINICAL PRESENTATION

Case 1

A 70-year-old patient was admitted to the Department of Gynecology with diagnosis of cervical cancer in early stage (FIGO IIA). She underwent Wertheim-Meigs radical hysterectomy. After six days of uneventful hospitalization, she was discharged in good clinical condition and no abnormalities in lab results. Unfortunately, seven days after the operation the patient started to complain about flank pain and constant dribbling with normal urine evacuation. A Foley catheter was placed. CT-urography disclosed a formation of a UVF. The patient was qualified for implantation of DJ-stent and nephrostomy. With patient in a prone position the right flank region was cleansed with povidone iodine and draped. In local anesthesia and under ultrasound guidance the upper pelvis calyx was punctured. Afterwards, under fluoroscopy guidance right ureter was catheterized. Contrast injection confirmed the presence of UVF (Fig. 1A). A 6 French sheath was introduced and catheterization of urinary bladder with microcatheter was attempted. Multiple attempts were futile. Therefore, cystoscope was inserted and with use of the loop the wire was passed from the urinary bladder to the puncture site (Fig. 1B). Afterwards,

DJ catheter and nephrostomy were placed. She also received oral antibiotics. Initial hematuria subsided after two days. A double-dye tampon test which was conducted six days after stent implantation showed incomplete resolution of UVF. The test was repeated after two weeks and showed complete resolution of UVF.

Case 2

A 39-year-old patient was admitted to the Department of Gynecology with diagnosis of multiple fibroids. She reported long history of excessive bleeding, anemia and painful cramps. She was therefore qualified for laparoscopic hysterectomy. After four days of uneventful hospitalization, she was discharged in good clinical condition and no abnormalities in lab results. Three weeks after the procedure she was admitted with right flank pain and constant dripping. Intravenous urography disclosed hydronephrosis at the right side (30 mm) with dilated right ureter (20 mm) (Fig. 2A). Based on clinical symptoms and imaging findings the patient was referred for DJ-implantation. Despite multiple attempts and use of microcatheter DJ-implantation was futile. The decision about nephrostomy implantation was made. Control intravenous pyelography was performed five weeks after the procedure. It showed proper position of the nephrostomy and persistent dilatation of the right ureter (Fig. 2B). That is why, second DJ-stent implantation

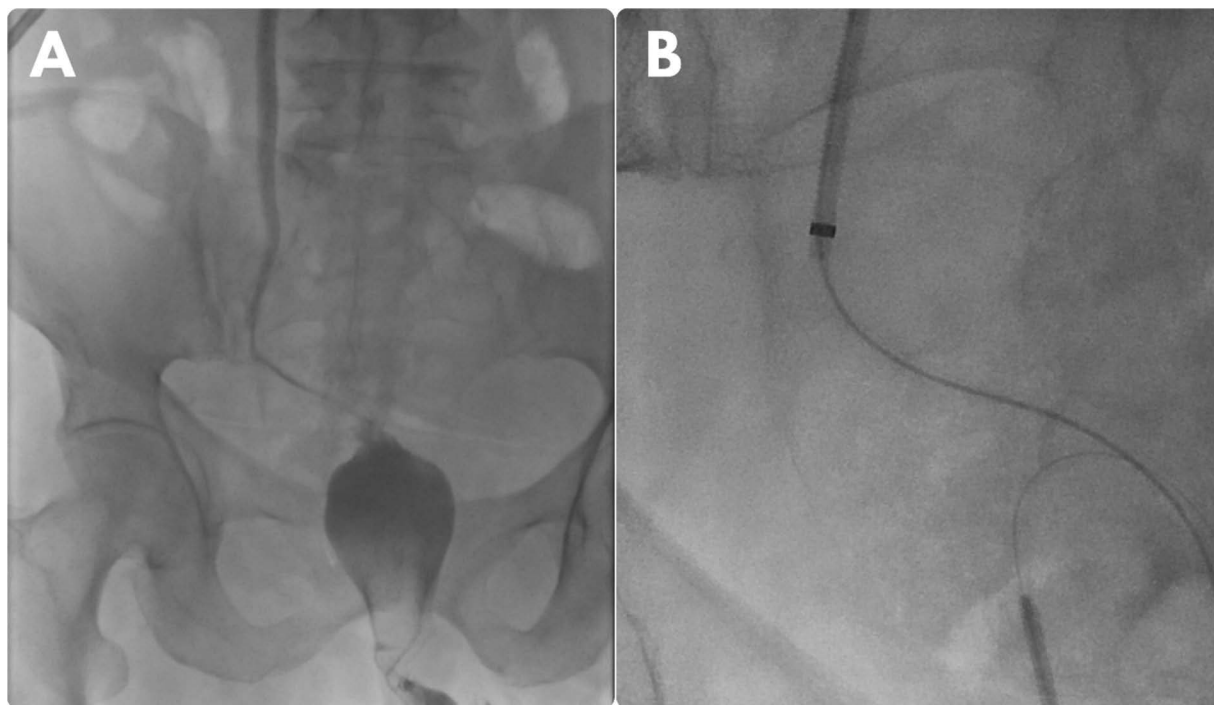


Figure 1. A. Initial contrast injection confirmed the presence of utero-vaginal fistula; **B.** After insertion of the cystoscope the guiding wire was successfully passed and DJ catheter was placed

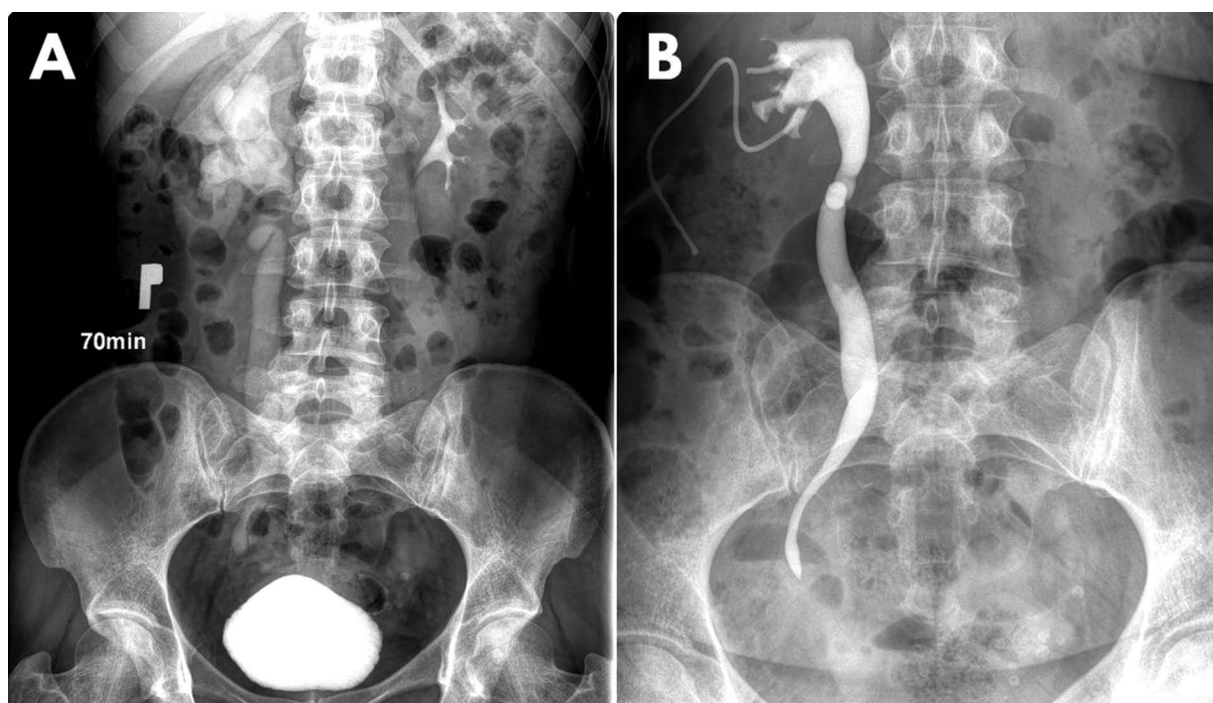


Figure 2. A. Initial intravenous urography showing significant hydronephrosis and ureter dilatation at the right side; B. Control intravenous pyelography performed 5 weeks after nephrostomy placement confirming the persistence of right ureter dilatation

was attempted. Again, the procedure was futile. The patient underwent urological examination and complete occlusion of the right ureter was confirmed. Based on these findings, she was referred for open ureter reimplantation. The operation was successful and the patient was discharged in good clinical condition 10 days after the procedure.

In case of UVF suspicion, all patients should undergo thorough history and physical examination. Most common clinical presentation of UVF include continuous vaginal leak of urine with or without ipsilateral flank, fever and urinary tract infection which typically occur up to four weeks after the ureteral injury [11]. It is crucial to obtain an accurate medical history as some symptoms may be very helpful in differentiation of uretero-vaginal fistulas from other types of fistulas without radiological imaging (*e.g.*, the sensation to void and hold a normal bladder capacity would not be present in case of vesicovaginal fistula) [12].

DIAGNOSIS

The diagnostic method of choice to diagnose various types of vaginal fistulas, including UVF is a double-dye tampon test during which one dye is injected to the patient's bladder and the second dye of different color is injected intravenously [13]. The staining on the packs removed from patient's vagina indicate the localization of the fistula. Its main advantages are low costs, simplicity and high accuracy.

As far as the imaging examinations are concerned, CT-urography is the most commonly used diagnostic modality and is considered to be the gold standard for the detection of ureteral injury, including fistula [14]. In addition to this, intravenous pyelography and retrograde pyelography are also very useful and should be considered as part of a UVF diagnosis and evaluation [15].

Despite all methods mentioned above, some authors state that overall rate of ureteral injury during gynecological surgery, which may lead to creation of UVF is much higher than reported [16]. That is why, they suggest that the routine intraoperative cystoscopy during major gynecologic and especially urogynecologic surgery might prevent sequelae from lower urinary tract injuries. On the other hand, routine intraoperative cystoscopy does not guarantee recognition of all lower urinary tract injuries, especially UVF which may develop over time [17]. Hence, the role of routine intraoperative cystoscopy remains debatable.

Treatment

Traditional treatment of UVF included reimplantation of the ureter into the bladder (ureteroneocystostomy). Although the reported were satisfactory, the procedure had all drawback of an open surgery [8, 18]. Recent laparoscopic and robotic techniques are promising alternatives to open surgery with comparable rate of clinical success [19, 20].

In addition to that, reports on successful repair of UVF performed exclusively through the vaginal approach are also available in the literature [21, 22]

Nonetheless, according to Chen et al. [12] who proposed a ureterovaginal fistula management algorithm, the first step in management of UVF should to assess if a patient is candidate for placement of ureteral stent. Placement of nephrostomy alone is contraindicated as it is associated with relatively high rate of clinical failure [5, 23]. Contraindication for primary ureteral stenting include presence of concurrent vesicovaginal fistula and/or history of ureteral injury. These patients should be considered as candidates for ureteral reimplantation surgery.

Over last decades the success rate of stent placement increased from < 40% to > 70% [5, 24, 25]. Chen et al. [12] even reported success rate of 92% which was attributed to use of innovative techniques (which included multi-stage procedures) and multidisciplinary approach. As far as the optimal timing for ureteral stent placement is concerned, no clear indications are available. Although delayed treatment increases the risk of procedural failure, cases of patients treated successfully over two years after initial surgery are described [14]. Similarly, no guidelines on safe time frame of stent maintenance can be found in the literature. Based on authors' experience, Chen et al. [12] recommended to keep stents for at least three months and perform retrograde pyelogram upon stent removal.

Another minimally-invasive procedure in treatment of UVF is retrograde ureteroscopic stenting. In their paper Rajamaheswari et al. [26] described 17 patients with UVF of which 13 (77%) was successfully managed with ureteroscopic DJ stenting. All 13 patients were followed-up and no leakage, stricture or obstruction was reported. Remaining four patients underwent ureteral reimplantation due to near-total ureteral occlusion precluding safe stent implantation. However, authors suggest that even in subtotal ureteral occlusion open surgery could be replaced by less invasive alternatives (e.g., simultaneous antegrade and retrograde ureteroscopy) [27].

Complications

Most common complications of UVF treatment are persistent fistula and ureter stricture. These complications appear to be especially frequent after placing a percutaneous nephrostomy only. Schmeller et al. [23] who described 11 patients with UVFs treated only by percutaneous nephrostomy, reported 55% rate of persistent fistula and 18% of stricture. Similarly, Al-Otaibi observed high rate of ureter stricture after placing a percutaneous nephrostomy [5]. That is why, in case of failure of either conservative or minimally-invasive treatment, surgical intervention is necessary [14].

CONCLUSIONS

Ureterovaginal fistula is rare yet important post-operative complication and should therefore be included in the differential diagnosis in patients reporting post-operative urinary incontinence. Early and correct diagnosis is crucial and can be made in the clinical setting with a simple dual-dye tampon test. Proper treatment selection is of great importance as minimally invasive ureteral stenting is associated with high cure rates and low morbidity compared with surgery in eligible patients. In case of contraindications or treatment failure, ureteral reimplantation may be necessary.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Contributions

All authors contributed significantly to the paper: MSZ, KP, TR, HSZ and SW evaluated the data and prepared the manuscript. KP, MSZ, SW, TJ and TR participated in described procedures. All authors approved the final version of the manuscript.

Conflict of interest

All authors declare that they have no conflict of interest.

REFERENCES

- Li X, Wang P, Liu Y, et al. Minimally invasive surgical treatment on delayed uretero-vaginal fistula. *BMC Urol.* 2018; 18(1): 96, doi: [10.1186/s12894-018-0410-z](https://doi.org/10.1186/s12894-018-0410-z), indexed in Pubmed: [30373586](https://pubmed.ncbi.nlm.nih.gov/30373586/).
- Hosseini SY, Roshan YM, Safarinejad MR. Ureterovaginal fistula after vaginal delivery. *J Urol.* 1998; 160(3 Pt 1): 829, doi: [10.1097/00005392-199809010-00055](https://doi.org/10.1097/00005392-199809010-00055), indexed in Pubmed: [9720560](https://pubmed.ncbi.nlm.nih.gov/9720560/).
- von Eye Corleta H, Moretto M, D'Avila AM, et al. Immediate ureterovaginal fistula secondary to oocyte retrieval — a case report. *Fertil Steril.* 2008; 90(5): 2006.e1–2006.e3, doi: [10.1016/j.fertnstert.2008.03.005](https://doi.org/10.1016/j.fertnstert.2008.03.005), indexed in Pubmed: [18440002](https://pubmed.ncbi.nlm.nih.gov/18440002/).
- Ignatoff JM, Graham JB. Bilateral ureterovaginal fistula; complication of radiation therapy. *Urology.* 1974; 4(5): 585–589, doi: [10.1016/0090-4295\(74\)90497-x](https://doi.org/10.1016/0090-4295(74)90497-x), indexed in Pubmed: [4428560](https://pubmed.ncbi.nlm.nih.gov/4428560/).
- Al-Otaibi KM. Ureterovaginal fistulas: The role of endoscopy and a percutaneous approach. *Urol Ann.* 2012; 4(2): 102–105, doi: [10.4103/0974-7796.95556](https://doi.org/10.4103/0974-7796.95556), indexed in Pubmed: [22629006](https://pubmed.ncbi.nlm.nih.gov/22629006/).
- Akgör U, Kuru O, Güneş AC, et al. Impact of clinicopathological variables on laparoscopic hysterectomy complications, a tertiary center experience. *Ginekol Pol.* 2021 [Epub ahead of print], doi: [10.5603/GPa.2021.0097](https://doi.org/10.5603/GPa.2021.0097), indexed in Pubmed: [34105742](https://pubmed.ncbi.nlm.nih.gov/34105742/).
- Stojko R, Malinowski A, Baranowski W, et al. Recommendations of the Polish Society of Gynaecologists and Obstetricians for removal of the uterus by vaginal, laparoscopic and abdominal routes. *Ginekol Pol.* 2020; 91(6): 352–361, doi: [10.5603/GP.2020.0081](https://doi.org/10.5603/GP.2020.0081), indexed in Pubmed: [32627157](https://pubmed.ncbi.nlm.nih.gov/32627157/).

8. Parpala-Spårman T, Paananen I, Santala M, et al. Increasing numbers of ureteric injuries after the introduction of laparoscopic surgery. *Scand J Urol Nephrol*. 2008; 42(5):422–427, doi: [10.1080/00365590802025857](https://doi.org/10.1080/00365590802025857), indexed in Pubmed: [18609278](https://pubmed.ncbi.nlm.nih.gov/18609278/).
9. Mandal AK, Sharma SK, Vaidyanathan S, et al. Ureterovaginal fistula: summary of 18 years' experience. *Br J Urol*. 1990; 65(5): 453–456, doi: [10.1111/j.1464-410x.1990.tb14785.x](https://doi.org/10.1111/j.1464-410x.1990.tb14785.x), indexed in Pubmed: [2354309](https://pubmed.ncbi.nlm.nih.gov/2354309/).
10. Selzman AA, Spirnak JP, Kursh ED. The changing management of ureterovaginal fistulas. *J Urol*. 1995; 153(3 Pt 1): 626–628, doi: [10.1097/00005392-199503000-00020](https://doi.org/10.1097/00005392-199503000-00020), indexed in Pubmed: [7861500](https://pubmed.ncbi.nlm.nih.gov/7861500/).
11. Murphy DM, Grace PA, O'Flynn JD. Ureterovaginal fistula: a report of 12 cases and review of the literature. *J Urol*. 1982; 128(5): 924–925, doi: [10.1016/s0022-5347\(17\)53279-6](https://doi.org/10.1016/s0022-5347(17)53279-6), indexed in Pubmed: [7176053](https://pubmed.ncbi.nlm.nih.gov/7176053/).
12. Chen YB, Wolff BJ, Kenton KS, et al. Approach to ureterovaginal fistula: examining 13 years of experience. *Female Pelvic Med Reconstr Surg*. 2019; 25(2): e7–ee11, doi: [10.1097/SPV.0000000000000690](https://doi.org/10.1097/SPV.0000000000000690), indexed in Pubmed: [30807428](https://pubmed.ncbi.nlm.nih.gov/30807428/).
13. Raghavaiah NV. Double-dye test to diagnose various types of vaginal fistulas. *J Urol*. 1974; 112(6): 811–812, doi: [10.1016/s0022-5347\(17\)59857-2](https://doi.org/10.1016/s0022-5347(17)59857-2), indexed in Pubmed: [4436904](https://pubmed.ncbi.nlm.nih.gov/4436904/).
14. Shaw J, Tunitsky-Bitton E, Barber MD, et al. Ureterovaginal fistula: a case series. *Int Urogynecol J*. 2014; 25(5): 615–621, doi: [10.1007/s00192-013-2272-y](https://doi.org/10.1007/s00192-013-2272-y), indexed in Pubmed: [24346812](https://pubmed.ncbi.nlm.nih.gov/24346812/).
15. Brandes S, Coburn M, Armenakas N, et al. Diagnosis and management of ureteric injury: an evidence-based analysis. *BJU Int*. 2004; 94(3): 277–289, doi: [10.1111/j.1464-410X.2004.04978.x](https://doi.org/10.1111/j.1464-410X.2004.04978.x), indexed in Pubmed: [15291852](https://pubmed.ncbi.nlm.nih.gov/15291852/).
16. Gilmour DT, Dwyer PL, Carey MP. Lower urinary tract injury during gynecologic surgery and its detection by intraoperative cystoscopy. *Obstet Gynecol*. 1999; 94(5 Pt 2): 883–889, doi: [10.1016/s0029-7844\(99\)00456-1](https://doi.org/10.1016/s0029-7844(99)00456-1), indexed in Pubmed: [10546778](https://pubmed.ncbi.nlm.nih.gov/10546778/).
17. Councill RB, Thorp JM, Sandridge DA, et al. Assessments of laparoscopic-assisted vaginal hysterectomy. *J Am Assoc Gynecol Laparosc*. 1994; 2(1): 49–56, doi: [10.1016/s1074-3804\(05\)80831-x](https://doi.org/10.1016/s1074-3804(05)80831-x), indexed in Pubmed: [9147858](https://pubmed.ncbi.nlm.nih.gov/9147858/).
18. Goodwin WE, Scardino PT, Goodwin WE, et al. Vesicovaginal and ureterovaginal fistulas: a summary of 25 years of experience. *Trans Am Assoc Genitourin Surg*. 1979; 71(3): 123–129, indexed in Pubmed: [545802](https://pubmed.ncbi.nlm.nih.gov/545802/).
19. Linder BJ, Frank I, Occhino JA. Extravesical robotic ureteral reimplantation for ureterovaginal fistula. *Int Urogynecol J*. 2018; 29(4): 595–597, doi: [10.1007/s00192-017-3459-4](https://doi.org/10.1007/s00192-017-3459-4), indexed in Pubmed: [28884348](https://pubmed.ncbi.nlm.nih.gov/28884348/).
20. Ramalingam M, Senthil K, Venkatesh V. Laparoscopic repair of ureterovaginal fistula: successful outcome by laparoscopic ureteral reimplantation. *J Endourol*. 2005; 19(10): 1174–1176, doi: [10.1089/end.2005.19.1174](https://doi.org/10.1089/end.2005.19.1174), indexed in Pubmed: [16359208](https://pubmed.ncbi.nlm.nih.gov/16359208/).
21. Boateng AA, Eltahawy EA, Mahdy A. Vaginal repair of ureterovaginal fistula may be suitable for selected cases. *Int Urogynecol J*. 2013; 24(6): 921–924, doi: [10.1007/s00192-013-2070-6](https://doi.org/10.1007/s00192-013-2070-6), indexed in Pubmed: [23525821](https://pubmed.ncbi.nlm.nih.gov/23525821/).
22. Chen SS, Yang SH, Yang JM, et al. Transvaginal repair of ureterovaginal fistula by Latzko technique. *Int Urogynecol J Pelvic Floor Dysfunct*. 2007; 18(11): 1381–1383, doi: [10.1007/s00192-007-0374-0](https://doi.org/10.1007/s00192-007-0374-0), indexed in Pubmed: [17404678](https://pubmed.ncbi.nlm.nih.gov/17404678/).
23. Schmeller NT, Göttinger H, Schüller J, et al. [Percutaneous nephrostomy as primary therapy of ureterovaginal fistula]. *Urologe A*. 1983; 22(2): 108–112, indexed in Pubmed: [6683024](https://pubmed.ncbi.nlm.nih.gov/6683024/).
24. Dowling R, Corriere J, Sandler C. Iatrogenic ureteral injury. *Journal of Urology*. 1986; 135(5): 912–915, doi: [10.1016/s0022-5347\(17\)45921-0](https://doi.org/10.1016/s0022-5347(17)45921-0).
25. Elabd S, Ghoniem G, Elsharaby M, et al. Use of endoscopy in the management of postoperative ureterovaginal fistula. *Int Urogynecol J Pelvic Floor Dysfunct*. 1997; 8(4): 185–190, doi: [10.1007/BF02765810](https://doi.org/10.1007/BF02765810), indexed in Pubmed: [9449293](https://pubmed.ncbi.nlm.nih.gov/9449293/).
26. Rajamaheswari N, Chhikara AB, Seethalakshmi K. Management of ureterovaginal fistulae: an audit. *Int Urogynecol J*. 2013; 24(6): 959–962, doi: [10.1007/s00192-012-1959-9](https://doi.org/10.1007/s00192-012-1959-9), indexed in Pubmed: [23093322](https://pubmed.ncbi.nlm.nih.gov/23093322/).
27. Lingeman JE, Wong MY, Newmark JR. Endoscopic management of total ureteral occlusion and ureterovaginal fistula. *J Endourol*. 1995; 9(5): 391–396, doi: [10.1089/end.1995.9.391](https://doi.org/10.1089/end.1995.9.391), indexed in Pubmed: [8580939](https://pubmed.ncbi.nlm.nih.gov/8580939/).