

# Uterovesical fistulas as obstetric complications: Diagnosis, management and prognosis (Review)

ANCA JILAVEANU<sup>1</sup>, BOGDAN SOCEA<sup>2,3</sup>, ROXANA BOHILTEA<sup>4,5</sup>, OVIDIU STIRU<sup>6,7</sup>,  
ADNAN AL ALOUL<sup>8</sup>, BOGDAN URSUT<sup>2,9</sup>, CORNEL SAVU<sup>10,11</sup>, ALEXANDRU FILIPESCU<sup>4,12</sup>,  
IRINA BALESCU<sup>13</sup> and NICOLAE BACALBASA<sup>1,4,14</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, 'I. Cantacuzino' Clinical Hospital, 030167 Bucharest; <sup>2</sup>Department of Surgery, 'Carol Davila' University of Medicine and Pharmacy, 020021 Bucharest; <sup>3</sup>Department of Surgery, Clinical Emergency Hospital 'Sf. Pantelimon', 021659 Bucharest; <sup>4</sup>Department of Obstetrics and Gynecology, 'Carol Davila' University of Medicine and Pharmacy, 020021 Bucharest; <sup>5</sup>Department of Obstetrics and Gynecology, University Emergency Hospital, 050098 Bucharest; <sup>6</sup>Department of Cardiovascular Surgery, 'Prof. Dr. C. C. Iliescu' Emergency Institute for Cardiovascular Diseases, 022322 Bucharest; <sup>7</sup>Department of Cardiovascular Surgery, 'Carol Davila' University of Medicine and Pharmacy, 020021 Bucharest; <sup>8</sup>Department of Surgery, Ramnicu Sarat County Hospital, 125300 Ramnicu Sarat; <sup>9</sup>Department of Surgery, 'Prof. Dr. Agrippa Ionescu' Emergency Clinical Hospital, 011356 Bucharest; <sup>10</sup>Department of Thoracic Surgery, 'Carol Davila' University of Medicine and Pharmacy, 020021 Bucharest; <sup>11</sup>Department of Thoracic Surgery, 'Marius Nasta' National Institute of Pneumology, 050159 Bucharest; <sup>12</sup>Department of Obstetrics and Gynecology, 'Elias' Emergency Hospital, 125100 Bucharest; <sup>13</sup>Department of Surgery, 'Ponderas' Academic Hospital, 021188 Bucharest; <sup>14</sup>Department of Visceral Surgery, Center of Excellence in Translational Medicine, 'Fundeni' Clinical Institute, 022328 Bucharest, Romania

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**Abstract.** Urogenital fistulas are abnormal communications between the female genital and urinary tract; while such fistulas, which are the most commonly encountered, are located between the vagina and urinary bladder and are caused by the local extension of a tumoral process. Another frequently encountered cause is represented by the obstetric one, leading to the development of uterovesical fistulas. However, many questions regarding the diagnosis and management of uterovesical fistulas remain unanswered. Therefore, the aim of this article was to review the existent data so far, with special attention being focused on the pathogenic mechanisms leading to this complication, on the modalities of diagnosis, and on the possible therapeutic strategies. Therefore, according to the time of diagnosis, uterovesical fistulas can be classified as early fistulas, diagnosed in the first months postoperatively and late fistulas, diagnosed within several years from the initial surgical procedure. For early fistulas, a conservative

therapeutic strategy can be taken in consideration, while in cases diagnosed after a longer period of time, a surgical approach should be taken into consideration. Meanwhile, although a surgical approach can cure most of the cases, attention should be given towards preventive strategies such as provision of quality obstetric care with improvements of surgical skills.

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*Correspondence to:* Dr Irina Balescu, Department of Surgery, 'Ponderas' Academic Hospital, 85A Nicolae Caramfil Street, 021188 Bucharest, Romania  
E-mail: irina.balescu@ponderas-ah.ro

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## 1. Introduction

Urogenital fistulas are serious conditions which can significantly influence the biological and psychological condition of women, with a negative impact on the quality of life (1,2). They represent abnormal communications between the urinary and genital tract and have various origins such as locally advanced malignancies, ischemia, septic processes or iatrogenic causes. When it comes to such pathological communications that are

most commonly encountered, vesico-vaginal fistulas occupy a central role and are usually encountered in patients presenting locally advanced pelvic malignancies; therefore it is estimated that this eventuality is usually related to the local development of the neoplastic process or as a therapeutic complication whenever irradiation is performed (3-5).

Most commonly, uterovesical fistula represent a iatrogenic communication between the uterus and urinary bladder, with lower segment Caesarean section accounting for approximately two-thirds of the cases (6). Other incriminated factors leading to the development of this complication are represented by uterine artery embolization, uterine curettage, curative hysteroscopy, instrumental delivery, manual removal of the placenta, placenta praevia, intrauterine migration of contraceptive devices, history of uterine surgical procedures or uterine rupture due to obstructed labor (7-11). Other aetiologies include traditional practices such as female circumcision or salt packing (12,13) The social status of women (malnutrition, lack of formal education and access to medical services, place of delivery and/or whether the delivery was attended by skilled or unskilled personnel, multiparity, previous Caesarean section, placental abnormalities) plays a major role in this pathology and its recovery (12-15). Exceptionally, congenital uterovesical fistula may be encountered, being caused by abnormal development of Mullerian ducts or urogenital sinus (16,17).

The prevalence varies geographically; however, there is no clear data concerning the true incidence of obstetric fistulas worldwide. It is estimated that in high income countries, the incidence is much lower, whereas in developing countries obstetric fistulas are more common (6-8). Globally, it is estimated that uterovesical fistulas account for 1-4% of all genitourinary fistula, with an increased incidence being reported in the last decade due to the permanent trend of the increasing numbers of Caesarean sections (18).

## 2. Clinical presentation

Classical clinical presentation of uterovesical fistula can vary from the classic triad of amenorrhea, menouria and complete continence (Youssef's syndrome) to normal periods, menouria or urinary incontinence (19). In a review conducted by Cook *et al*, the authors reported the presence of Youssef's triad in up to one-third of cases, with other incriminated symptoms including low-grade pyrexia, hematuria, with or without urinary leakage. Yet, it should not be omitted that certain patients can have an asymptomatic course (20). Depending upon the site of injury and time of diagnosis, the clinical presentation of uterovesical fistula varies. Patients can have a late presentation with urinary leakage from the vagina if the cervix is incompetent, cyclic hematuria, amenorrhea, infertility or first trimester abortions. Heightened awareness concerning various clinical presentations may help in the early identification of patients without delay in management (21).

Time to presentation can vary from post-operative discovery to years. Timely identification and treatment can prevent the terrible consequences of this morbidity, as it is more common in developing countries. The time elapsed until diagnosis is also important for the type of surgical treatment, prognosis and future complications (16-21). During a retrospective study carried out by Hassan *et al*, most of the patients

presented in order to benefit from treatment within 6 months of symptoms, although a significant percent (22.2%) presented after 5 years of cyclical symptoms. The majority of them had fistulas as a result of primary Caesarean section for obstructed labour, followed by repeated Caesarean sections, adherent placenta or dilatation and evacuation (22).

## 3. Diagnosis

Most cases can be easily diagnosed during clinical examination and anamnesis; however, in order to confirm the diagnosis and to identify the site and trajectory of the fistulous path, imagistic studies are needed. Therefore, information obtained during standard clinical examination should be completed with those obtained during pelvic examination under anesthesia, cystourethrography, intravenous pyelography, sonohysterosalpingography, cystourethroscopy or hysteroscopy (3,23). However, in certain cases presenting long evolution of the disease, fistulous trajectory might be difficult to be demonstrated during such imagistic studies and therefore pelvic magnetic resonance imaging (MRI) might be needed (24).

The presence of a fistula can usually be confirmed with a simple dye test using sterile water mixed with indigo carmine or methylene blue dye. Cystogram demonstrates the flow of dye into the endometrial cavity and then into the vagina via the cervix. Meanwhile other imagistic exploratory studies of the urinary tract such as cystourethrography or intravenous pyelography might be used in order to demonstrate the presence of this abnormal communication. However, it should not be neglected that during such exploratory investigations of the urinary tract contrast is introduced in the urinary bladder, which has a significantly lower degree of pressure when compared to the uterine cavity; therefore, communication can be demonstrated only if a high diameter fistula is present (3,19-22). In this respect, the presence of a utero-vesical communication should be more facile to be demonstrated during exploratory studies regarding the genital tract such as hysterosalpingography or hysteroscopy; therefore intracavitary injection of contrast during hysterosalpingography will lead to the exteriorization of the substance at the level of the urinary tract. In order to complete the data obtained at hysterosalpingography, a hysteroscopy might be associated; therefore, during this investigation direct visualization of the uterine cavity as well as the presence of the fistulous orifice might be demonstrated. Meanwhile, depending on the dimensions of the orifice, it can be further explored and the trajectory can be identified. During the same intervention, explorative cystoscopy can be also associated in order to confirm the presence of the second orifice of the fistulous trajectory at the level of the urinary bladder; meanwhile the distance between the fistulous orifice, the ureteral ostiums and urethra can be further evaluated. These aspects play a crucial role in regard with the future surgical management of the case (21-25).

Unfortunately, in a significant number of cases, the presence of the fistulous trajectory cannot be objectivized during such exploratory studies; therefore, more complex investigations such as pelvic MRI are needed. Moreover, Williams *et al* suggest that MRI should be the first line of investigation when a uterovesical fistula is suspected, as cystography fails to demonstrate it (24).

#### 4. Classification

There is no generally accepted international classification system for obstetric fistulas. However, according to the World Health Organization classification system, a fistula involving the uterine body or the uterine cervix, with a length of at least 4 cm, presenting multiple fistulous orifices, extensive and/or circumferential tissue loss as well as cases submitted to previous unsuccessful attempts of repair are considered as complex fistulas and are expected to be difficult to repair (25). Meanwhile, according to the time of diagnosis, they can be considered as early or late complications. Therefore, fistulas diagnosed in the first months after an obstetric procedure are considered to be early fistulas and are expected to be successfully managed in a conservative manner while fistulas reported after a later period of time (years) are considered late fistulas and usually necessitate a complex surgical procedure in order to be assessed (21-23,25).

#### 5. Management

Depending on the type, the mechanism leading to the development of these abnormal communications and the time of detection, the surgical approach is different.

The timing of fistula repair is dependent on how the surrounding tissue appears. Early repair can be done if the tissue is healthy, especially after obstetric injury related to instrumented delivery or Caesarean section. Usually, it takes approximately 6 to 12 weeks to allow most granulation tissue to dissipate after gynecologic surgery, therefore increasing the chance of a successful repair. During the waiting period, catheterization of the bladder can allow a spontaneous closure (26,27).

A randomized controlled trial of women conducted in West Africa demonstrated the importance of antibiotic prophylaxis. The participants in the prophylaxis group received 500 mg of ampicillin intraoperatively whereas the control group received no antibiotics. Women in the prophylaxis group received fewer doses of antibiotics postoperatively and had fewer urinary infections on the 10th day after surgery (28).

In a 2007 review by Creanga and Genadry, three surgical approaches were described: abdominal, vaginal and combined +/- laparoscopy (29).

The vaginal route allows for rapid recovery, but it is associated with vaginal shortening and scarring. The vaginal approach is contraindicated when vaginal stenosis is present; the vaginal epithelium around the fistula is severely indurated; the bladder has a small capacity and is poorly compliant; other pelvic structures are involved; or when the repair requires ureteral reimplantation. A layered closure is the preferred method, whether a vascular flap or urethral reconstruction is needed or not (29).

The abdominal route is mostly preferred for complex fistulas. Absolute indications include a small-capacity or poorly compliant bladder requiring simultaneous bladder augmentation; ureteral orifices requiring ureteral reimplantation; the involvement of other abdominal viscera in addition to the bladder; high fistulas that are inadequately exposed; multiple fistulas; vaginal stenosis or adverse musculoskeletal conditions. The disadvantages associated with this approach are

mostly related to a higher rate of postoperative complications and definitely higher costs (29,30).

The combined transabdominal/transvaginal route may be indicated in some cases. Interposed tissue serves to create an additional layer in the repair, fill dead space, and bring a new blood supply to the area. The tissues used include labial fat and bulbocavernosus muscle in a procedure known as the Martius graft. Other procedures can use a gracilis muscle graft, an omental pedicle graft, a peritoneal flap graft, a pedicled flap of the vaginal wall, and a free bladder mucosal graft (30-34).

Laparoscopic repair appears to be a viable alternative for surgeons experienced with laparoscopic suturing techniques. In a case report by Maioli *et al*, limited cystotomy was performed. The posterior bladder wall was adequately mobilized away from the uterus, the uterine rent was then closed using single 3/0 Vicryl sutures and two-layer watertight closure of the urinary bladder was achieved by using 3/0 Vicryl sutures. An omental flap was mobilized and inserted between the uterus and the urinary bladder, and was fixed using two 3/0 Vicryl sutures, followed by tube drain insertion. Laparoscopy has advantages over open surgery in that it is associated with shorter length of hospital stay, less pain, better cosmetic, quicker recovery, and equal efficacy (32).

Unsuccessful repairs occur in 7 to 20% of patients and require complete evaluation of the bladder, ureters, and kidneys before planning subsequent surgeries. Patience is required in the re-evaluation of a patient that continues to leak after a repair. Other complications are the same as for other types of gynecologic surgery (eg., infection, hemorrhage, gynatresia) (32).

#### 6. Prognosis

In skilled surgeons, prognosis is excellent, even though there is no systematic approach available. As obstetric fistula is a preventable pathology; therefore, it is of utmost importance to train medical staff to recognise and treat prolonged labour and perfect Caesarean section technique (33-36).

#### 7. Conclusions

Data on obstetric fistulas are scarce. Therefore, a standardized classification, information regarding surgical management and complications of obstetric fistulas are needed. Better differentiation between simple and complex fistulas would indicate both the severity of the lesions and the degree of surgical care and expertise required for repair, resulting in enhanced patient care. The need for skilled medical personnel, emergency obstetric care and trained surgeons is crucial in particular in developing countries, especially in countries where obstructed labour and obstetric fistulas are known to be prevalent.

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### Authors' contributions

AJ, NB, IB, AF and RB contributed to the conception and design of the present review. CS, BS, RB, OS, BU, and AAA consulted the relevant references and performed the literature data collection. IB and AJ wrote the first draft of the manuscript. NB and IB revised the manuscript. All authors read and approved the final version of the manuscript for publication.

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### Competing interests

The authors declare that they have no competing interests.

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