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Original Article

Spectrum of urologic complications in obstetrics and gynecology: 13 years' experience from a tertiary referral center

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ABSTRACT

Objective: To analyze the patterns of presentation and management for urologic complications of obstetrics and gynecology in the form of genitourinary fistulas at a tertiary referral center and highlight the social issues associated with them.

Material and methods: We conducted this retrospective study analyzing 311 patients with genitourinary fistulas after obstetric and gynecologic surgeries between January 2005 and January 2018. We recorded the patients' characteristics and area of residence and then analyzed the etiology, surgical management and success rates by grouping the patients into four types of genitourinary fistulas. The primary end point of success was patient being leak free.

Results: Majority of patients (90.4%) were from rural areas. The distribution of genitourinary fistulas in descending order was vesicovaginal (79.7%), ureterovaginal (11.8%), urethrovaginal (10.2%) and vesicouterine fistulas (2.6%). The mean time to presentation was 25.80±48.69 days with a wide range of 10 days to 360 months. The most common etiology was obstructed labour (58.5%) followed by abdominal hysterectomy (32.7%). For vesicovaginal fistulas the route to be used for repair depended on surgeon's preference and both transabdominal and transvaginal routes had almost equal success rates. The success rate of laparoscopic vesicovaginal fistula repair was 89.4% and all (100%) laparoscopic ureteroneocystostomies were successful.

Conclusion: Genitourinary fistulas especially due to obstructed labour are still common in developing world showcasing the problem of inequitable distribution of healthcare. The surgical treatment approach depends on the surgeon's familiarity with the said procedure although versatility is required.

Keywords: Equitable healthcare; vesicovaginal fistula; urethrovaginal fistula; ureterovaginal fistula; Youssef's syndrome.

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Introduction

Anatomically the female genital tract and the urinary tract are closely related, thus injuries of the urinary tract have always been an Achilles's heel of gynecologic and obstetric surgeries. The most common injuries are those involving the urinary bladder and the ureter. Injuries to the urethra occur comparatively less frequently. In the developing world, genitourinary fistulas form bulk of the spectrum of these injuries. The incidence of these fistulas has been reported to be between 0.2-2%. In the developed world it has a lower incidence, while the incidence is higher in developing countries.[1] Although the exact incidence of these genitourinary fistulas cannot be stated as many patients with these condition, especially those from poor socioeconomic background never turn up for definitive treatment. The genitourinary fistulas become a social stigma for these patients that hampers their quality of life. In rural areas where these fistulas are most common, the patients become a social outcast so much so that they cannot participate in the cultural and religious activities. One of the most important reasons for this is the inequity in healthcare distribution and lack of access to proper healthcare facilities.[2] Ours is a tertiary referral center in Northern India, which provides healthcare services to a vast population, so we conducted this study to see the patterns of presentation and management of these injuries.

Material and methods

In this retrospective study, we thoroughly reviewed our prospectively maintained database for those patients who presented to us with urologic complications of gynecologic or obstetric surgeries performed from January 2005 to January 2018. Ethical clearance was taken from institutional ethical committee (2988/Ethics/R-cell-18). At admission we take informed consent from all patients for using their data in academic research. We could identify 311 such cases. We recorded the demographic characteristics of the patients including age and area of residence. The complications were due to injuries either to ureter, bladder or urethra resulting in formation of genitourinary fistulas. We recorded the etiology and presentation of these genitourinary fistulas along with the interval between the inciting surgery/procedure and their presentation to us.

All vesicovaginal (VVF) and urethrovaginal fistulas (UVF) were confirmed by cystoscopy, vaginoscopy and pelvic examination (Figure 1). In case of doubt a methylene blue test was done. In case of suspicion of a concomitant ureterovaginal fistula (UtVF) a three-swab test was done. Upper urinary tracts of all cases were evaluated by either using an intravenous pyelogram (IVP) or ultrasound. Over the years it has been our institutional experience that patients with normal upper urinary tracts on ultrasound rarely have any concomitant ureteral involvement associated with a VVF. Earlier we used to perform an IVP in all patients with a VVF but now we perform only an ultrasound. In our center specialist in kidney-uretrer-bladder ultrasonography performs the ultrasonographic examinations and it is our experience that if there is ureteral involvement it is accompanied by some degree of upper urinary tract dilation. Computed tomography (CT) urography was done only in select cases with suspicion of UtVF. An IVP or CT urography was done in all cases of UtVF. These investigations are supplemented with a retrograde ureteropyelography if required.

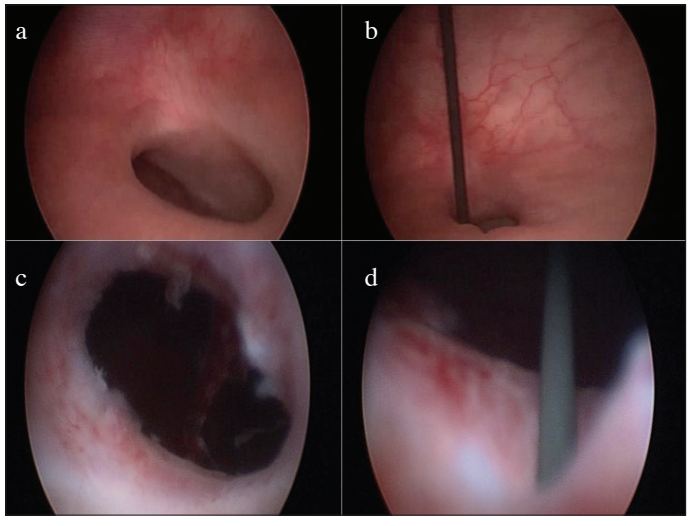

Figure 1. a-d. A vesicovaginal fistula on cystoscopy (a). Samefistula with a guidewire passed into the vagina (b). A urethrovaginal fistula visible on vaginoscopy (c). Appearance of a guidewire passed into the urinary bladder as seen through cystoscopy in the proximal urethra (d)

We generally wait 3 months before carrying out definitive management of genitourinary fistulas except for ureterovaginal fistulas, which we operate even at one month after patient's presentation. Both senior urologists and urology residents in training (under supervision) perform these surgeries at our institute. The management of VVFs was achieved with transabdominal, transvaginal or laparoscopic repair or glue injection. For transabdominal repair of a VVF we use the modified O'Connor's Technique, which has previously been described in a paper from the same institute in 2006.[3] For transvaginal repair we keep the patient in the prone jackknife or extended lithotomy position. We prefer the prone jackknife position and now it has become the standard position for transvaginal repair in our institute. Extended lithotomy position was used only in a few cases done in the past. Circumferential incision is given around the fistula edges after infiltration of edges with saline-adrenaline mixture and vaginal and bladder edges are separated. Bladder is closed with interrupted vicryl 3-0 sutures in two layers and then a Martius labial fat pad is interposed and then the vaginal wall is closed using interrupted vicryl 2-0 sutures. In both approaches we keep in situ both urethral as well as suprapubic catheters. A ureteric splint either in the form of a ureteric catheter or an infant feeding tube is also kept in place if the fistula is close to the ureteric orifice. For a laparoscopic VVF repair we place ureteral stents before starting the surgery and use the same technique as for laparoscopic transabdominal repair. The catheters are kept for at least 6-8 weeks and then removed. Anticholinergics and laxatives are routinely prescribed to all patients and their dose is titrated according to the patient's symptoms. We do not routinely perform a cystographic examination before catheter removal. Glue was used only for small supratrigonal fistulas and injected under cystoscopic guidance after freshening margins of the fistula with cold knife. After any form of VVF repair the patient is advised to abstain from sexual intercourse for 3 months.

Ureteroneocystostomy for UtVF was done through extravesical route, using open or laparoscopic approaches. In cases where the injury was high up in the ureter a Boari's flap was made. UFSs were repaired via transvaginal route as described for transvaginal VVF repair.

The primary end point for success rate was patient being leak free. As a challenging issue because of the patients' underdeveloped socioeconomic background and educational status they

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tend to get lost to follow up and usually do not return unless there is recurrence of symptoms. So the follow-up period of these patients was estimated as the time elapsed from catheter removal up to their last visit.

Statistical analysis

The data was analyzed using IBM Statistical Package for the Social Sciences version 21.0 (IBM SPSS Corp.; Armonk, NY, USA) for Mac. The continuous data were presented as mean with standard deviation and categorical data with percentages.

Results

The characteristics of the study population are presented in Table 1. Most of the patients (90.4%) were from a rural background. The most striking characteristic was the time passed up to the onset of symptomatic complications (range 10 days-30 years). The presentation of the complications of gynecologic and obstetric surgeries was in the form of genitourinary fistulas that included VVF in 79.7%, UVF in 10.2%, UtVF in 11.8% and vesicouterine fistulas (Youssef's Syndrome) in 2.5% of the patients. Both VVF and UVF were seen in 8, whereas both VVF and UtVF in 6 cases. The most common etiology was obstructed labour seen in 182 (58.5%) patients. The patients either underwent vaginal delivery (65.3%), Lower segment cesarean section (LSCS) (32.9%), cesarean hysterectomy (5.4%) or uterine rupture (1.6%) developed following obstructed labour. The second most common etiologic factor was abdominal hysterectomy in 103 (33.2%) patients. VVFs were of supratrigonal (n=152; 61.2%), and trigonal type (n=96; 38.7%). Obstetric causes were responsible for 181 (67.2%) fistulas. The patient characteristics, etiology for the complication and procedures done for each type of genitourinary fistula are described in Table 2. Patients underwent transabdominal repair (n=130), and ureteroneocystostomy (n=14) with indications of concomitant ureterovaginal fistula (n=6) and VVF involving the ureteric orifice (n=8). Patients with supratrigonal VVF underwent transabdominal (n=102), transvaginal (n=24) and laparoscopic (n=19) repairs. The patients with trigonal VVFs underwent transabdominal repair (n=33) or transvaginal repair (n=79). Our experience with glue was limited. We used it in 5 patients and 2 of the fistulas recurred. In 2 patients with large VVFs (both >4 cm) and small capacity bladders we augmented the urinary bladder with ileum. In two patients who had undergone hysterectomy, for carcinoma of cervix we constructed a continent cutaneous urinary diversion after their radiotherapy was complete. The success rates for transabdominal, transvaginal and laparoscopic repairs for VVFs were 95.2%, 92.2% and 89.4%, respectively. All patients of UVFs were managed by transvaginal repair with a success rate of 86.3%. Three cases of UtVF resolved by JJ-stent placement alone and another case had a fistula high up in the ureter for which Boari's flap procedure was performed. The success rates of repairs for UtVF and vesicouterine fistulas were 100%. The mean hospital stay was 14.66±5.57 days. This was a prolonged hospitalization period, because ours is a state run institute and also we do not discharge these patients early because many of them tend to get neglected at home.

Table 1. Characteristics of study population

Characteristics	
Mean age in years±SD (range)	34.15±7.68 (20-61)
Area of residence, n (%)	
Urban	30 (9.6)
Rural	281 (90.4)
Mean interval since presentation in months+SD (range)	25.80±48.69 (10 days-360 months)
Mean hospital stay in days±SD (range)	14.66±5.57 (3-36)
Types of genitourinary fistulas, n (%)	
VVF	248 (79.7)
UVF	32 (10.2)
UtVF	37 (11.8)
Youssef's syndrome	8 (2.6)

SD: standard deviation; VVF: vesicovaginal fistula; UVF: urethrovaginal fistula; UtVF: ureterovaginal fistula

Discussion

Genitourinary fistulas are more common in the developing world. In the developed world they do occur related to gynecologic causes whereas in the developing world obstetric causes predominate. In fact genitourinary fistulas due to obstetric procedures are now virtually unknown in the developed world.[4] In our study, in 67.2% of the patients obstetric causes predominated.

Most of the literature on genitourinary fistulas is from those parts of the world where the population is from a low socioeconomic background and lacks access to proper healthcare.[5-7] An important consideration to be kept in mind is that this is also related to inequitable distribution of healthcare services. Our patient data is a prime example of this. In India almost all the latest technologies for treatment are available in metropolitan cities whereas in rural areas even basic health care facilities are lacking. One of the most important determinants of equitable healthcare is maternal healthcare facility and these genitourinary fistulas with a dominant obstetric cause reflect the failure of equitable healthcare distribution.[2] In fact in many parts of the world maternal mortality rate closely follows the genitourinary fistula rate because obstructed labour is a common denominator.[4] Unsurprisingly 90.4% of our study patients were from a rural area of residence.

Table 2. Characteristics of patients, etiology and definitive procedure for each genitourinary fistula

	VVF (n=248)	UVF (n=32)	UtVF (n=37)	Youssef's syndrome (n=8)
Characteristics±SD (range)				
Age in years	34.4±7.6 (20-61)	31.3±8.1 (20-50)	35.8±7.5 (26-47)	31.8±6.2 (21-41)
Time to presentation (months)	26.2±49.9 (1-360)	51.3±60.2 (3-180)	20.5±38.9 (1-120)	10.8±6.8 (3-20)
Hospital stay (days)	14.9±5.3 (5-36)	16.9±6.4 (8-28)	9.8±5.2 (3-20)	12.6±4.2 (7-22)
Etiology n (%)				
Obstructed labour with vaginal delivery	85 (34.3)	18 (56.2)	6 (16.2)	0 (0)
LSCS for obstructed labour	40 (16.1)	10 (31.2)	8 (21.6)	2 (25)
LSCS for other indications	12 (4.8)	0 (0)	4 (10.8)	6 (75)
Cesarean hysterectomy	9 (3.6)	4 (12.5)	4 (10.8)	0 (0)
Uterus rupture	3 (1.2)	0 (0)	0 (0)	0 (0)
Abdominal hysterectomy	88 (35.4)	0 (0)	14 (37.8)	0 (0)
Vaginal hysterectomy	2 (0.8)	0 (0)	1 (2.7)	0 (0)
Carcinoma cervix	2 (0.8)	0 (0)	0 (0)	0 (0)
Dilatation and curettage	6 (2.4)	0 (0)	0 (0)	0 (0)
Myomectomy	1 (0.4)	0 (0)	0 (0)	0 (0)
Mean size of fistula (mm) (range)	36 (5-60)	7 (5-15)	-	11 (5-20)
Procedures performed, n (%)				
Transabdominal repair	111 (44.7)	0 (0)	0 (0)	5 (62.5)
Transabdominal repair + ureteroneocystostomy	14 (5.6)	0 (0)	6 (16.2)	0 (0)
Transvaginal repair	103 (41.5)	32 (100)	0 (0)	0 (0)
Laparoscopic repair	19 (7.6)	0 (0)	0 (0)	3 (37.5)
Continent cutaneous diversion	2 (0.8)	0 (0)	0 (0)	0 (0)
Augmentation with ileum	2 (0.8)	0 (0)	0 (0)	0 (0)
Glue	5 (2.1)	0 (0)	0 (0)	0 (0)
Ureteroneocystostomy	0 (0)	0 (0)	4 (10.8)	0 (0)
Laparoscopic ureteroneocystostomy	0 (0)	0 (0)	23 (62.1)	0 (0)
Boari's flap	0 (0)	0 (0)	1 (2.7)	0 (0)
JJ-stenting	0 (0)	0 (0)	3 (8.1)	0 (0)

SD: standard deviation; VVF: vesicovaginal fistula; UVF: urethrovaginal fistula; UtVF: ureterovaginal fistula; LSCS: lower segment cesarean section

An important debate in the definitive treatment of VVFs is to choose among transabdominal, transvaginal or laparoscopic approaches. The transvaginal approach can be used to manage most of the simple VVFs whereas complex fistulas that include large fistulas (>4 cm), multiple fistulas, those requiring ureteric re-implant (ureteric orifice close to the fistula) or bladder augmentation and post radiotherapy fistulas are best managed by transabdominal route.[8-11] Although many a times the most important deciding factor is the familiarity and expertise of the surgeon with the said approach and procedure. In our study both transvaginal and transabdominal approaches for VVF repair had an almost equal outcome with success rates of 92.2% and 95.2% respectively.

For laparoscopic repair of VVF either the O'Connor technique or the extravesical technique are used.[12] We operated all 19 patients using the modified laparoscopic O'Connor technique. Laparoscopic repair of genitourinary fistulas demand advanced skills, as it requires intracorporeal suturing and thus has a learning curve. The success rate in expert hands is comparable to open approach. In our study the success rate was 89.4%, which was slightly lower than the open approaches. Robotic repair of VVFs has been described in the literature, but it is comparatively expensive and probably at present time it is not suitable to the profile of mostly poor patients from rural areas that present with these fistulas.[13]

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Spontaneous closure of small VVFs with use of catheter drainage and anticholinergics has been reported in the literature with closure rates up to 10%.[9] We never attempted to use this treatment method in our patient cohort as we felt that our patient population with their lower socioeconomic background and fistula characteristics is not suitable for this treatment modality. Glue has been described for use in the treatment of small VVFs with moderate success rates.[14] We also used it in our 5 patients with small VVFs but the failure rate was high (40%) and somehow we never got convinced to use it in more patients.

UVFs are rarely seen compared to VVFs. The most common etiology for UVF remains to be prolonged obstructed labour. Other etiologies include urethral instrumentation, trauma, pelvic surgery and radiation. In our study all UVFs were associated with obstructed labour followed by: vaginal delivery, LSCS or uterine rupture.[15] The important surgical consideration while doing a UVF repair is that there is relatively scant tissue available because of its location.[16] We did all our repairs transvaginally and a Martius labial fat pad flap was used in all cases and the success rate was 86.3%. A combined transabdominal and transvaginal approach was done in 8 patients who had a concomitant urethrovaginal fistula associated with a vesicovaginal fistula.

The lower part of the ureter near the uterine artery, base of the infundibulopelvic ligament or uretero-vesical junction is most commonly injured during gynecologic or obstetric surgeries.[17,18] In some patients the fistula may heal spontaneously or with the help of a JJ-stent.[19] In our study 3 patients were healed by an indwelling JJ-stent. One patient had upper urinary tract injury, so a Boari's flap reconstruction was required. Rest of the patients, were managed by ureteroneocystostomy. Most of the patients underwent laparoscopic ureteroneocystostomy with a great success rate. Combined UtVF and VVF were found in 6 patients. Combined fistulas have been reported in up to 25% of the cases in the literature. In the present study this incidence was surprisingly low at 2.4% (6/248). Two factors could play a role in this low incidence rate. Firstly our patients presented in advanced stage of the disease, and a small concomitant ureterovaginal fistula could have healed by the time a patient presented and secondly we used ureteric splint very judiciously and this could help in healing of a missed small ureterovaginal fistula. Another 8 cases required ureteroneocystostomy because their vesicovaginal fistulas were very close to the ureteric orifice.

Youssef's syndrome or vesicouterine fistulas can constitute up to 4% of the spectrum of genitourinary fistulas. LSCS is reported as the most common cause of Youssef's Syndrome.[20] The classical triad of presentation consists of maintained continence, amenorrhea and cyclical hematuria (menouria).[21] The management options include conservative treatment with catheterization, medical therapy to induce amenorrhea by luteinizing hormone-releasing hormone agonist or surgery. Surgical management is the mainstay and open, laparoscopic or robotic approaches may be used. Whatever be the approach, the goal is to separate the bladder and uterus and repair them followed by interposition with either omentum or vesicouterine fold. Hysterectomy is rarely required.[22] In our study its incidence was 2.6%, (8/311), and all patients developed fistulas after LSCS and we achieved 100% success rate with 3 laparoscopic repairs.

The present study is a comprehensive report on the spectrum of urologic complications of obstetric and gynecologic surgeries in an area of the world where genitourinary fistulas are probably still endemic. There are certain limitations to our study. Firstly it is retrospective in nature. Secondly, our data were from a state run tertiary referral center in Northern India where most patients are from rural areas with low socioeconomic background, but this probably paradoxically is strength of our study as well because these genitourinary fistulas are common in this subset of the population. Thirdly, our study had a limited follow-up period, because unfortunately these patients are from one of the most neglected population in the society and many times are lost to follow up so we had to measure success at last visit only.

In conclusion, genitourinary fistulas form the major part of urologic complications of obstetric and gynecologic surgeries in the developing world. This is a social problem as well raising major healthcare issues. It is also an indirect indicator of inequitable distribution of healthcare. Their management remains surgical most of the times and a meticulous surgeon with training in the repair of fistulas may achieve successful results. The surgical approach used to treat this condition (transabdominal, transvaginal or laparoscopic) also depends on the surgeon's familiarity with the technique, but the best results would come if the operating surgeon is versatile in adopting these techniques.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of King George's Medical University (2988/Ethics/R-cell-18).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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References

1. Jones HW, Rock JA. Te Linde's operative gynecology: Lippincott Williams & Wilkins; 2015.
2. Balarajan Y, Selvaraj S, Subramanian SV. Health care and equity in India. Lancet 2011;377:505-15. [CrossRef]
3. Dalela D, Ranjan P, Sankhwar PL, Sankhwar SN, Naja V, Goel A. Supratrigonal VVF repair by modified O'Connor's technique: an experience of 26 cases. Eur Urol 2006;49:551-6. [CrossRef]
4. Wall LL, Arrowsmith SD, Briggs ND, Browning A, Lassey A. The obstetric vesicovaginal fistula in the developing world. Obstet Gynecol Surv 2005;60(7 Suppl 1):S3-S51. [CrossRef]
5. Bodner-Adler B, Hanzal E, Pablik E, Koelbl H, Bodner K. Management of vesicovaginal fistulas (VVFs) in women following benign gynaecologic surgery: A systematic review and meta-analysis. PLoS One 2017;12:e0171554. [CrossRef]
6. Ezegwui HU, Nwogu-Ikojo EE. Vesicovaginal fistula in Eastern Nigeria. J Obstet Gynaecol 2005;25:589-91. [CrossRef]
7. Ghoniem GM, Warda HA. The management of genitourinary fistula in the third millennium. Arab J Urol 2014;12:97-105. [CrossRef]
8. Kapoor R, Ansari MS, Singh P, Gupta P, Khurana N, Mandhani A, et al. Management of vesicovaginal fistula: An experience of 52 cases with a rationalized algorithm for choosing the transvaginal or transabdominal approach. Indian J Urol 2007;23:372-6. [CrossRef]
9. Stamatakos M, Sargedi C, Stasinou T, Kontzoglou K. Vesicovaginal fistula: diagnosis and management. Indian J Surg 2014;76:131-6. [CrossRef]
10. Blaivas JG, Heritz DM, Romanzi LJ. Early versus late repair of vesicovaginal fistulas: vaginal and abdominal approaches. J Urol 1995;153:1110-3. [CrossRef]
11. Hillary CJ, Chapple CR. The choice of surgical approach in the treatment of vesicovaginal fistulae. Asian J Urol 2018;5:155-9. [CrossRef]
12. Miklos JR, Moore RD. Laparoscopic extravesical vesicovaginal fistula repair: our technique and 15-year experience. Int Urogynecol J 2015;26:441-6. [CrossRef]
13. Matei DV, Zanagnolo V, Vartolomei MD, Crisan N, Ferro M, Bocciolone L, et al. Robot-Assisted Vesicovaginal Fistula Repair: Our Technique and Review of the Literature. Urol Int 2017;99:137-42. [CrossRef]
14. Kumar U, Albala DM. Fibrin glue applications in urology. Curr Urol Rep 2001;2:79-82. [CrossRef]
15. Wong MJ, Wong K, Rezvan A, Tate A, Bhatia NN, Yazdany T. Urogenital fistula. Female Pelvic Med Reconstr Surg 2012;18:71-8. [CrossRef]
16. Pushkar DY, Sumerova NM, Kasyan GR. Management of urethrovaginal fistulae. Curr Opin Urol 2008;18:389-94. [CrossRef]
17. Lee JS, Choe JH, Lee HS, Seo JT. Urologic complications following obstetric and gynecologic surgery. Korean J Urol 2012;53:795-9. [CrossRef]
18. Janssen PF, Brolmann HA, Huirne JA. Causes and prevention of laparoscopic ureter injuries: an analysis of 31 cases during laparoscopic hysterectomy in the Netherlands. Surg Endosc 2013;27:946-56. [CrossRef]
19. Mandal AK, Sharma SK, Vaidyanathan S, Goswami AK. Ureterovaginal fistula: summary of 18 years' experience. Br J Urol 1990;65:453-6. [CrossRef]
20. Birge O, Ozbey EG, Erkan MM, Arslan D, Kayar I. Youssef's Syndrome following Cesarean Section. Case Rep Obstet Gynecol 2015:605325. [CrossRef]
21. Youssef AF. Menouria following lower segment cesarean section; a syndrome. Am J Obstet Gynecol 1957;73:759-67. [CrossRef]
22. Bettez M, Breault G, Carr L, Tu le M. Early versus delayed repair of vesicouterine fistula. Can Urol Assoc J 2011;5:E52-5. [CrossRef]