

Urogynecologic Fistulae: A Prospective Clinical Study in a Tertiary Center

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Abstract:

Background: Urogynecologic fistula (UGF) is a post-surgical complication commonly associated with gynecological treatments such as hysterectomy. Modern obstetric techniques have led to a decline in childbirth-related fistulae in affluent countries, but in poor countries with limited access to obstetric care, vesicovaginal fistulas (VVF) continue to remain, posing social and physiological difficulties. Efficient restoration necessitates exact surgical techniques customized to each patient's unique attributes. To improve knowledge and treatment of UGFs, this study is conducted to thoroughly investigate patient demographics, incidence, and causes of different UGFs, as well as diagnostic standards and surgical procedures. Results will be compared with those of earlier studies.

Materials and Methods: This prospective study, conducted from June 2021 to May 2023 at King George Hospital, examined urogynecologic fistulae that resulted from hysterectomy and obstructed childbirth. Urinary incontinence due to causes other than urogynecologic fistula is excluded. Comprehensive evaluations and a range of surgical repair techniques were used in the diagnosis. Continence three months after surgery was deemed a successful result.

Results: The study involved 36 cases, predominantly vesicovaginal fistulae (VVF). Of these, 34 were primary fistulae, and two were recurrent VVF cases. Among VVF patients, 20 had simple and 9 had complex fistulae. No recurrences were observed in ureterovaginal and urethrovaginal fistulae. Treatment approaches included abdominal O'Conor repair (22 cases), vaginal repair (5 cases), combined abdominal and vaginal repair (2 cases), and McGuire Pubovaginal fascial sling in 2 patients.

Conclusion: The lives of women are profoundly affected by urogynecologic fistulae, and the only effective treatment is meticulous surgery. With possible benefits, both the abdominal and vaginal methods can yield great outcomes in certain situations. For good healing and problem monitoring following surgery, adequate urine drainage and routine follow-up are crucial.

Keywords: Urogynecological fistula, Vesicovaginal fistula, O'Conor repair, McGuire Pubovaginal fascial sling.

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Introduction

Surgical therapy faces a profound challenge in the treatment of urogynecologic fistula (UGF), which has its historical roots in obstetric and gynecologic procedures [1]. Modern obstetrical procedures have decreased the number of childbirth-related incidents, but in industrialized countries, trauma from gynecological surgeries—particularly hysterectomy—continues to be a major contributing factor. In low-income countries, prolonged strenuous labor is a significant factor contributing to the increasing incidence of the most common type of urogynecologic fistulas, known as vesicovaginal fistulas (VVF). [2]

This upsetting illness, which mainly affects women

in underprivileged areas, causes constant vulval and vaginal excoriation and urine leaks, which frequently ends in social rejection [3]. The fundamental ideas established by Couvelaire in 1953—"good visualization, good dissection, good approximation of the margins, and good urine drainage"—hold the key to any fistula's effective repair. According to Couvelaire's principles, vaginal and abdominal procedures can both be used to achieve successful fistula repair. [4] These techniques need careful imaging, dissection, margin approximation, and efficient urine drainage.

The choice of procedure is influenced by the features of the fistula and the surgical team's

experience. Based on estimates from the World Health Organization (WHO), obstetric fistulae in developing countries result in significant morbidity in 2–7 million women annually [5]. However, there is limited information available about the prevalence of obstetric fistulas in Asia, notably India. Based on the inconsistent occurrence rates observed in previous research, a fistula registry is one example of an organized data collection program that is required [6,7,8].

The Aim and Objectives of the Study:

1. Examining patient profiles, demographics, incidence, and etiology of urogynecologic fistulas (UGF).
2. Assessing UGF diagnosis criteria and surgical techniques.
3. Comparing outcomes with previous research to improve comprehension of UGF treatment.

Materials and Methods:

This prospective study was conducted at the tertiary care facility, King George Hospital, in Visakhapatnam, in the department of urology. The study was conducted from June 2021 to May 2023, a span of 24 months. This study covered all patients with proven urogynecology fistulae, whether they were referred from outside the study institute or diagnosed there. Patients with UGF who presented with a history of radiation, instrumental delivery, trauma, hysterectomy, or lower segment cesarean section (LSCS) met our inclusion criteria. Individuals with urinary incontinence from other causes were not included.

A modified Kuppaswamy scale was used to assess socioeconomic standards. A low body mass index suggests malnutrition (BMI). A common questionnaire was used for the interviews with each patient. Each woman was assessed based on a thorough history that included her age, parity, and the antecedent incident that caused the fistula.

An evaluation of the woman's overall physical state was conducted. Regular blood examinations were

performed, including testing for renal function and blood sugar levels, as well as hemoglobin levels, blood grouping and anemia correction was done prior to surgery. In every instance, a urine culture was performed, and when necessary, the sensitivity report was used to determine which antibiotics to use. A thorough history, physical examination, CT urography, ultrasound, and endoscopic examination were used to establish the diagnosis.

To determine the true degree of the injury, the size, location, and number of fistulae, as well as the existence of any further issues (such as calculi or infection), a cystoscopy and examination under anesthesia (EUA) were performed.

At the time of admission, every patient had a catheter. Following an assessment under anesthesia, the type of fistula and the surgical technique were determined. The procedures used on VVF patients were either vaginal or abdominal. The O'Connor's technique was used in abdominal repair. The vaginal flap technique was used for the vaginal approach. All of the UVF patients had vaginal flap surgery when they were in the Lawson's or jackknife positions. One patient had ureteric reimplantation using Pacquin's approach, while two patients with ureterovaginal fistulae underwent ureteral stenting. Either a suprapubic catheter, a per urethral catheter, or both were used to guarantee continuous bladder drainage. All patients received antibiotics after surgery based on their preoperative patterns of sensitivity. Complications following surgery were recorded.

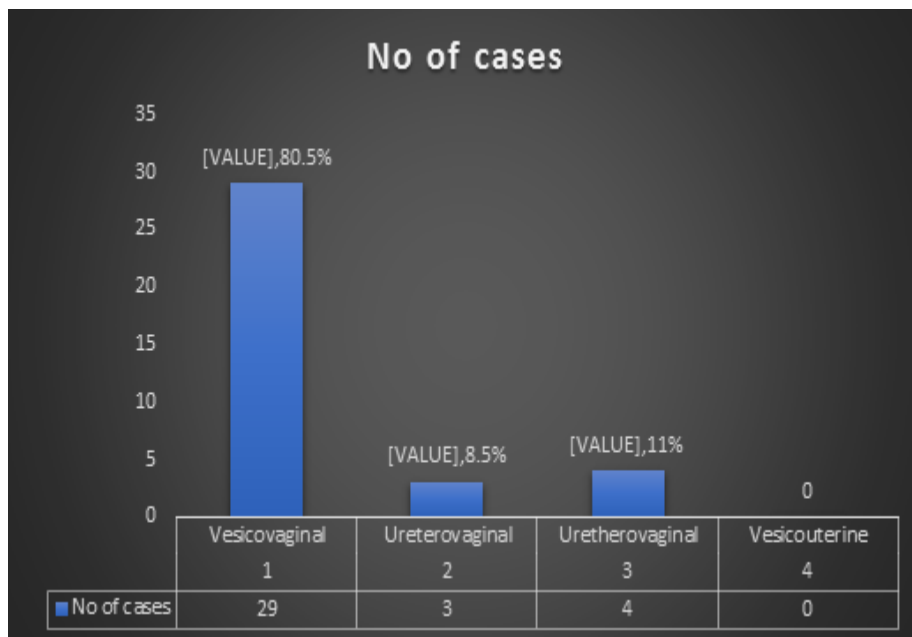
Every patient received care till their discharge and then continued with routine outpatient appointments. It was recommended that patients refrain from having sex for three months following surgery. Patients were questioned about their sexual lives, new onset lower urinary tract symptoms, and recurrent urine incontinence during follow-up. During follow-up, patients got focused physical examinations. At three months of follow-up, being continent was considered success.

Results

Table 1: Patient distribution based on fistula types

Type of Fistula	Number of Women
Vesicovaginal Fistula (VVF)	27
Urethrovaginal Fistula (UVF)	2
Ureterovaginal Fistula (URVF)	3
Both VVF and URVF	2
Total Women	34
Total Fistulae	36

The distribution of research participants is summed up in this table, which classifies them according to the kind of urogynecologic fistula they had. Vesicovaginal fistulas predominated, with urethrovaginal and ureterovaginal fistula instances following. A portion of the patients had both URVF and VVF, which added to the overall count of fistulae found.



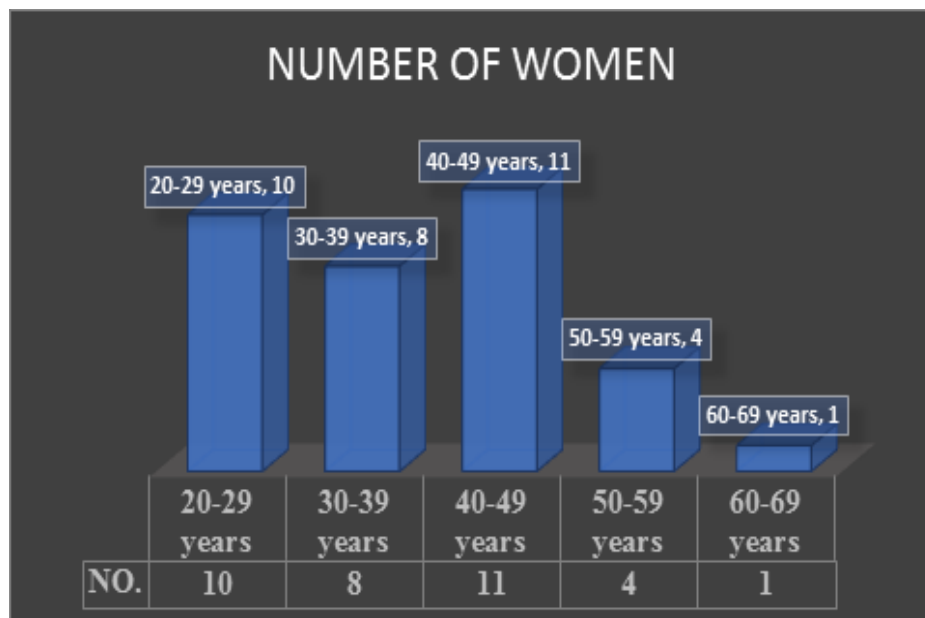
Graph 1: Distribution of urogynecologic fistula types

This graph shows the distribution of the different types of urogynecology fistulas that were found during the investigation. Urethrovaginal and Ureterovaginal fistulae were the next most common types, after vesicovaginal fistulae. The study did not report any cases of vesicouterine fistulae.

It was found that two VVF patients had recurring fistulae. A one-year follow-up was provided for more than half of the women, however the duration of follow-up varied, between three to twenty-five

months. Among patients with ureterovaginal fistulae, there was a more than a year follow-up time. Of the participants, eighteen were from rural backgrounds and sixteen were from cities.

There are eight ladies with one child, ten with two children, nine with three children, and seven with four children, totaling 34 women. The women were 49.7 kg in weight and 148.8 cm (4'11") tall on average. The study's average hospital stay was fifteen days.



Graph 2: Distribution of Patients Based on Presenting Age Groups

Women aged in the range of 20 - 60 years with the mean age was 37 years. 10 patients were between 20 – 29 years, 8 patients were between 30 – 39 years, 11 patients were between 40-49 years, 4 patients were between 50– 59 years whereas 1 patient was above 60 years.

Table 2 : Etiology, Duration, and Size Distribution of Urogynecologic Fistulae

Etiology	Number
Abdominal Hysterectomy	22
Vaginal Hysterectomy	2
Obstructed Labour	11
Lscs	5
Instrumental Delivery	5
Home Delivery	1
Radiation	1
Duration of fistula	Number
<1 Yr	13
1-3yrs	11
4-5yrs	3
6-10yrs	4
>10yrs	3
Size of the fistulae	No
< 1cm	5
1-2cm	14
2-3cm	7
3-4cm	4
>4 cm	3

This table provides a detailed breakdown of the number of urogynecologic fistulae cases based on their etiology, duration, and size within the studied population.

With 22 coming from abdominal hysterectomy and 2 from vaginal hysterectomy, gynecological reasons accounted for the bulk of urogynecology fistulae (66.6%).

Eleven fistulae were caused by obstructed labor; five of these instances involved lower segment cesarean sections, five had tool births, and one patient involved a home birth with protracted labor.

The majority of short-statured and malnourished women with a history of obstructed labor had large babies in two of their cases.

One patient had radiation treatment for cervical cancer in the past.

Depending on when the fistula occurred, 70.5% of cases manifested within three years of the preceding incident. Thirteen women made their presentation in the first year, eleven in the 1–3-year range, three in the 4–5-year range, and three who presented more than ten years later.

The fistula ranged in size from less than 1 cm to more than 4 cm, with the majority (14 instances) being 1-2 cm. Sizes ranged from less than 1 centimeter to 2-3 cm, 4–4 cm, and 3–4 cm.

The size of ureterovaginal fistulae was not taken into account.

Table 3 :Characteristics of Vesicovaginal Fistulas (VVF)

Type of VVF	No
Supra-trigonal	16
Trigonal	10
Combined	3
Number of VVF	No
Single	26
Multiple	3
Complexity	No
Simple	20
Complex	9
Recurrence	No
Primary	27
Recurrent	2
Repair	No
Abdominal	22
Vaginal	5
Combined	2

This table presents details related to Vesicovaginal Fistulas (VVF), including the type, number, complexity, recurrence, and repair method.

The distribution of fistula locations among the 29 individuals who received a VVF diagnosis was as follows: Ten people had trigonal fistulas, three had fistulas involving both the trigonal and supratrigonal regions, and sixteen had supratrigonal fistulae. Reimplantation of the ureters was necessary in two cases because the fistula was near the ureteric orifice. Furthermore, two patients had concomitant bladder calculi, and two others had fistulas around the bladder neck that appeared wide open.

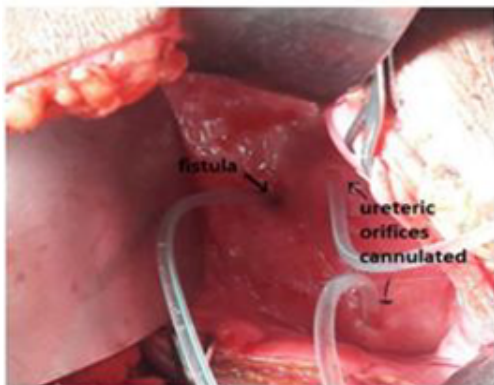
Three of the 29 VVF patients had numerous fistulas, while the rest of the patients—26—had just one. The

supratrigonal region was the site of both fistulas in each of the three cases involving multiple (2).

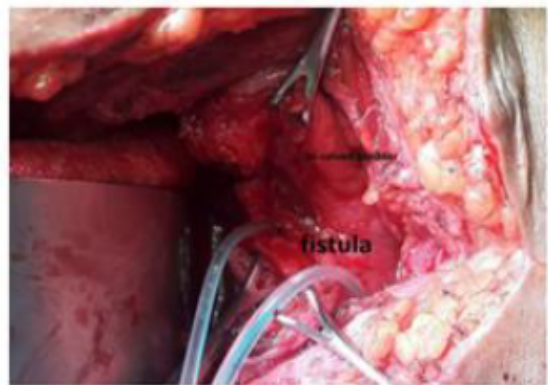
Twenty of the 29 VVF cases had simple fistulas, while nine had complicated fistulas. Of the total number of fistulas, 27 were primary, and 2 were recurring. Remarkably, no recurrence cases were noted in the cases of urethrovaginal and ureterovaginal fistulas.

Of the 29 VVF cases, 22 patients had their O'Connor repaired, five chose to have their vaginal repair, and two had both their vaginal and O'Connor repair. Furthermore, two patients needed procedures including McGuire Pubovaginal Fascial Slings.

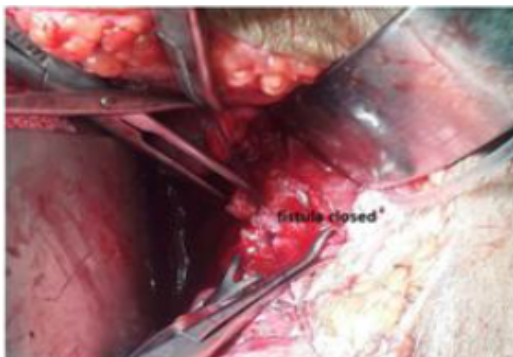
O' Connor's Technique



Supra-Trigonal fistula



Bladder Bivalved

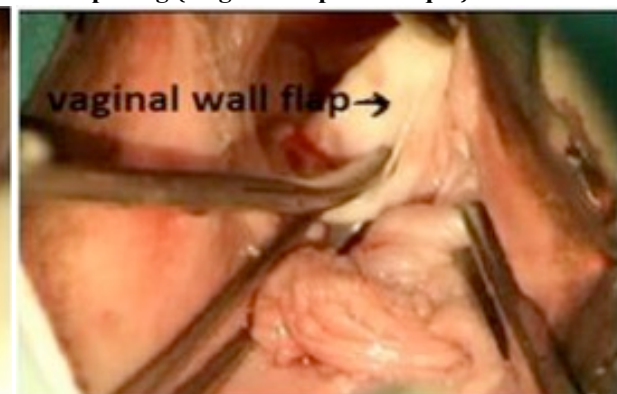
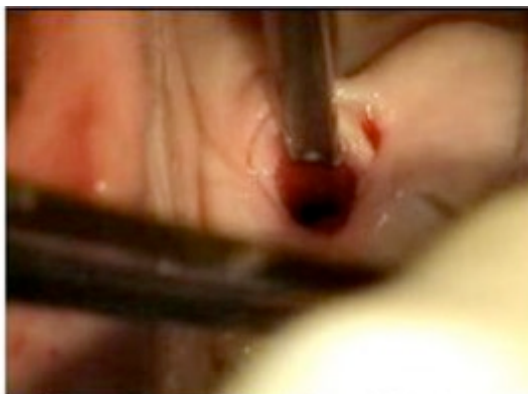


Fistula closed



Omental flap

Circumferential Incision Around Fistulous Opening {Vaginal Flap Technique}



MARTIUS FLAP

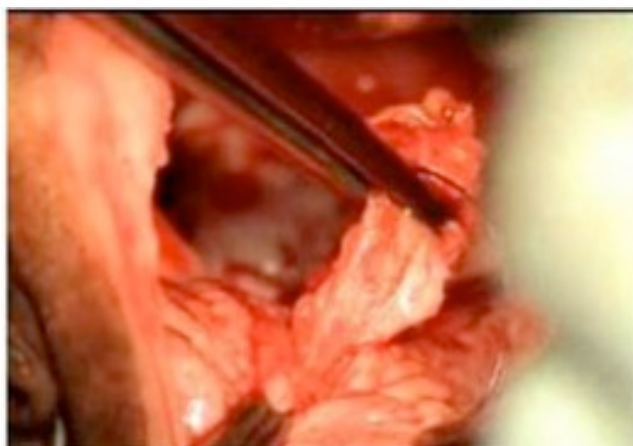


Table 4 : Etiology and Type of Repair in Ureterovaginal Fistulae

Etiology	No
Abdominal hysterectomy	2
LSCS	1
Type of repair	No
Ureteral stenting	2
Ureteric reimplantation	1

The causative factors and related repair methods for ureterovaginal fistulae are shown in this table. Three patients were diagnosed with ureterovaginal fistulae; two had previously undergone abdominal hysterectomy, and the third had undergone a lower segment cesarean section (LSCS). Notably, every unilateral ureterovaginal fistula discovered throughout the study was observed.

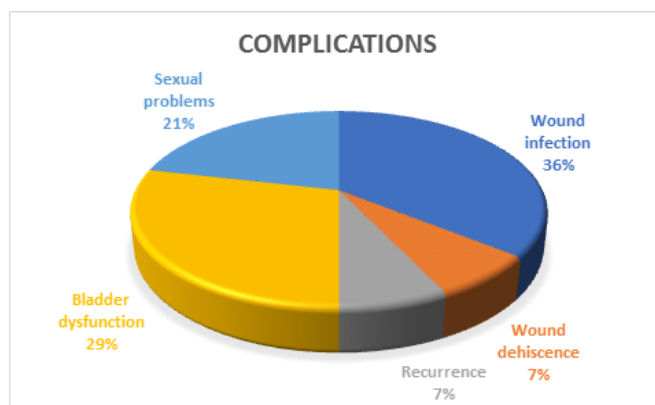
While the third patient had ureteric reimplantation, the other two patients with ureterovaginal fistulae responded favorably to stenting. Every patient had a DJ stent in place. The stent was taken out eight weeks following surgery.

Table 5: Presentation and Surgical Management of Urethrovaginal Fistulae

UVF	No
UVFalone	2
UVF+VVF	2
Fistula	Procedure
UVFalone	Vaginal flap repair
UVF+VVF	Combined abdominal & vaginal repair

The presentation and surgical therapy of urethrovaginal fistulae are described in this composite table. It shows that two instances had UVF only, two cases had UVF and VVF, and it gives information on the surgical techniques used in each case. Individuals with coupled UVF and VVF underwent combined abdominal and vaginal surgery, whereas patients with UVF alone underwent vaginal flap repair. A

simultaneous anti-incontinence treatment using McGuire's pubovaginal fascial sling was carried out for instances with both UVF and VVF near the bladder neck. The use of the Martius flap as an interpositional flap is highlighted. This combined table provides a thorough summary of urethrovaginal fistulae presentation and surgical treatments.



Graph 3: Complications following fistula repair.

This pie chart summarizes the complications observed after fistula repair procedures. Two months following the first repair, one of the patients in our study had a recurrent fistula, which required a successful second operation. Five individuals experienced wound infections, which were successfully treated with the appropriate medications. One patient experienced wound dehiscence, which was successfully repaired. Anticholinergics were used to treat urgency and frequency difficulties in four patients. Vaginal dilatation was used to treat the symptoms of dyspareunia in three patients.

Discussion

In the course of our investigation, we looked at 34 ladies who had 36 urogynecologic fistulae in total. Eighty-five percent of these cases had vesicovaginal fistulae (VVF), eighty-five percent had ureterovaginal fistulae (UVF), and eleven percent had urethrovaginal fistulae. There were two patients with VVF and UVF. Interestingly, no vesicouterine fistulae were found, which is consistent with other research showing a higher frequency of VVF than other urogynecology fistulae.

In our investigation of 36 fistulae, gynecological reasons, primarily abdominal hysterectomy (66.6%), and obstructed labour (30.5%), predominated. Ureterovaginal fistulae were linked to abdominal hysterectomy or a second LSCS, whereas urethrovaginal fistulae were linked to obstructed labor or instrumental deliveries. The rising prevalence of hysterectomy, particularly in metropolitan areas, may have an impact on the rise in gynecological causes.

UGF presentation time varies; some report immediately after catheter removal, while most present 4-6 weeks post-surgery. Pelvic radiation induced UGFs typically show delayed onset, appearing months or years after treatment [12].

In our study, presentations ranged from 4 weeks to over 18 years. The majority presented within 3 years, with 13 women in the first year, 11 between 1-3 years, 3 between 4-5 years, 4 between 6-10 years, and 3 after more than 10 years. Cultural taboos and ignorance often lead to delayed reporting of urinary leakage onset.

In our study, most women presented after at least 3 months, precluding early repair. Surgical intervention occurred after comprehensive evaluation, anemia correction, and infection treatment. The ideal timing for intervention remains a debated topic.

Vaginal approaches minimize complications but may lead to vaginal shortening and dead space formation. Abdominal approaches like O'Connor's operation are widely accepted for supratrigonal fistula repair, offering durable success. The transperitoneal approach is suitable for larger fistulae and

concurrent procedures if intra-abdominal pathology is present or prior attempts were unsuccessful.

All patients in the study underwent surgical repair. The majority (64.7%) of VVF patients (22 women) received O'Connor transabdominal repair. Five patients had vaginal repair, while two underwent combined abdominal and vaginal repair. Two patients required McGuire pubovaginal autologous fascial sling, chosen for small, infratrigonal fistulas near the bladder neck with a scar-free vagina. Other VVF patients underwent abdominal repair.

With a vascular graft and replacement tissue, the omentum—which is frequently used for interposition—offers a robust circulatory supply and lymphatic drainage to the suture lines. It is commonly used to treat radiation fistulas, especially urethral and bladder neck fistulas, as well as to reduce scarring and post-fistula repair stress incontinence. Evans et al.'s investigation showed that all patients were effectively treated with omental interposition grafts, showing greater success rates [15]. In comparison, the success rate dropped to about 66% for surgeries done without flaps. Excellent success rates in repairs without omental flaps have been reported in certain investigations, particularly in patients with small-sized fistulas. [16,17]

When trying to mobilize the labial flap for interposition between the vaginal and bladder walls during fistula repair, a reliable and secure procedure termed as the Martius flap is often used as an interpositional tissue. Improved rates of success with the Martius flap were reported in studies by Ranganekar[18] and colleagues and Eilber [14] and colleagues, confirming its usefulness in both urethrovaginal fistula (UVF) and vesicovaginal fistula (VVF) repairs. [19,20]

In the present study all the patients in VVF and UVF groups, interpositional grafts were used to cover the fistula and to separate the adjacent structures.

Omentum was used in all the abdominal repairs, whereas Martius flap was used for vaginal approach.

Iatrogenic ureterovaginal fistulas (URVFs) are an uncommon complication of major gynecological procedures that affect 0.5-2.5% of cases and cause ureteric obstruction. Research by Selzman [22] et al. and Dowling et al. [21] has effectively treated URVF with internal stenting, highlighting the possibility of retrograde stent placement providing ureteral continuity shown on imaging. The mainstay treatment method is still surgery, which is usually carried out at least three months after the injury to allow for complete tissue healing [23]. There are others who support early repair by laparoscopic or robotic surgery in order to expedite healing and minimize hospital stays [24]. If stent placement fails, ureteroneocystostomy is advised, with successful outcomes in certain series. For poor-risk

patients, nephrectomy or renal embolization may be considered [25,26]. Novel approaches, such as the Memokath 051 stent used in a study by Khalid al otaibi et al. [27], may also be used.

An abdominal technique only succeeded in 58% of instances in Goodwin's series [28], but a vaginal approach showed a 70% success rate on the first try and a 92% success rate on the second. The vaginal method was linked to shorter hospital stays, less blood loss, and faster operating times. In the course of the treatment plan, surgeons ought to give serious thought to whether a concurrent anti-incontinence surgery is necessary and feasible. According to several research, such as Pushkar et al. [29], urethrovaginal fistulae closed 90.1% of the time after the first vaginal intervention and 7.4% of the time during the second intervention. Study conducted at Patna Medical College, reported treatment success rates ranging from 92.8% to 92.9%.³⁰ In our study, one patient experienced a recurrent fistula two months post-VVF repair, underwent successful Martius interpositional flap

vaginal flap repair, followed by abdominal repair. Five patients received antibiotic treatment for wound infections, and one patient's wound dehiscence healed satisfactorily. [30]

Four patients received anticholinergics for their urgency and frequency complaints, while vaginal dilatation was used to treat three patients' dyspareunia. At least 10% of individuals with obstetric fistulas experience stress incontinence; in two of these cases, the bladder neck was involved. In these patients, combined abdominal and vaginal surgery included anti-incontinence techniques, such as McGuire's pubovaginal autologous fascial sling. It was determined that using the Martius flap was necessary for positive results. The study's overall success rate of 97% can be attributed to the usual recommendation of the Martius flap in urethrovaginal fistula closure. [31,32] Continence three months after surgery was considered a successful outcome, however this little follow-up period may have constraints.

Table 6: success rate of studies over past 10years

Author	Year	Country	Patients	Years	Technique	Success rate%
Demirci et al [33]	2013	Sweden	19	6	Abdominal/vaginal	100
Altaweel et al [34]	2013	Saudi arabia	26	8	Abdominal	95
Raashid et al [35]	2010	Pakistan	61	2	Vaginal/abdominal	87
Kochakamand Pummangura [36]	2007	Thailand	45	7	Vaginal/abdominal	100
Kapoor et al [37]	2007	India	52	6	Vaginal/Oconor	94.2
Khan et al [38]	2005	Pakistan	30	6	Transvesical	80
Sotelo et al [39]	2005	Venezuela/brazil	15	7	Laparoscopic	93
Gupta et al [40]	2010	India	32	-	12 robotic 20 open	100 90
Present study	2016	India	34	2	O'conor/vaginal	97

Table7 :Study comparison of ureterovaginal fistulae

STUDY	no	Etiology	Laterality	Surgery	Success %	Remarks
Bencheckroun [41]	45	71% Obstetric 29% gynec	U/L 42B/L3	Ur.reimp27 Boarif 13 Psoashitch 5 Nephroctomy 2 Dj stent 3 Appendicoureteroplasty 2 Lleouretero plasty 2EEA1	77	2 nephrectomy
Mandal AK [45]	31	Allgynec	-	Jreteroneocystostomy 29, (boarifl 10, direct19) Conservativemx 2	100	Renal lavage in all cases
Haqnavaz [42]	26	Gynec 20 Caesei- ansec 6	23U/L 3B/L	Ureteroneocystostomy Nall cases	100	Renal salvage+
ShawJ [43]	19	18 hysterctomy 1LSCS	-	UreteroNeocystostomy 14 Stenting 5	100	Renal salvage+
B.murtaza [44]	17	10 gynec 7LSCS	-	14 direct ureteroneocystostomy 2 boariflap, 1 pso-ashitch	100	Renal salvage+
CurrentStudy	3	2gynec 1LSCS	ALLU/L	2 stenting, 1uretero Neocystostomy	100	Renal salvage+

Table 8: study comparison of urethrovaginal fistulae

Author	No	Etiology	Surgery	Success	Remarks
Haqnavaz [42]	54	44obstet 6 instr 3trauma 1radiation	Vaginal flap repair	-	-
Dypushkar [29]	71	Obstetric trauma 30 And vaginalsurgery41	Vaginalrep	90.1%	SUIishigh
Abdelbary[46]	19	Post birth trauma	Vaginalflap	100	Antvag wall slingforcor- rection of SUI
Present Study	4	OBSTRUCTED LABOUR	VAGINAL FLAP	100	McGiore [VS for SUIIN2 pts

Conclusion

Urogynecologic fistulae significantly impact the quality of life for affected women. An accurate diagnosis and well-planned surgical intervention are essential for effective management. Success in treatment relies on meticulous surgical planning and execution, with the best chance for a successful repair occurring during the initial attempt. Both abdominal and vaginal approaches can yield excellent outcomes for vesicovaginal fistula (VVF) in well-selected cases. The vaginal approach may offer advantages such as reduced blood loss, pain, complications, and shorter hospital stays.

Interposition tissue grafts play a crucial role in achieving favourable outcomes, emphasizing their essential use in surgical procedures. For ureterovaginal fistulae, attempting ureteral stenting can be a viable option, especially for small fistulae. Unobstructed postoperative urinary drainage is critical for the successful healing of the fistula. Regular follow-up is essential to monitor complications and ensure successful outcomes in the management of urogynecologic fistulae.

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