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Trends and Outcomes in Reporting and Grading Complications of Urological Surgery: A Retrospective Analysis

Habib Ur Rehman[1], Muhammad Asif[2], Yassar Hussain Patujo[3], Maliha Amjad[4]*, Hamza Khan[5], Tahmeedah Safiullah[6], Muhammad Inzamam Wakeel[7], Irshad Ahmad[8]

[1] Department of Urology, Institute of Kidney Diseases, Peshawar, KP, Pakistan.
[2] Department of Urology, DHQ Teaching Hospital, Mardan, KP, Pakistan.
[3] Department of Urology, Chandka Medical College/ SMBBMU Larkana, Sindh, Pakistan.
[4] Department of Urogynecology, Shalamar Hospital, Lahore, Punjab, Pakistan.
[5] Department of General Surgery, Bacha Khan Medical Complex, Swabi, KP, Pakistan.
[6] Department of General Surgery, Lady Reading Hospital, Peshawar, KP, Pakistan.
[7] Department of Medicine, RIMS Trauma Hospital, Karachi, Sindh, Pakistan.
[8] Department of Radiology, Niazi Medical and Dental College, Sargodha, Punjab, Pakistan.

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Corresponding Author: Maliha Amjad, Department of Urogynecology, Shalamar Hospital, Lahore, Punjab, Pakistan.
Email: malihaamjad90@gmail.com

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ABSTRACT

Introduction: Complications in urological surgery can range from minor, self-limiting issues to severe, life-threatening events requiring significant medical intervention. This study aimed to assess the reporting and grading of complications in urological surgery, focusing on current trends and future perspectives. **Methodology:** Conducted at the Institute of Kidney Diseases, Peshawar, from 2022–2023. This retrospective study included 165 patients diagnosed with vesicovaginal fistula (VVF) or bladder urethral stricture and hypoplasia (BURSH) requiring surgical intervention. Patients with prior surgeries that could interfere with complication assessment or incomplete medical records were excluded. **Results:** Various surgical procedures were performed, tailored to the individual's medical history, fistula location, and size. Surgical approaches included transvaginal repair, transabdominal repair, or laparoscopic repair. The mean age of patients was 49.23 years (range 26–74), with 90% females and 10% males. Comorbidities included diabetes (20%), hypertension (25%), and other chronic illnesses (15%), with an average BMI of 24. A history of smoking and alcohol consumption was reported in 15% and 10% of patients, respectively, while 30% had undergone prior urological surgeries. **Discussion:** Post-surgery, 70% achieved satisfactory urinary control, 20% experienced mild to moderate incontinence, and 10% reported persistent control issues. Minimal to moderate pain was noted in 60%, while 25% experienced transient discomfort resolving within three months, and 15% reported chronic pain. **Conclusion:** The findings highlight the importance of personalized surgical approaches, with minimally invasive techniques reducing complication rates and improving outcomes in urological surgeries for VVF and BURSH.

INTRODUCTION

Complications in urological surgery can vary widely in type and severity, ranging from minor issues that resolve with minimal intervention to life-threatening events requiring extensive medical care. The accurate classification and reporting of these complications are crucial for several reasons: In regards to quality assurance, it helps patients compare across different cares and educates patients and care providers of the risks that might be attached to certain treatments [1].

Environmental complication reporting also has significant responsibility in professional accountability because it provides the practitioner with measurable standards and outcomes, goals against which to measure performance, and potential opportunities for embellishment. Previously, there was no standardized framework in which details concerning complications in urological surgery could be reported and analysed [2].

In response to this, a number of classification systems have been proposed and all of them have distinct grading parameters. Perhaps the most common is the Clavien-Dindo system that was initially developed for general surgery but later applied to urology [3]. This system classifies complications as Grade I through Grade V depending on the type of intervention needed for their treatment. Grade I means the patient is slightly off from the expected post operative recovery and Grade V is implies the patient has developed a complication that has caused his death. This increases consistency, facilitates data organization and collection and makes it easier to assess outcomes between different institutions/and or studies [4].

Another system is the Martin criteria which give a comprehensive framework of documenting complication, and it includes the type of complication, the time period it occurs, the severity of the complication among others. This system makes reporting very transparent and inclusive by forcing the surgeon to report any aberration from the normal postoperative procedure right down to lesser holds [5]. As a result, besides giving a more detailed picture of the patients' condition, the Martin criteria can be useful for outlining trends that would remain hidden otherwise, due to the more limited scope of the grading system. In urological surgery complications arising from specific diseases like VVF and BURSH are unique [6]. Vesicovaginal fistula is a major complication in which there is formation of an abnormally direct communication between the bladder and the vagina leading to urine leakage into the vaginal canal. Chronic obstructive pulmonary disorder is often associated with obstructed labor in resource-limited developing countries although it can also develop from surgical procedures, physical trauma, radiation therapy, or infections. Surgical management of VVF is a very technical exercise as repairing it poses many challenges due to the high chances of reconversion, infection and complications of the urinary and sexual system [7].

The management of VVF requires a very delicate approach in that the fistula needs to be closed and at the same time maintain normal form and function of the bladder and vagina. Conservative management of VVF is not possible, and several surgical procedures are done to bridge the fistula including transvaginal, transabdominal, laparoscopic or robotic surgery among others [8]. Both techniques are not devoid of their own specific complications and grading of these complications is crucial in measuring the success and safety of the procedure. Some of the complications that are bound to occur at the later ages of VVF repair include; reinfection, fistula formation, urinary tract infection, and wound breakdown. Many of these complications are also not only physical, but have a significant influence on a patient's quality of life, his or her psychological state and stability; therefore it is imperative that when it comes to grading and managing these complications, the multifactorial nature of the matters at hand has to be taken into consideration [9]. Other types of chronically complicated urological diseases include benign ureteral strictures and hydronephrosis (BURSH) that can mostly be treated with surgery. Acute or chronic secondary BURSH can occur due to renal stones, trauma, surgery, burns or chronic inflammation [10]. Ureteral strictures lead to the obstruction of urine drainage, stagnation causing hydronephrosis a condition in which kidneys may become damaged due to urine backup. Ureteral reconstruction including end to end anastomosis, buccal mucosa grafting or balloon dilation is common management option for the surgical treatment of BURSH. Every one of these procedures has potential complications such as restenosis of stricture, infection and leakage of urine [11]. Moreover, the concerns related to reconstructive surgery of VVF and BURSH often needs long duration of follow up because of post-operative complications such as scar formation, infection or incontinency may occur after a long period of time [12].

OBJECTIVE

The basic aim of the study is to find the reporting and grading of complications in urological surgery and its current trends and future perspectives.

METHODOLOGY

This retrospective study was conducted at Conducted at the Institute of Kidney Diseases, Peshawar, from 2022 to 2023. Data was collected from 165 patients. Patients diagnosed with VVF or BURSH who required surgical intervention. Patients undergone previous surgeries that might interfere with complication assessment or if they had incomplete medical records were excluded from the study. Different operations were performed on the patients. The established approach to repair VVF included transvaginal repair, transabdominal repair or laparoscopic repair depending on the location, size of the fistula and the medical history of the patient. Participants' surgery consisted of BURSH with potential ureteral reconstruction procedures, which may include end-to end anastomosis, balloon dilation or buccal mucosa grafts depending on each patient's needs. Both surgical approaches were designed to be as morbid as possible while providing the best functional and anatomic results possible. Adverse outcomes therefore recorded and classified using the Clavien-Dindo criteria of grading surgical complications.

This system enabled a standardized approach to recording complications across grades:

- **Grade I**: Minor complications managed conservatively.
- **Grade II**: Complications requiring pharmacological intervention.
- **Grade III**: Complications requiring surgical, endoscopic, or radiological intervention.
- **Grade IV**: Life-threatening complications requiring intensive care.
- **Grade V**: Complications resulting in the patient's death.

Patient-reported outcome measures (PROMs) were employed to assess the broader impact of complications on quality of life. PROMs were gathered through structured questionnaires conducted preoperatively, at discharge, and during follow-up visits to assess issues such as pain, urinary control, sexual function, and overall emotional well-being.Patients were monitored closely postoperatively, with follow-up assessments at one month, three months, and six months. The recurrence of fistula or stricture, infection rates, and any need for re-intervention were recorded. Data were analyzed using SPSS v26.Descriptive statistics provided insights into the demographics and characteristics of the patient population, while comparative analysis was performed to evaluate the outcomes associated with each surgical approach.

RESULTS

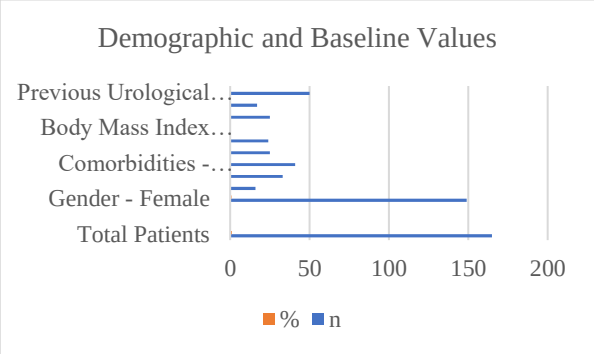
Data were collected from 165 patientswith an average age of 49.23 years (range 26-74). Females made up 90% of the group, while males accounted for 10%. Key comorbidities included diabetes (20%), hypertension (25%), and other chronic illnesses (15%). The average Body Mass Index (BMI) was 24, with a range from 18 to 35. Additionally, 15% of patients had a history of smoking, 10% consumed alcohol, and 30% had undergone previous urological surgeries.

Table 1

Demographic and Baseline Values

Parameter	n	%
Total Patients	165	100%
Average Age (years)	49.23±3.01	-
Age Range (years)	26-74	-
Gender - Female	149	90%
Gender - Male	16	10%
Comorbidities - Diabetes	33	20%
Comorbidities - Hypertension	41	25%
Comorbidities - Other Chronic Illnesses	25	15%
Body Mass Index (BMI) - Average	24	-
Body Mass Index (BMI) - Range	18-35	-
Smoking History	25	15%
Alcohol Consumption	17	10%
Previous Urological Surgeries	50	30%

Graph 1



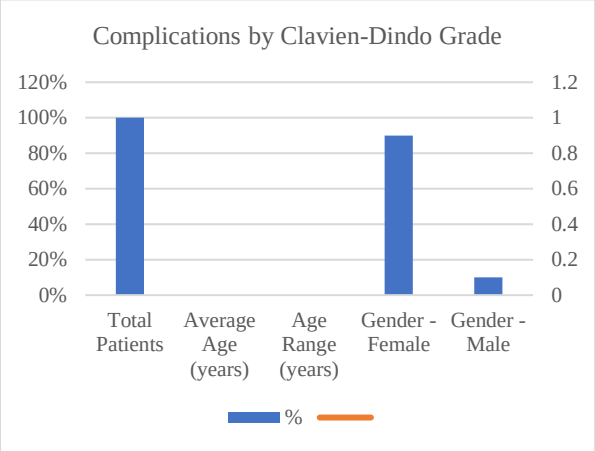
The complication analysis based on the Clavien-Dindo classification shows that the majority of complications were minor to moderate, with 12% of patients experiencing Grade I complications and 15% experiencing Grade II complications, both manageable with conservative or pharmacological treatment. Severe complications (Grade III) requiring further intervention affected 9% of patients, while 6% faced life-threatening issues (Grade IV) that required intensive care. Grade V complications, resulting in mortality, occurred in 3% of the cohort.

Table 2

Complications by Clavien-Dindo Grade

Clavien-Dindo Grade	Description	No. of Patients (%)	Percentage
Grade I	Minor complications (e.g., minor infections, managed conservatively)	20	12%
Grade II	Moderate complications (e.g., infections needing antibiotics, mild hemorrhage)	25	15%
Grade III	Severe complications requiring intervention (e.g., endoscopic dilation, reoperation)	15	9%
Grade IV	Life-threatening complications requiring ICU (e.g., sepsis, renal failure)	10	6%
Grade V	Death due to complications (e.g., severe sepsis, renal failure)	5	3%

Graph 2



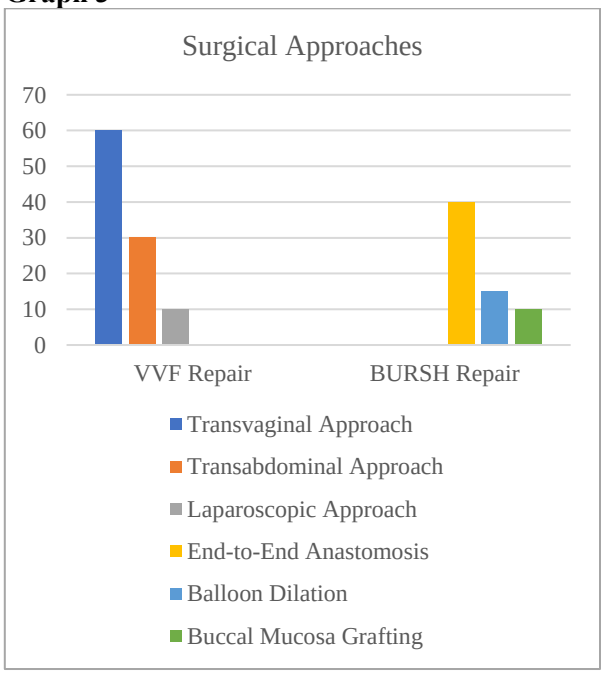
The surgical approach data shows that for vesicovaginal fistula (VVF) repairs, the transvaginal approach was the most commonly used, performed on 60 patients, followed by the transabdominal approach on 30 patients and laparoscopic approach on 10 patients. For benign ureteral stricture and hydronephrosis (BURSH) repairs, the end-to-end anastomosis approach was used in 40 cases, balloon dilation in 15 cases, and buccal mucosa grafting in 10 cases.

Table 3

Surgical Approaches

Condition	Transvaginal Approach	Transabdominal Approach	Laparoscopic Approach	End-to-End Anastomosis	Balloon Dilation	Buccal Mucosa Grafting
VVF Repair	60.0	30.0	10.0	nan	nan	nan
BURSH Repair	nan	nan	nan	40.0	15.0	10.0

Graph 3

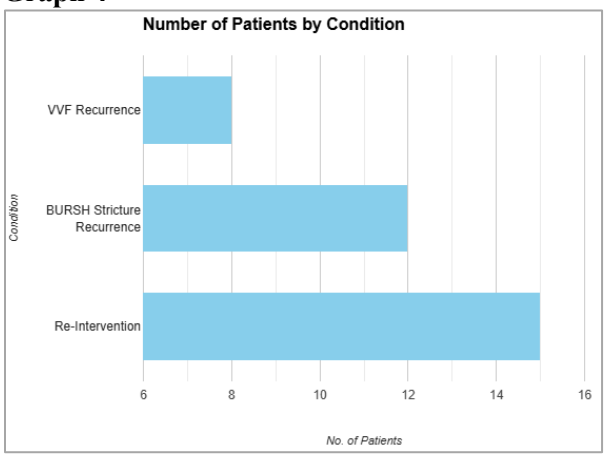


The recurrence and re-intervention rates indicate that 8% of vesicovaginal fistula (VVF) cases experienced recurrence, while a higher rate of recurrence, at 18%, was observed among patients with benign ureteral stricture and hydronephrosis (BURSH). Additionally, 9% of the total patient cohort required re-intervention due to complications or recurrence.

Table 4
Recurrence and Re-Intervention Rates

Condition	No. of Patients	Percentage of Total
VVF Recurrence	8	8% of VVF cases
BURSH Stricture Recurrence	12	18% of BURSH cases
Re-Intervention	15	9% of total patients

Graph 4

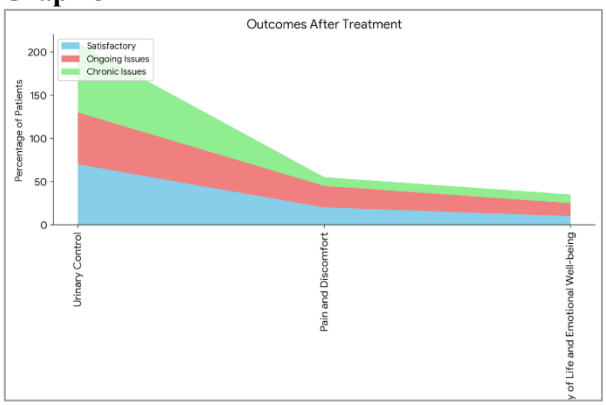


For urinary control, 70% of patients reported satisfactory results, although 20% experienced mild to moderate incontinence, and 10% faced ongoing control issues. Regarding pain and discomfort, 60% of patients reported minimal to moderate pain, with 25% experiencing persistent discomfort that typically resolved within three months, while 15% dealt with chronic pain. In terms of quality of life, 80% were satisfied with their recovery, though 10% noted a negative impact on quality of life, and another 10% experienced significant emotional distress.

Table 5
Patient-Reported Outcomes (PROMs)

Outcome	Satisfactory	Ongoing Issues	Chronic Issues
Urinary Control	70% reported satisfactory control	20% mild to moderate incontinence	10% ongoing control issues
Pain and Discomfort	60% minimal to moderate pain	25% persistent discomfort (resolved in 3 months)	15% chronic pain
Quality of Life and Emotional Well-being	80% satisfied with recovery	10% negative impact on quality of life	10% significant emotional distress

Graph 5



DISCUSSION

The findings from this study provide insights into the complications associated with urological surgeries for conditions like vesicovaginal fistula (VVF) and benign ureteral strictures and hydronephrosis (BURSH). The cohort includes 165 patients, and the authors describe the variety of complication rates depending on the surgical approaches in detail and classify them using Clavien-Dindo. This discussion focuses on the significance of the outcomes derived from these results, the advantages and disadvantages associated with surgical approaches, and the aspects associated with the STR of complications [13].

The allocation of complications according to CDG is also presented to show the extent of the variations as well as their complexity of the required interventions. The majority of complications were perseverant in Grade I and II, and as a result, can be treated conservatively or with the assistance of medication [14]. Grade III and IV, however, the complications were serious requiring endoscopic/ surgical re- intervention in some centers and required ICU support. All of the five Grade V cases (mortality) were due to septicaemia and renal failure, highlighting the importance of post operative surveillance to detect and treat life threatening complications [15]. These results emphasize that a uniform grade system such as Clavien-Dindo is useful to assess the level of complications systematically and to standardize the approach to the treatment protocols. The findings of this study show that the complication rates are

dependent on the surgical intervention type. In the case of VVF repair, both transvaginal and laparoscopic methods had fewer complications as compared to the transabdominal technique, which had a higher reoccurrence and infection index [16].

This implies that invasions with lower frequency could lower the risk of complications in concordance to previous work on minimally invasive surgery in urology. Bursh reported the highest complication and recurrence rate with balloon dilation, buccal mucosa grafting intermediate and end to end anastomoses had less complications than the former two. The fact that balloon dilation was reported to have a high recurrence rates suggest that this method seems may not be as effective for curing strictures in the long term, especially for those with complex or recurrent strictures. These observational results support the rationale for the selective application of some methods in terms of patient characteristics and surgical experience [17]. Also, by scoring complications clinically, this dataset gains insight into the patient's life following surgical procedures through the inclusion of Patient Reported Outcome Measures (PROMs). For example, the majority of the surveyed respondents complained of low-grade urinary incontinence and chronic pain though they did and frankly high-grade complications were not revealed.

Approximately 10-15% of the patients experienced chronic pain and the presence of a persistent emotional problem in the postoperative period in their respective specialties. The use of PROMs gives a patient care orientation that is often not considered when analyzing raw data from a hospital recommending a need for patient-centered follow-up support [18]. The following are among the clinical implication of these findings. First, they stress that every proposed surgical method has its indications for use considering characteristics of patients and the nature of their disorders since complications influence results in complicated cases. The results therefore emphasize the need to adopt less invasive surgical techniques where possible to reduce dangers. Second, the study shows the importance of the application of universally shared classification systems such as Clavien–Dindo to effectively make comparisons and improve quality control across different centers [19]. Finally, the use of PROMs also reflects the shift toward value-based medicine and encompasses patient satisfaction and Quality of Well-Being indices among the outcomes. However, it is also important to recognise some considerations of the study: However, the major limitation to the study is the use of medical records because the current study is a retrospective analysis of data and quality may vary because of differences in documentation.

Besides, it is also a weakness that a relatively smallamount of participants included in the present study, and hence it could not give a large population perspective [20]. Further work should strive for inclusion of more centers and a greater number of patients as well as continued work on randomized clinical trials to confirm these findings. It is also possible to introduce more precise complication classification models that involve both clinical and self-estimated data, which is important for prognosis after the surgery.

CONCLUSION

It is concluded that urological surgeries for VVF and BURSH benefit significantly from personalized surgical approaches, with minimally invasive techniques showing reduced complication rates. Standardized complication grading, such as the Clavien-Dindo system, provides a valuable framework for assessing outcomes, while incorporating patient-reported outcomes ensures a comprehensive evaluation of recovery and quality of life. These strategies together enhance patient care and contribute to improved clinical practices in urology.

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