

Research Article

Practice and Safety of Rigid Cystoscopy Without Prior Urine Culture or Antibiotic Prophylaxis: Observational Analysis in Chad

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Abstract

Introduction: Cystoscopy is a key diagnostic procedure in urology, but the need for prior urine culture and routine antibiotic prophylaxis remains controversial due to the low risk of infection reported in several studies. In resource-limited settings, these practices pose particular challenges. This study evaluates the safety of rigid cystoscopy performed without prior urine culture or antibiotic prophylaxis in a referral center in Chad. **Methods:** We conducted a retrospective descriptive study at the Urology Department of CHU La Renaissance, Chad, including patients who underwent outpatient rigid cystoscopy without prior urine culture or antibiotic prophylaxis between 2023 and 2025. Patients with active urinary tract infections were excluded. Clinical data, indications, and post-procedural complications were analyzed descriptively. **Results:** During the study period, 361 patients underwent cystoscopy, of whom the majority were male (n = 329, 91.1%) with a mean age of 46.4 years (range, 14-81). The most common comorbidities were diabetes mellitus (19%) and hypertension (14%). Lower urinary tract symptoms were the leading indication for cystoscopy (n = 157, 43.5%), followed by hematuria (n = 130, 36.0%). Cystoscopy was successfully completed without intraoperative complications in most patients (n = 329, 91.2%). Normal cystoscopic findings were observed in 97 patients (26.9%). Post-procedural complications were generally mild, with pain being the most frequent (n = 69, 19%), and symptomatic urinary tract infections occurring in 14 patients (3.9%) within an average of 48 hours. No severe infectious complications were reported. Additional interventions included urethral dilation/urethrotomy, bladder biopsy, and prostate biopsy. **Conclusion:** This study in Chad shows that rigid cystoscopy without prior urine culture or routine antibiotic prophylaxis is associated with a low rate of mild infections, with no cases of sepsis or hospitalization. It suggests that a selective approach, based on clinical evaluation and strict aseptic technique, is safe and appropriate in this context.

Keywords

Rigid Cystoscopy, Antibiotic Prophylaxis, Urinary Tract Infection, Outpatient Urology, Tchad

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1. Introduction

Cystoscopy is an essential endoscopic examination in urology, allowing for the evaluation of the lower urinary tract for the diagnosis and follow-up of various pathologies [1]. It ranks among the most frequently performed urological procedures, with over three million cystoscopies conducted annually in Europe and the United States [2]. Its indications are diverse, including hematuria, assessment of lower urinary tract symptoms, urothelial cancer surveillance, foreign body removal, and surgical planning, among others [3]. The procedure is performed using a cystoscope, classified as a semi-critical device according to Spaulding due to its contact with mucous membranes [4]. The most common complications are urinary tract infections, pain, and hematuria [5]. Post-cystoscopy urinary tract infections represent a major concern [6], with reported incidence rates of up to 21% [7]. Traditionally, a urine culture (cytobacteriological examination) is recommended prior to the procedure to prevent infections; however, current guidelines remain imprecise [8]. Studies have demonstrated that systematic antibiotic prophylaxis is not necessary in patients without signs of acute urinary tract infection, even in cases of asymptomatic bacteriuria [7, 9]. In this context, our study aims to evaluate the safety of rigid cystoscopy performed without prior urine culture or systematic antibiotic prophylaxis in a reference center in Chad, with the goal of providing local data to inform practice in resource-limited settings.

2. Methodology

Study design and type: With institutional approval, and in accordance with the Declaration of Helsinki [10] and the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [11], we conducted a descriptive retrospective study in the urology unit of the La Renaissance University Hospital Center in Chad. Medical records of patients who underwent outpatient rigid cystoscopy between January 2023 and December 2025 were reviewed. All patients who had a rigid cystoscopy, regardless of indication, without prior urine culture (cytobacteriological examination, CBEU) or antibiotic prophylaxis, and with complete medical records were included. Exclusion criteria comprised hospitalized patients, incomplete medical records, and patients presenting clinical signs of active urinary tract infection. The variables assessed included patients' sociodemographic characteristics (age, sex, comorbidities, urinary tract infection risk factors), indications for cystoscopy (hematuria, lower urinary tract symptoms, tumor follow-up, other indications), procedural details, any additional interventions performed, and post-procedural complications, particularly urinary tract infections.

Procedure: Following the establishment of indications, the procedure was explained to the patient, and informed consent

was obtained. Cystoscopy was performed on an outpatient basis under direct visualization. External genitalia were cleansed with 0.5% chlorhexidine gluconate solution. For male patients, 10 mL of 2% sterile lidocaine gel was instilled into the urethra to ensure effective local anesthesia, whereas an appropriate local anesthesia was applied for female patients. The procedure was carried out using a 19 Fr rigid cystoscope (30 °optics) with irrigation using sterile 0.9% saline. All cystoscopes were cleaned and disinfected following the center's standardized protocol.

Data collection and analysis: Data were extracted from medical records, entered into an Excel spreadsheet, and analyzed descriptively. Qualitative variables were expressed as counts and percentages, while quantitative variables were summarized using means and ranges.

3. Results

During the study period, a total of 361 patients underwent cystoscopy and met the inclusion criteria for this study. The population was predominantly male (n = 329, 91.1%). The mean age of the patients was 46.4 years, ranging from 14 to 81 years. The most frequently reported comorbidities were diabetes mellitus (19%) and arterial hypertension (14%). Lower urinary tract symptoms represented the main indication for cystoscopy (n = 157, 43.5%). All epidemiological data and indications are summarized in Table 1.

Table 1. Indications for Cystoscopy.

Indication for Cystoscopy	Number of Patients (n)	Percentage (%)
Hematuria	130	36.0
Lower urinary tract symptoms (LUTS)	157	43.5
Bladder tumor follow-up	32	8.9
Staging evaluation	23	6.3
Others (recurrent infection, urinary incontinence, etc.)	19	5.3
Total	361	100

Cystoscopy was performed without intraoperative complications in the majority of patients (n = 329, 91.2%). Reported incidents included severe pain despite anesthesia and patient refusal to undergo the procedure once in the operating room. The cystoscopic findings were normal in 97 patients (26.9%). Postoperative complications mainly manifested as pain and

symptomatic urinary tract infections, as shown in [Figure 1](#). Urinary tract infections occurred on average 48 hours after

procedure.

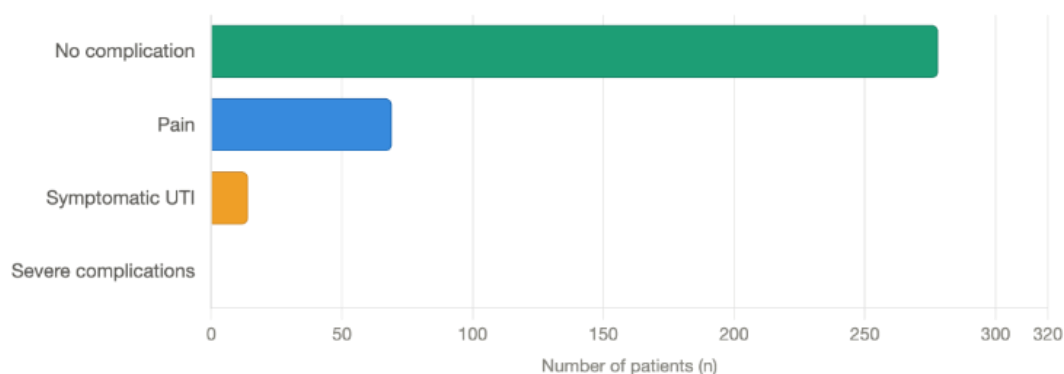


Figure 1. Distribution of post-procedural complications after rigid cystoscopy without antibiotic prophylaxis.

These infections were characterized by urinary symptoms with or without fever and were subsequently confirmed by a positive urine culture. No severe infectious complications (pyelonephritis, sepsis, prolonged hospitalization) were reported.

Additional procedures performed included urethral dilation/urethrotomy, bladder biopsy, and prostate biopsy. [Table 2](#) summarizes the cystoscopic findings as well as the post-procedural complications.

Table 2. Cystoscopic Findings and Post-Procedural Complications.

Variable	Number of Patients (n)	Percentage (%)
Intraoperative course		
Without complications	329	91.2
With complications (severe pain despite anesthesia, procedure refusal)	32	8.8
Cystoscopic findings		
Normal	97	26.9
Abnormal	264	73.1
Post-procedural complications		
Pain	69	19.0
Symptomatic urinary tract infection	14	3.9
Total	361	100

4. Discussion

Diagnostic rigid cystoscopy is a common procedure in urology [12], as evidenced by the high patient volumes reported in previous studies [13-16]. In the present study, 361 patients were included, with a mean age of 46.4 years and a predominantly male population (91.1%, n = 329). In a five-year Nigerian study, Abdullahi et al. [13] reported a mean age of 43.7 years and a male-predominant sex ratio (3.9: 1). In Senegal,

Jalloh et al. [14] found in a hospital series of 655 patients a mean age of 47.44 years, with men representing 61.83% of the cohort. In a multicenter Nigerian study, Oranusi et al. [15] observed that men accounted for 66.7% of patients, a finding similar to that reported by Hodonou et al. [16] in Benin. The male predominance observed in our series and across published African series is consistent with the higher prevalence of cystoscopy indications in men, particularly lower urinary tract symptoms secondary to benign prostatic hyperplasia,

urethral strictures, and bladder tumours, which are substantially more frequent in the male population [17, 18]. These conditions constitute the primary drivers of cystoscopic referral in sub-Saharan Africa, explaining the male predominance irrespective of the centre considered.

Indications for cystoscopy can vary between centers [15]. In the present study, the most frequent indications were lower urinary tract symptoms (43.5%) and haematuria (36.0%), which is broadly consistent with published African series. Among men, the leading indications were lower urinary tract symptoms (38%) and hematuria (34%), whereas among women, evaluation of cervical tumor extension was the most frequent indication (40.5%), followed by hematuria (18.5%) and lower urinary tract symptoms (16%) [19]. Bladder tumor assessment was the primary indication in 50 patients (45.0%), followed by hematuria in 31 patients (28.0%) and hydro-nephrosis in 13 patients (11.8%) [15]. The high proportion of lower urinary tract symptoms in our cohort likely reflects the significant burden of benign prostatic hyperplasia and urethral strictures in the male Chadian population. Compared with the series by Oranusi et al. [15], where bladder tumour assessment predominated, our series shows a different indication profile, reflecting the specific epidemiological context and referral patterns of our tertiary centre.

Endoscopic findings reported in the literature show considerable variability depending on context and the epidemiological profile of centers [13, 14, 19, 20]. Overall, bladder tumors are the most frequently observed lesions, ranging from 20% to 38% of cases. Benign prostatic hyperplasia is also commonly reported in men (14-21%), whereas in women, bladder tumors predominate, followed by other cystopathic lesions. Normal cystoscopic examinations range between 13% and 27% according to different series. Other reported lesions include urethral strictures (5-11% in men), schistosomal lesions (up to 9% in endemic regions), bladder stones, bladder neck stenosis, and, more rarely, posterior urethral valves or bladder polyps. In our cohort, normal cystoscopic findings were observed in 26.9% of patients, within the range of 13% to 27% reported in the literature. The distribution of pathological findings was consistent with the main indications for the procedure, with obstructive and neoplastic lesions predominating, directly reflecting the burden of benign prostatic hyperplasia and bladder tumours in our population.

Complementary procedures may be performed during cystoscopy, including prior urethral dilation, bladder biopsy [14], or ureteroscopy [19]. In our series, bladder and prostate biopsies were performed as additional interventions. Regarding post-procedural complications and the central question of antibiotic prophylaxis, our findings directly address the primary objective of this study. Post-cystoscopy complications are reported at varying rates. Abdullahi et al. [13] reported an overall complication rate of 4.1%, including urethral or bladder bleeding (n=14, 2.4%), urosepsis (n=8, 1.4%), and urethral or bladder injuries (n=2, 0.3%). In the multicenter study by

Oranusi et al. [15], documented complications included hematuria in 5 patients (4.5%), pain in 5 patients (4.5%), and acute retention in 9 patients (8.1%). Other studies reported urethral pain, hematuria, and acute pyelonephritis in 8.8% (n=9), 2.95% (n=3), and 1% (n=1) of cases, respectively [20]. In our series, post-procedural complications consisted predominantly of pain (19.1%) and symptomatic urinary tract infection in 14 patients (3.9%), all of which were mild and self-limiting. Crucially, no cases of urosepsis, secondary hospitalisation, or death were recorded. Compared with Abdullahi et al. [13], who reported urosepsis in 1.4% of cases despite variable antibiotic use, our series demonstrated a more favourable severe infectious complication profile, despite the complete absence of pre-procedural urine culture or systematic antibiotic prophylaxis.

In some studies [13], no antibiotic prophylaxis was administered, whereas in others [15], the use of prophylaxis was not reported. In the study by the third authors [20], urine culture was performed prior to cystourethroscopy in patients with signs of urinary tract infection, and those with positive cultures received targeted antibiotic therapy before the procedure.

An important contextual consideration is the exclusive use of rigid rather than flexible cystoscopy in our centre. At our center, rigid cystoscopy continues to be performed despite the advantages of flexible cystoscopy, including its atraumatic, painless, and rapid nature, absence of blind spots, and complete mucosal evaluation of diverticula [21]. In addition, flexible cystoscopes offer better patient tolerance and preference. Flexible cystoscopy should be favored over rigid cystoscopy due to its lower postoperative morbidity [22]. International guidelines, favour flexible over rigid cystoscopy for outpatient diagnostic procedures in men, primarily due to superior patient comfort and lower post-procedural morbidity. However, in resource-limited settings such as Chad, the high acquisition and maintenance costs of flexible cystoscopes render them structurally inaccessible, making rigid cystoscopy the only feasible option for the vast majority of patients. Evaluating its safety profile in the absence of routine antibiotic prophylaxis is therefore not only clinically relevant but operationally necessary.

The available international evidence supports the safety of omitting systematic antibiotic prophylaxis before cystoscopy in selected patients. A study evaluating the risk of urinary tract infection (UTI) after outpatient rigid cystoscopy in patients with positive urine cultures receiving antibiotics, compared to patients with sterile urine without prophylaxis, showed no significant difference in UTI risk at days 7 and 30 post-procedure [23]. Another study assessing febrile UTI following outpatient flexible cystoscopy in bladder cancer patients who had never received antibiotics included 2,010 patients, of whom 489 (24%) had asymptomatic bacteriuria and 1,521 (76%) had sterile urine. Thirty-nine patients (1.9%) developed febrile UTI within 30 days post-cystoscopy: 4.5% among colonized patients versus 1.1% in uninfected patients (p=0.02). No pa-

tient required hospitalization for bacterial sepsis. These findings suggest that antibiotic treatment prior to outpatient flexible cystoscopy is not necessary in bladder cancer patients without clinical signs of acute urinary tract infection, even in the presence of asymptomatic bacteriuria [24]. In a 2023 prospective observational study of 300 patients undergoing outpatient flexible cystoscopy, Perez et al. [6] compared post-procedural UTI incidence between a group receiving antibiotic prophylaxis and a group without prophylaxis. UTI incidence was comparable (9.3% with prophylaxis versus 10.0% without prophylaxis), with no statistically significant difference and no cases of urinary sepsis. Risk factors were evenly distributed. The authors concluded that systematic prophylaxis does not significantly reduce post-cystoscopy infection risk, even in patients with comorbidities, supporting a more judicious and selective use of antibiotics. In a prospective randomized trial, Cam K et al. [25] assessed the efficacy of a single intravenous dose of cefoperazone prior to diagnostic cystoscopy in 200 patients with initially sterile urine cultures. Participants were assigned to either a prophylaxis or no-prophylaxis group. Urine analyses, cultures, and clinical evaluations (fever, dysuria) were performed on post-procedure day two. Minor additional interventions (pinch biopsy or transurethral resection of a small bladder tumor) were performed in 15% of patients, similarly across groups. Post-cystoscopy UTI rates were very low, with one and two positive cultures in the prophylaxis and non-prophylaxis groups, respectively, with no statistically significant microbiological or clinical differences. The authors concluded that systematic antibiotic prophylaxis does not appear necessary prior to diagnostic cystoscopy in patients without pre-existing bacteriuria, though low event rates warrant larger studies.

In our cohort, symptomatic urinary tract infection was observed in 14 patients (3.9%), all mild and self-limiting, with no severe complications. This rate is comparable to international reports for outpatient endoscopic procedures performed without routine antibiotic prophylaxis, where post-cystoscopy UTI incidence ranges from 1.9% [24] to 10% [25]. These results are consistent with the available evidence and support a selective rather than systematic approach to antibiotic prophylaxis before rigid cystoscopy, based on careful clinical assessment and identification of individual risk factors. From an antimicrobial stewardship perspective, this finding carries particular relevance in the Chadian context, where antimicrobial resistance is an emerging concern, access to microbiological testing is structurally limited, and the cost of routine urine culture represents a significant financial burden for patients.

5. Conclusion

This study, conducted in a reference center in Chad, demonstrates that rigid cystoscopy performed without prior urine culture or systematic antibiotic prophylaxis is associated with a low rate of exclusively mild infectious complications, with no cases of sepsis, secondary hospitalization, or death. These

findings align with available international data. In a context where antibiotic pressure contributes to resistance and access to microbiological testing and antibiotics is limited, these results support a more targeted strategy. A selective approach, based on careful clinical assessment and identification of individual risk factors, may suffice to ensure patient safety. Therefore, with appropriate patient selection and strict adherence to asepsis and disinfection protocols, rigid cystoscopy without prior urine culture or routine antibiotic prophylaxis appears safe and suitable for our setting.

6. Limitation

This study has a number of limitations stemming from its retrospective and descriptive nature, which may have introduced a bias in the data. The absence of a comparison group makes it impossible to formally assess the relative efficacy of antibiotic prophylaxis or prior urine culture. Furthermore, the single-center nature of the study, the predominantly male population, and the center-specific disinfection protocol limit the generalizability of the results.

Abbreviations

STROBE	Strengthening the Reporting of Observational Studies in Epidemiology
CBEU	Cytobacteriological Examination of Urine
Fr	French Gauge
mL	Milliliter
LUTS	Lower Urinary Tract Symptoms
UTI	Urinary Tract Infection

Data Availability Statement

Data are available upon request to the corresponding author.

Author Contributions

Saleh Abdelkerim Nedjim: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

Mahamat Ali Mahamat: Investigation, Writing – review & editing

Ndormadjita Allah-Syengar: Methodology, Writing – review & editing

Adoumadji Kouldjim: Investigation, Resources, Writing – review & editing

Valentin Vadandi: Data curation, Writing – review & editing

Rimtebaye Kimassoum: Supervision, Writing – review & editing

Conflicts of interest

The author declares no conflicts of interest.

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