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Epidemiological, Clinical and Histopathological Profile of Squamous Cell Carcinoma of the Bladder in Guinea

Mamadou Diawo Bah[1*], Alexandre Vahina Gamamou[1*], Lahoumbo Ricardo Gnammi[1], Aboubacar Cherif[1], Daouda Kanté[1], Rémy François Akoï Guilavogui[2], Thierno Mamadou Oury Diallo[1], Abdoulaye Bobo Diallo[1], Oumar Raphiou Bah[1]

[1]Urology Department, Ignace Deen University Hospital, Gamal Abdel Nasser University of Conakry, Conakry, Guinea
[2]Urology Department, AK Eramishantsev Municipal Clinical Hospital, Peoples' Friendship University of Moscow, Moscow, Russia
Email: *oumarbobo1975@gmail.com, *gamamouprolaex622@gmail.com

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Abstract

Introduction: Bladder squamous cell carcinoma, closely associated with endemic urinary schistosomiasis in sub-Saharan Africa, presents distinctive characteristics. This study aimed to describe the sociodemographic, clinical, and histopathological profile of this disease in Guinea. **Methodology:** A retrospective descriptive study was conducted at Conakry University Hospital between January 2015 and December 2024, including 35 patients with histologically confirmed bladder squamous cell carcinoma. Sociodemographic, clinical, cystoscopic, and histopathological data were analyzed. **Results:** The mean age was 57.4 years with predominance in the 60 - 69 age group (42.86%). Female predominance was observed (male-to-female ratio 0.59:1). Freshwater bathing was the main risk factor (80%). Hematuria was the primary presenting symptom (88.57%). Diagnosis was late, with 57.14% of patients having ECOG ≥ 3 and 54.29% presenting with renal failure. Tumors were predominantly solid (85.71%), sessile (91.43%), and multifocal (88.57%), with large size (median 7.8 cm) and ureteral orifice involvement (71.43%). Histological analysis revealed 91.43% muscle-invasive tumors and 97.14% high-grade tumors. *Schistosoma haematobium* eggs were identified in 34.29% of specimens. **Conclusion:** Bladder squamous cell carcinoma is associated with vesical schistosomiasis in Guinea and characterized by late diagnosis at the muscle-invasive stage. Strengthening schistosomiasis prevention and improving early detection are essential to enhance prognosis.

Keywords

Bladder Squamous Cell Carcinoma, Guinea, Urinary Schistosomiasis,

Late Diagnosis

1. Introduction

Bladder tumors represent a major public health problem worldwide, ranking among the most common cancers and constituting a significant cause of cancer-related mortality [1]. While urothelial carcinoma is the predominant histological type in European and North American countries, the epidemiological profile of bladder cancer differs considerably in regions where urinary schistosomiasis is endemic [2].

In sub-Saharan Africa, bladder squamous cell carcinoma presents distinctive epidemiological, clinical, and histopathological characteristics, closely linked to chronic infection by *Schistosoma haematobium*. This association between urinary schistosomiasis and vesical squamous cell carcinoma has been documented for several decades and remains a concerning reality in many African countries [3]. Studies conducted in the African Great Lakes region and West Africa have demonstrated that squamous cell carcinoma represents a significant proportion of all bladder cancers in these areas of endemic schistosomiasis, with frequent presence of *S. haematobium* eggs in affected patients [3] [4].

The demographic profile of patients with schistosomiasis-associated squamous cell carcinoma differs significantly from that observed in bladder cancers in developed countries. The age at diagnosis is generally earlier, often occurring several years before that observed for urothelial carcinomas [4]. Furthermore, unlike developed countries where marked male predominance is observed, regions of endemic schistosomiasis present a more balanced distribution between sexes [5].

Tumors are generally characterized by late presentation at a locally advanced stage at diagnosis, which significantly compromises patient prognosis [4] [5].

In Guinea, where urinary schistosomiasis remains endemic in several regions, epidemiological data concerning bladder squamous cell carcinoma remain limited.

The objective of this study was to describe the sociodemographic, clinical, cystoscopic, and histological characteristics of bladder squamous cell carcinomas at the Conakry University Hospital Center (CHU), in order to better understand the reality of this pathology in our context and to contribute to improving its management.

2. Methodology

2.1. Study Design and Setting

This was a retrospective descriptive study conducted within the framework of collaboration between the Urology Department and the Pathology Department of the Conakry University Hospital Center (CHU) over a 10-year period, extending from January 2015 to December 2024.

2.2. Study Population and Inclusion Criteria

The study covered all patients presenting with histologically confirmed bladder squamous cell carcinoma during this period.

We included in our study all patients presenting with bladder squamous cell carcinoma confirmed by histological examination of transurethral resection of bladder tumor (TURBT) specimens, managed at the Urology Department of Conakry CHU between January 2015 and December 2024, and whose medical records contained complete clinical, paraclinical, and histological data.

During the study period, a total of 52 patients with bladder squamous cell carcinoma were identified. However, 17 patients were excluded due to incomplete medical records (n = 9), absence of histological confirmation due to advanced disease precluding biopsy (n = 5), or loss of pathology specimens (n = 3), resulting in a final cohort of 35 patients.

2.3. Data Collection and Variables Studied

Patient recruitment was performed retrospectively from the registers of the Urology and Pathology Departments of Conakry CHU, including hospitalization registers, operative registers for cystoscopy and TURBT, as well as pathology reports. Data were collected using a standardized form.

Demographic variables (age, sex), risk factors (documented schistosomiasis, freshwater bathing, smoking), and clinical data were studied, including presenting symptoms/signs, ECOG status, and physical examination including pelvic examinations.

Paraclinical parameters included serum creatinine (normal ≤ 13 mg/l) and hemoglobin stratified according to anemia severity. Cystoscopic characteristics analyzed included macroscopic appearance, implantation, multifocality, ureteral orifice status, location, and tumor size. Pathological data focused on TNM stage, WHO grade, and presence of tumor necrosis. Histological identification of *Schistosoma haematobium* eggs in tumor specimens was recorded when reported by pathologists, though systematic search for eggs was not standardized across all examinations.

Statistical analysis was performed using SPSS 20.0® software, expressing quantitative variables as means and medians and qualitative variables as frequencies and percentages.

2.4. Ethical Considerations

Ethical approval was obtained from the institutional review board of Conakry CHU. Confidentiality and data anonymization were guaranteed throughout our study.

3. Results

Our study included a total of 35 patients with bladder squamous cell carcinoma. Analysis of sociodemographic characteristics and risk factors (**Table 1**) showed a

mean age of 57.4 years ranging from 26 to 74 years. Age distribution showed a predominance of patients aged 60 to 69 years (42.86%). We observed female predominance with 22 women (62.86%), giving a male-to-female sex ratio of 0.59:1.

Table 1. Sociodemographic characteristics and risk factors.

Parameters	Number	Percentage (%)
Age range (years)		
20 - 29	1	2.86%
30 - 39	1	2.86%
40 - 49	3	8.57%
50 - 59	14	40.00%
60 - 69	15	42.86%
70 - 79	1	2.86%
Total	**35**	**100%**
Sex		
Male	13	37.14%
Female	22	62.86%
Total	**35**	**100%**
Exposure factors		
Freshwater bathing	28	80.00%
Active smoking	3	8.57%
Freshwater bathing + Smoking	2	5.71%
No identified risk factors	2	5.71%
Total	**35**	**100%**

Note: Risk factor categories are mutually exclusive. Patients with both freshwater bathing and smoking are classified only in the combined category.

Analysis of exposure factors identified freshwater bathing as the main risk factor, found as the sole identified exposure in 28 patients (80%). Active smoking alone was reported in 3 patients (8.57%), while 2 patients (5.71%) reported both freshwater bathing and smoking. Two patients (5.71%) had no identified risk factors. It should be noted that 10 patients (28.57%) had established clinical history of urinary schistosomiasis. When considering all patients with freshwater exposure (including those with concurrent smoking), 30 patients (85.71%) reported this risk factor.

Clinical and biological parameters of patients are detailed in Table 2. Hematuria was the main presenting sign, found in 31 patients (88.57%). Evaluation of performance status according to the ECOG scale showed that the majority of patients had significant deterioration of their general condition, with 16 patients (45.71%) at ECOG stage 3 and 4 patients (11.43%) at ECOG stage 4. Clinical ex-

amination by rectal examination in 13 men and vaginal examination in 22 women revealed abnormalities in nearly half of the patients. Extension to neighboring organs in 2 cases (5.71%) involved the rectum and vagina.

Table 2. Clinical and biological parameters.

Parameters	Number	Percentage
Presenting symptoms/signs		
Hematuria	31	88.57%
Irritative signs	2	5.71%
Hypogastric mass	2	5.71%
ECOG status		
1 (symptomatic, autonomous)	8	22.85%
2 (moderate limitation)	7	20.00%
3 (severe limitation)	16	45.71%
4 (bedridden permanently)	4	11.43%
Rectal/Vaginal examination		
Normal	18	51.42%
Palpable pelvic mass	8	22.85%
Bladder base induration	7	20.00%
Extension to neighboring organs	2	5.71%
Serum creatinine		
Normal (<13 mg/l)	16	45.71%
Elevated (≥13 mg/l)	19	54.29%
Hemoglobin level		
Hemoglobin ≥ 11 g/dl	15	42.86%
Mild anemia (10.9 - 9.5 g/dl)	8	22.86%
Moderate anemia (9.4 - 8 g/dl)	7	20.00%
Severe anemia (7.9 - 6.5 g/dl)	4	11.43%
Critical anemia (<6.5 g/dl)	1	2.86%

Biologically, serum creatinine was elevated (≥13 mg/l) in 19 patients (54.29%), indicating renal failure. Anemia was frequent as only 15 patients (42.86%) had near-normal hemoglobin levels (≥11 g/dl).

Table 3 presents the characteristics of lesions observed on cystoscopy. The macroscopic appearance of tumors was solid in 30 cases (85.71%). The tumor implantation base was sessile in 32 patients (91.43%). Lesions were multifocal in 31 cases (88.57%). Involvement of ureteral orifices was noted in 25 cases (71.43%), including 17 unilateral cases (68%) and 8 bilateral cases (32%). The trigone was the predominant location of lesions with 8 cases (22.86%). The majority of tumors (82.86%) measured more than 6 cm, with median size of 7.8 cm ranging from 2.5

to 12 cm.

Detailed histological analysis in Table 4 characterized tumor stage, histological grade, and presence of necrosis. Muscle-invasive bladder tumors (MIBC) represented 32 cases (91.43%). Tumor grade was high in the majority of cases, with 34 high-grade tumors (97.14%). Presence of tumor necrosis on histological examination was observed in 18 patients (51.43%). *Schistosoma haematobium* eggs were histologically identified in 12 specimens (34.29%), while 23 specimens (65.71%) showed no evidence of parasitic eggs on examination.

Table 3. Characteristics of cystoscopic lesions.

Characteristics	Number	Percentage
Lesion appearance		
Papillary	5	14.29%
Solid	30	85.71%
Tumor base		
Pedunculated	3	8.57%
Sessile	32	91.43%
Number		
Multifocal	31	88.57%
Unifocal	4	11.43%
Ureteral orifice status		
Orifices involved	25	71.43%
Orifices free	10	28.57%
Location		
Bladder neck	4	11.43%
Trigone	8	22.86%
Bladder floor	5	14.29%
Dome	6	17.14%
Anterior wall	3	8.57%
Lateral walls	7	20.00%
Bladder papillomatosis	2	5.71%
Size		
<3 cm	1	2.86%
3 - 6 cm	5	14.29%
>6 cm	29	82.86%
Associated lesions		
Bladder calcifications	12	34.29%
Bladder mucosal thickening	19	54.29%

Table 4. Histopathological characteristics.

Histological parameters	Number	Percentage
Tumor stage		
NMIBC	3	8.57%
MIBC	32	91.43%
Tumor grade		
Low grade	1	2.86%
High grade	34	97.14%
Presence of tumor necrosis		
Yes	18	51.43%
No	17	48.57%
Schistosoma eggs		
Eggs identified	12	34.29%
No eggs identified	23	65.71%

Note: Systematic search for eggs was not protocol-based.

4. Discussion

Our study of 35 cases of bladder squamous cell carcinoma at Conakry CHU constitutes one of the first Guinean series dedicated exclusively to this particular histological type. The results obtained allow better understanding of the epidemiological, clinical, and histopathological profile of this pathology in our context and offer comparative elements with available data in the literature.

Our study presents several important limitations that must be acknowledged. First, the retrospective design inherently limits data quality and completeness. The relatively small sample size (n = 35 over 10 years) reflects multiple factors: the single-center nature of the study at a tertiary referral center, which may not capture all cases in the country; challenges in medical record archiving and retrieval in our resource-limited setting, resulting in exclusion of 17 additional cases with incomplete documentation; patients presenting with advanced disease who died before histological confirmation could be obtained; and potential underdiagnosis of bladder cancer in rural areas with limited access to cystoscopy and specialized pathology services. This sample size may underestimate the true burden of bladder squamous cell carcinoma in Guinea and limits statistical power for subgroup analyses.

Second, the absence of systematic parasitological examination protocols and the lack of longitudinal follow-up data prevent assessment of treatment outcomes, survival, and definitive establishment of schistosomiasis causation. Third, we lack data on treatments received and clinical evolution of patients, limiting our ability to draw therapeutic conclusions. Fourth, the absence of molecular or immunohistochemical analyses limits deeper understanding of tumor biology in our population.

Despite these limitations, this series represents the first dedicated study of bladder squamous cell carcinoma in Guinea and provides valuable baseline epidemiological data.

In our series, we observed female predominance with a male-to-female sex ratio of 0.59:1. This result contrasts with classic data from developed countries where bladder cancer predominantly affects men with a ratio that can reach 3 to 4 men for 1 woman [6]. However, our observation aligns with findings from several African studies conducted in areas of endemic schistosomiasis. Several authors have reported relatively balanced distribution between sexes in regions where schistosomiasis is endemic [3] [4] [7]. This epidemiological pattern is explained by comparable exposure of both sexes to infested waters during daily agricultural, domestic, and recreational activities in rural and peri-urban areas [8]. The female predominance observed in our series could also reflect specific cultural practices in Guinea, where women are particularly exposed during domestic tasks requiring prolonged contact with fresh water.

The mean age of our patients was 57.4 years with predominance in the 60-69 age range. These results are consistent with African literature data. Yohana et al. in Tanzania reported a mean age of 55 years for patients with schistosomiasis-associated squamous cell carcinoma [4]. Rambau et al. in their Tanzanian series also observed a mean age of 54.3 years [3]. This age of occurrence is significantly earlier than that observed for urothelial carcinomas in Western countries, where the peak incidence is generally in the seventh decade of life [6]. This relative earliness is explained by parasitic exposure often beginning in childhood in endemic areas, with an estimated latency period of between 20 and 40 years between initial infection and carcinoma development [9] [10].

Analysis of exposure factors in our series revealed that freshwater bathing was the main risk factor, found in 80% of patients. Additionally, 28.57% of patients had documented clinical history of urinary schistosomiasis, and *Schistosoma haematobium* eggs were histologically identified in 34.29% (12/35) of tumor specimens. This detection rate is lower than the clinical exposure history suggests, which may be explained by several factors: the lack of systematic protocol for egg identification in all specimens, the potential destruction or masking of eggs by tumor necrosis and inflammation, and the possibility that chronic schistosomiasis-induced bladder changes may persist and promote carcinogenesis even after parasite clearance [3] [8]. These findings support but do not definitively confirm the role of *S. haematobium* infection in our cohort. In African literature, the presence of schistosome eggs in bladder resection specimens varies considerably according to series, ranging from 25% to more than 70% of squamous cell carcinoma cases [3] [4], with variation attributed to differences in systematic search protocols and disease chronicity.

These data suggest a likely association between *Schistosoma haematobium* exposure and bladder squamous cell carcinoma in Guinea, though the strength of this association in our specific cohort requires cautious interpretation. While 80%

of patients reported freshwater bathing exposure, only 28.57% had documented clinical history of schistosomiasis, and parasitic eggs were histologically confirmed in 34.29% of specimens. This discrepancy may reflect several factors: asymptomatic schistosomiasis infections that were never clinically diagnosed, inadequate documentation in medical records, self-resolution of active infection prior to cancer diagnosis, and the possibility that freshwater exposure represents a proxy marker for other environmental or socioeconomic factors. The temporal relationship between schistosomiasis exposure and carcinoma development, combined with the endemic nature of schistosomiasis in Guinea and the predominance of squamous histology (uncommon in non-endemic regions), provides supportive but not definitive evidence for a causal relationship in our population.

Nevertheless, our study's limitations—including lack of systematic parasitological examination, absence of serological testing for schistosomiasis, and retrospective design—prevent us from definitively establishing causation. The etiological role of schistosomiasis in our cohort remains inferential, based primarily on epidemiological patterns consistent with endemic regions rather than direct parasitological evidence in the majority of cases.

The World Health Organization has classified *S. haematobium* as a Group 1 carcinogen for humans, with sufficient evidence of its role in bladder cancer development [11] [12].

Hematuria was the main presenting sign in our series, present in 88.57% of patients. This cardinal symptom of bladder cancer is universally recognized as the most frequent mode of presentation, found in 70 to 90% of patients according to series. However, it is important to note that in the African context, schistosomiasis-associated squamous cell carcinoma generally presents with painful hematuria, unlike urothelial carcinoma which typically manifests as painless hematuria [5] [13]. This semiological difference reflects the chronic inflammatory and infiltrative nature of schistosomiasis-related squamous cell carcinoma. Bowa *et al*. [5] reported that squamous cell carcinoma in sub-Saharan Africa often presents with more pronounced symptomatology including pelvic pain, dysuria, and irritative signs.

Evaluation of performance status according to the ECOG scale revealed significant deterioration of general condition in the majority of our patients, with 45.71% at ECOG stage 3 and 11.43% at ECOG stage 4. This observation indicates late diagnosis, when the disease has already considerably impacted patients' quality of life. Marked deterioration of general condition is a well-established unfavorable prognostic factor in the literature [14], though we did not collect survival data to confirm this in our population, and considerably limits available therapeutic options. This late presentation is unfortunately frequent in sub-Saharan Africa and is explained by several factors including low level of population awareness, limited access to healthcare, diagnostic delays related to health system inadequacies, and sometimes initial recourse to traditional medicine [5] [15].

Rectal examination in men and vaginal examination in women revealed abnor-

malities in nearly half of our patients, including palpable pelvic masses, bladder base indurations, and extension to neighboring organs in 5.71% of cases. These findings reflect the locally advanced nature of the disease at diagnosis. Schistosomiasis-related squamous cell carcinoma is characterized by a particular growth pattern with preferential horizontal extension along the bladder wall rather than rapid transmural invasion, frequently leading to involvement of the entire bladder and adjacent structures [5] [16] [17].

Analysis of cystoscopic characteristics in our series revealed several particularities. The macroscopic appearance of tumors was solid in 85.71% of cases, with sessile implantation base in 91.43% of patients. These morphological characteristics are typical of bladder squamous cell carcinoma and contrast with the frequently papillary and pedunculated appearance of low-grade urothelial carcinomas [18]. The solid and sessile character of lesions reflects their infiltrative nature and aggressive potential. Lesions were multifocal in 88.57% of cases, reflecting diffuse urothelial involvement secondary to chronic irritation induced by schistosome eggs [19].

The majority of tumors in our series measured more than 6 cm, with median size of 7.8 cm. This large tumor size at diagnosis confirms the advanced nature of the disease. In the literature, tumor size is recognized as an independent prognostic factor, with tumors larger than 3 cm being associated with increased risk of progression and mortality [20]. The trigone was the predominant location of lesions in our series, followed by lateral walls and bladder dome. This topographic distribution differs from that observed in non-schistosomiasis urothelial carcinomas, where the trigone is generally less affected due to the paucity of submucosal tissue at this level which makes massive accumulation of eggs difficult [21].

Ureteral orifice involvement, observed in 71.43% of our patients, constitutes a major characteristic of bladder squamous cell carcinoma in Africa. This ureteral involvement, frequently bilateral, leads to obstructive uropathy and renal failure observed in our patients. Associated bladder lesions included bladder calcifications in 34.29% of patients and bladder mucosal thickening in 54.29%. These abnormalities reflect chronic modifications induced by schistosomiasis, notably bladder fibrosis and schistosome egg calcifications [8] [22].

Histopathological analysis revealed that 91.43% of tumors were muscle-invasive bladder tumors. This very high proportion of invasive tumors reflects late diagnosis and biological aggressiveness of squamous cell carcinoma. In African series, the prevalence of muscle-invasive tumors at diagnosis varies between 70% and 90%, contrasting with developed countries where only 20 to 30% of cases are diagnosed at the invasive stage [5]. This major difference has considerable therapeutic and prognostic implications, since muscle-invasive tumors require radical treatment by cystectomy and are associated with high mortality in published series [23], though we lack follow-up data to confirm outcomes in our cohort.

Tumor grade was high in 97.14% of cases. High histological grade is an almost constant characteristic of bladder squamous cell carcinoma, reflecting its high

proliferative potential and aggressive clinical behavior. High-grade tumors present disorganized architecture, marked cellular pleomorphism, high mitotic activity, and are associated with major risk of progression and metastases.

Tumor necrosis (51.43% of cases) indicates rapid growth exceeding vascularization and constitutes a poor prognostic marker. It is frequent in large, high-grade squamous cell carcinomas, correlated with reduced survival.

An important limitation of our study is the absence of follow-up data on patient outcomes, survival, and treatment response. All prognostic inferences discussed in this paper are therefore extrapolated from the well-established literature correlating tumor stage, grade, size, and performance status with outcomes, rather than from direct observation of our patients' clinical course. While the advanced stage at presentation (91.43% muscle-invasive, 97.14% high-grade) strongly suggests poor prognosis based on international data, we cannot quantify actual survival or disease-specific mortality in our cohort. Future prospective studies with systematic follow-up are essential to determine whether prognostic factors validated in Western populations remain applicable to schistosomiasis-associated bladder cancer in the Guinean context, where biological behavior, treatment availability, and competing mortality risks may differ significantly.

Our study highlights major challenges in Guinea: late diagnosis limiting curative options. Radical cystectomy, the reference treatment for invasive tumors, remains a major intervention with significant morbidity, aggravated by deterioration of general condition and obstructive renal failure in most patients.

Prospective multicenter studies with standardized diagnostic protocols, systematic parasitological examination, serological testing for schistosomiasis, and long-term follow-up would be necessary to better evaluate the true incidence, etiological factors, therapeutic results, and prognostic factors in our context.

5. Conclusions

This study on bladder squamous cell carcinomas reveals a distinct profile characterized by female predominance and early occurrence, reflecting comparable exposure of both sexes.

Late diagnosis represents the major problem, with muscle-invasive, high-grade, large tumors frequently invading ureteral orifices. Significant deterioration of general condition limits curative options and is expected to compromise prognosis based on tumor characteristics, though survival data are not available.

Hematuria constitutes the main presenting sign, accompanied by obstructive renal failure and anemia, indicating advanced stage at diagnosis.

Public health priorities include strengthening anti-schistosomiasis efforts, improving access to safe water, raising awareness of warning signs, and developing early diagnosis pathways.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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