African Urology 2023;3:14-18
https://doi.org/10.36303/AUJ.0061

AFRICAN UROLOGY
ISSN 2710-2750 EISSN 2710-2750

ORIGINAL RESEARCH

Bladder cancer in Senegal: what's new?

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Background: The histological type determines the outcome of bladder cancers. Our study investigates the epidemiology of bladder cancer histology at our centre and compares it with previous studies carried out in Senegal.

Methods: This descriptive and analytical study was conducted among 190 patients observed for bladder cancer at General Hospital Idrissa Pouye over a period of eight years. The parameters studied were age, gender, histological type, tumour stage, smoking exposure, presence of bilharzia eggs, clinical and paraclinical signs, locoregional and distant extension, treatment and recurrence.

Results: The mean age of the participants was 62.37 ± 13.96 years. The gender ratio (M/F) was 1.63. Urothelial carcinoma was the most common histological type (79.5% of cases). Squamous cell carcinoma was found in 11.1% of the participants and was more frequent among patients under 40 years of age and among women. The tumour infiltrated the muscle in 78.42% of cases. Active smoking was observed in 45.2% of the participants and the presence of bilharzia eggs was found in 14.2% of cases. Haematuria was the most presenting finding of bladder cancer (91.58% of cases). Six patients had undergone endovesical chemotherapy. Twenty-one patients with non-muscle-invasive bladder tumours (NMIBT) had recurred. Cystectomy had been performed in 35 patients.

Conclusion: Urothelial carcinoma has become the most common type of bladder cancer, followed by squamous cell carcinoma. It is necessary to design a care pathway for endovesical chemotherapy and appropriate monitoring.

Keywords: bladder cancer, histology, schistosomiasis, endovesical chemotherapy, Senegal

Objectif: Le type histologique conditionne la prise en charge des cancers de la vessie. Le but de notre travail était d'étudier l'épidémiologie de l'histologie des cancers de la vessie dans notre centre et en comparer les résultats avec ceux des études précédemment réalisées au Sénégal.

Méthodologie: Il s'agissait d'une étude descriptive et analytique incluant 190 patients suivis pour le cancer de la vessie à l'hôpital Général Idrissa Pouye sur une durée de 8 ans. Les paramètres étudiés étaient l'âge, le sexe, le type histologique, le stade tumoral, l'intoxication tabagique, la présence d'œufs de Bilharzie, les signes cliniques et paracliniques, le traitement.

Résultats: L'âge moyen des patients était de 62,37 ± 13,96 ans. Le sex ratio était de 1,63. Le carcinome urothélial a été le type histologique majoritairement objectivé dans 79,5 % des cas. Le carcinome épidermoïde a été objectivé chez 11.,1 % des patients. La tumeur infiltrait le muscle dans 78,42 % des cas. Le tabagisme actif a été objectivée chez 45,2 % de nos patients et la présence d'œufs de Bilharzie dans 14,2 % des cas. L'hématurie était la circonstance majoritaire de découverte du cancer de la vessie dans 91,58 % des cas. Six patients présentant une TVNIM ont eu une chimiothérapie endovésicale. Vingt et un patients présentant une TVNIM ont récidivé. Une cystectomie a été réalisée chez 35 patients.

Conclusion: Le carcinome urothélial est devenu le type majoritaire au détriment du carcinome épidermoïde. Il est nécessaire de mettre en place un parcours de soins pour les chimiothérapies endovésicales et une surveillance adaptée.

Mots clés: Cancer de la vessie, histologie, bilharziose, chimiothérapie endovésicale, Sénégal

Introduction

Bladder cancer is the tenth most common cancer in the world. Differences in incidence worldwide can be explained in part by differences in exposure to bladder cancer risk factors.[1] The most common histological type in Africa, in the past, was squamous cell carcinoma,[2-4] while urothelial carcinoma is the predominant histological type in northern countries.[5,6]

Urogenital bilharzia is the main aetiological factor for squamous cell carcinoma of the bladder.[7] In 1994, the International Agency for Research on Cancer (IARC) confirmed that *Schistosoma haematobium* is carcinogenic.[8] However, the reason why schistosomiasis is more often associated with squamous cell carcinoma than with urothelial carcinoma, is unclear. It is known that *Schistosoma haematobium* eggs cause metaplastic lesions on the bladder urothelium that can progress to squamous cell carcinoma.[9]

Schistosomiasis is a highly endemic parasitosis in Senegal and is caused by the construction of dams.[10,11] Owing to its high morbidity, a schistosomiasis control programme has been in place in Senegal since 1988.

Other risk factors for bladder cancer such as smoking, occupational exposure, repeated urinary tract infections and metabolic syndrome, are more often associated with urothelial carcinoma.[12]

Despite numerous deterrence campaigns, smoking continues to increase in our regions. Furthermore, the increase in industrialisation and a lack of suitable means to protect workers mean that they are experiencing greater occupational exposure to factors that cause bladder cancer.

These lifestyle changes in our regions mean that we now share the same risk factors for bladder cancer as westerners. This may have

an impact on the histological types of bladder cancer seen at our centres.

The identification of histological type prior to treatment is important, as this has therapeutic implications. Endovesical chemotherapy is indicated after transurethral resection of the bladder tumour (TURBT) for non-muscle-invasive urothelial carcinomas. However, for non-muscle-invasive squamous cell carcinomas, a cystectomy is required in the same way as for muscle-invasive bladder tumours (MIBT) or non-muscle-invasive bladder tumours (NMIBT) with a very high recurrence risk. When cystectomy is indicated for urothelial carcinoma, neoadjuvant chemotherapy is recommended.[12] In contrast, squamous cell carcinomas are chemoresistant and there is no proven benefit to neoadjuvant or palliative chemotherapy in this type of cancer.[13]

As the management of bladder cancer depends on the histological type, it is necessary to evaluate the impact of preventive measures against bilharzia and of lifestyle changes on the epidemiology of bladder cancer at our centre. Thus, the aim of this study was to describe the evolution of the histological type and the clinical presentation of bladder cancer in Senegal in order to better plan the management thereof.

Methods

We conducted a descriptive and analytical study to evaluate the epidemiology of bladder cancer histology. We collected medical records and histological reports of patients over a period of eight years (January 2013 to December 2020) from the Urology Department and the Pathological Anatomy Laboratory, General Hospital Idrissa Pouye. We included patients who were observed for bladder cancer within these departments and who had complete medical records.

The parameters studied were age, gender, histological type, tumour stage, smoking exposure, presence of bilharzia eggs in surgical specimens, clinical and paraclinical signs, locoregional and distant extension, treatment and recurrence. We compared these parameters for the two histological types most frequently encountered in our regions, namely squamous cell carcinoma and urothelial carcinoma.

We also compared results published at the Hospital Aristide Le Dantec and those previously published at our centre as these two centres are the reference centres for the management of bladder cancer in Senegal. This comparison allowed us to observe the evolution of the epidemiology of bladder cancer, specifically in Senegal.

Data analysis was done with IBM SPSS Statistic software, version 2.0 (IBM Inc., USA). We determined averages for quantitative variables. For qualitative variables, we estimated proportions. The comparison between qualitative variables was done with the chi-square test. Statistical significance was considered for alpha < 0.05.

Results

A total of 190 participants were included in this study. The mean age of the participants was 62.37 ± 13.96 years, with extremes of 21 and 90 years. Of the participants, 111 were older than 60 years. The gender ratio (M/F) was 1.63.

Urothelial carcinoma was the most common histological type found in 79.5% of the participants, while squamous cell carcinoma was found in 11.1% of the participants (Table I).

We observed an increase in the proportion of urothelial carcinoma between 2013 and 2018 but a decrease in the proportion of squamous cell carcinoma during the same period. We also observed that other cumulative histological types (sarcoma and adenocarcinoma) were more frequent than squamous cell carcinoma from 2017 onwards (Figure 1).

Urothelial carcinoma was more common among men, while squamous cell carcinoma was more common among women (Figure 2). There was a significant relationship between gender and these two histological types (p = 0.001). Squamous cell carcinoma was predominant among patients under 40 years of age, while urothelial carcinoma was predominant among patients over 40 years of age (Figure 3). The relationship between histological type and age is statistically significant (p < 0.05) (Table I).

Schistosoma haematobium eggs were found in 27 participants (14.21%). There was a relationship between the presence of bilharzia eggs and squamous cell carcinoma (p < 0.05) (Table I).

Active smoking was observed in 45.2% of the participants. Urothelial carcinoma was diagnosed in 82% of the active smoking participants and there was a statistically significant relationship between active smoking and urothelial carcinoma (p = 0.01) (Table I).

Haematuria was the most presenting finding of bladder cancer (91.58% of participants) and cystoscopy was the main imaging procedure used to diagnose bladder tumours (83.68%). Multifocal location was seen in the majority of participants (44.21%) and node invasion in tomodensitometry was found in 31.1% of cases. Distant metastases were found in 33.3% of cases. There was no significant difference between histological type and lymph node involvement and distant metastases (Table I).

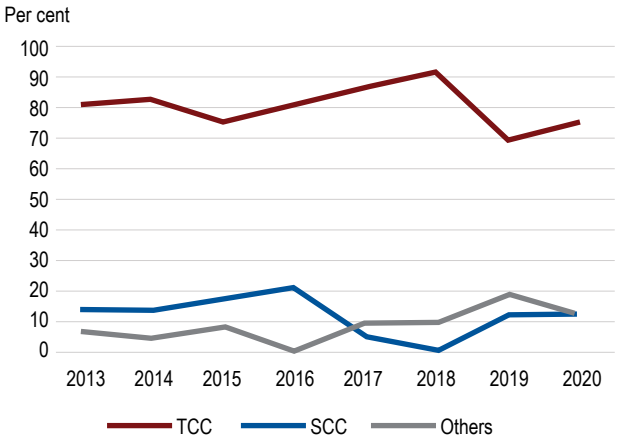

Figure 1: Distribution of the different histological types of bladder cancer according to the years (2013–2020)

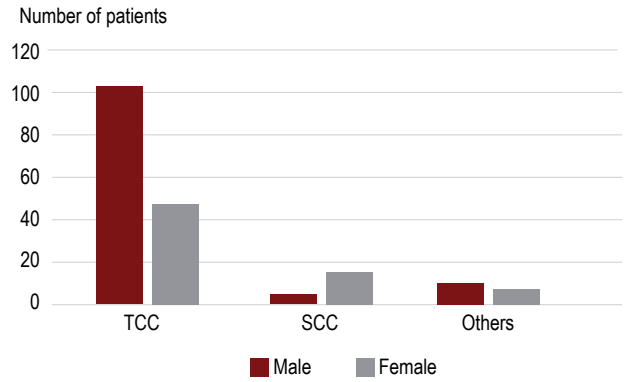

Figure 2: Distribution of the different histological types of bladder cancer according to gender

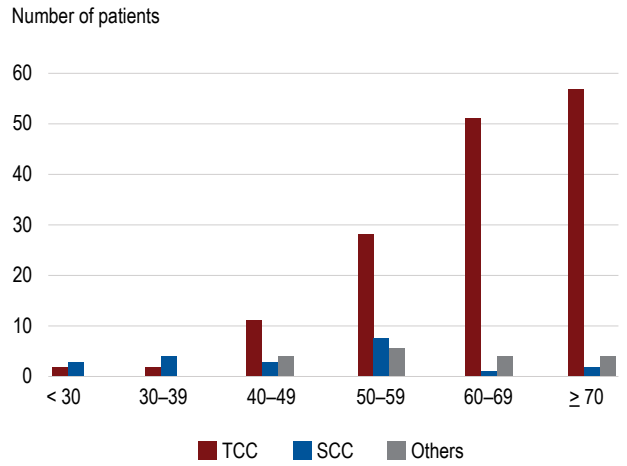

Figure 3: Distribution of the different histological types of bladder cancer according to age group

The bladder tumour invaded the muscle in 78.42% of cases. There was no significant difference between histological type and muscle invasion (p = 0.85) (Table I).

Of the 41 participants with NMIBT, eight participants had papillary carcinoma. Six of them had undergone endovesical chemotherapy with gemcitabine in addition to TURBT. No Bacillus Calmette-Guérin (BCG) therapy was performed for the other NMIBT. Of the 41 participants with NMIBT, 21 had relapsed. Six of these participants had recurred in the NMIBT mode and had undergone cystectomy.

Table I: Comparison of epidemiological and clinical parameters according to histological type

Variables	TCC	SCC	Others	*p*-value
Number	151 (79.5%)	21 (11.1%)	18 (9.4%)	–
Age (%)				
< 60	28.5	85.7	55.6	**0.00**
≥ 60	71.5	14.3	44.4	
Gender				
Male	68.2	23.8	55.6	**0.001**
Female	31.8	76.2	44.4	
Smoking (%)				
Yes	49.5	15.8	53.3	**0.01**
Bilharziasis (%)				
Yes	11.9	38.1	5.6	**0.00**
Pathologic stage (%)				
< T2	14.3	23.2	16.7	0.85
≥ T2	85.7	76.8	83.3	
Lymph node (%)				
N0	70.5	60	66.7	0.12
N+	29.5	40	33.3	
Metastases (%)				
M0	64.8	69.2	80	0.87
M+	35.2	30.8	20	

TCC – transitional cell carcinoma, SCC – squamous cell carcinoma

Fifty-six participants had non-metastatic MIBT.

Total cystectomy was performed in 32 participants and partial cystectomy in three participants, while Bricker diversion was performed in 22 participants and neo-bladder in 10 participants.

Discussion

The mean age of our patients tends to be close to that of Western series.[14,15] We have observed an increase in the mean age of patients with bladder cancer in Senegal from 45 years old before 2005[3] to 62 years currently (Table II). This increase in the age at which cancer occurs is mainly explained by a decrease in the

Table II: Comparison of the various works published in Senegal on bladder cancer

Variable	H. Le Dantec 1950–2005	H. Le Dantec 2014–2018	HOGIP 2009–2013	HOGIP 2013–2020
Mean age	45.5	55.6	55	62.37
Gender ratio	1.25	2.1	1.8	1.6
Pathologic finding (%)				
SCC	**58.4**	32.3	**48.3**	11.1
TCC	38.4	**51.5**	37.9	**79.5**
Others	3.2	16.2	13.8	9.4
Smoking (%)				
Yes	–	–	8.1	**45.2**
Bilharziasis (%)				
Yes	29.9	–	**13.9**	14.2

TCC – transitional cell carcinoma, SCC – squamous cell carcinoma, H – hospital, HOGIP – General Hospital Idrissa Pouye

proportion of squamous cell carcinoma, which occurs more in younger people.[3,15]

Like most studies published in Senegal, we observed that bladder cancer is more prominent in males.[3,14] However, our study observed that females were associated more with squamous cell carcinoma. This could be explained by the fact that women are the most exposed to schistosomiasis[16] and that they consume less tobacco in our regions.

As in Egypt, there has also been a change in the predominant type of cancer in our country in recent years. In Egypt, squamous cell carcinoma was predominant at 73% between 2001 and 2005, while between 2006 and 2010 transitional cell carcinoma was predominant at 65%.[17] In Senegal, at the Hospital Aristide Le Dantec, squamous cell carcinoma was predominant at 58.4% before 2005[3] and urothelial carcinoma became predominant at 51.5% between 2014 and 2018.[18] This trend was also observed at our centre with the proportions of squamous cell carcinoma decreasing from 48.3%[19] to 11.1% (Table II).

These results could have the same explanation as in Egypt with a decrease in schistosomiasis infestation on the one hand and an increase in smoking among patients on the other hand. Indeed, in Egypt, bilharzia eggs were found in 70% of surgical parts before 2005 compared to 15% in surgical parts after 2005.[17] In Senegal, Diao et al.'s study[3] published in 2005 found bilharzia eggs in 29.9% of surgical specimens compared to 14.9% in our study. We also noted that smoking exposure increased from 8.1% before 2013[19] to 45.2% among patients at our centre.

We did not observe any difference between lymph node involvement and distant metastasis, and the different histological types. However, it has been described in the literature that squamous cell carcinoma has lymph node and bloodstream extension.[15,20]

In Senegal, urogenital bilharziasis is prevalent in all regions with a prevalence reaching more than 50% in some areas.[10,11] This causes significant morbidity,[21] including bladder cancer. The association between bilharzia and squamous cell carcinoma has been described as early as 1911 by Ferguson[22] and has also been reported in our study and other African studies.[20,22,23] To reduce the morbidity of this parasite, a control programme has been put in place by Senegal's health authorities since 1988. It consists of making regular anti-bilharzia chemotherapy available to affected communities, regularly treating school-aged children both in schools and Koranic schools (dahras), providing early treatment to cases in isolated communities, promoting clean water supply and sanitation, controlling intermediate host molluscs, and integrating a health prevention component in all hydro-agricultural development projects.

This control programme could partly explain the decrease in the proportion of squamous cell carcinoma observed in our country.

In addition, hybrid strains (*Schistosoma haematobium* and *Schistosoma bovis*) have been observed in northern Senegal. These strains accounted for 24% of the samples infested by *Schistosoma haematobium*.[24] However, this study[24] showed that hybrid strains cause less urogenital morbidity than the pure strain.[25] Therefore, the appearance of hybrid strains of *Schistosoma haematobium* could also explain the decrease in squamous cell carcinoma.

The predominance of urothelial carcinoma observed in Senegal requires the adaptation of management. In fact, NMIBTs have a high potential for recurrence and therefore require maintenance therapy and monitoring. A care pathway for these patients must be set up and training must be provided for paramedical staff, which is essential for the maintenance therapy to run smoothly. An effort must also be made by the authorities to make BCG therapy available. The recurrence rate of NMIBT is indeed very high in our study as none of the patients who required BCG therapy had the benefit of it.

Despite a change in histological type, the majority of tumours diagnosed invade the muscle. Cystectomy still has an important place in the management of our patients. However, we have observed a low rate of cystectomy in patients requiring this treatment.

More effort needs to be made for earlier diagnosis of bladder cancer. Urinary biomarkers are less invasive than cystoscopy, and do not require special skills. Therefore, it can be performed in the most remote areas and may help to obtain earlier diagnoses.

Conclusion

A comparison between our results and those previously published in Senegal shows that urothelial carcinoma has become the predominant histological type of squamous cell carcinoma pattern. The recurrence rate of NMIBT was very high. It is therefore necessary to adapt the management of patients by setting up a care pathway for endovesical instillation and monitoring. A prospective multicentre study will allow for better understanding each risk factor in the occurrence of bladder cancer in our country, and propose new adequate preventive measures.

Acknowledgement

Special thanks to the Urology Department, General Hospital Idrissa Pouye.

Conflict of interest

The authors declare no conflict of interest.

Funding source

No outside funding was required.

Ethical approval

The institutional review board of General Hospital Idrissa Pouye (Dakar, Senegal) approved this study. Informed consent was waived by the ethics committee as this study is retrospective.

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