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ORIGINAL ARTICLE

Urinary Bladder Cancer and Schistosomiasis in North-Western Nigeria

Cancer Urinaire de Vessie et Schistosomiasis dans Nigeria du Nord-Ouest

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ABSTRACT

BACKGROUND: **An unusually high prevalence of bladder cancer was noticed by clinicians and in the cancer registry of Usmanu Danfodiyo University Teaching Hospital, Sokoto. Several areas of this region were also known to be endemic for urinary schistosomiasis.**

OBJECTIVE: **To determine the epidemiological characteristics of bladder cancer in the region and to assess the impact of schistosomiasis on these cases.**

METHOD: **Retrospective review of clinical and histopathogical records of bladder cancer cases seen at Usmanu Danfodiyo University Teaching Hospital, Sokoto from January 1999 to December 2004.**

RESULT: **One hundred and thirty three cases satisfied our criteria for inclusion. There was a 4.7 fold rise in the number of bladder cancer cases between 1999 and 2004. The male to female ratio was 11.1:1.0. The mean age was 46.0 years and ranged from 20 to 82 years. Majority, 107 (80.5%) were farmers and fishermen from regions of the distribution of surrounding river or their smaller tributaries. Squamous Cell Carcinoma comprised 65.1% of histologically verified cases and in 50% of Squamous Cell Carcinoma; there was histological evidence of chronic urinary schistosomiasis.**

CONCLUSION: **Bladder cancer is a common malignancy in Sokoto, North-Western Nigeria. The association with chronic urinary schistosomiasis is very strong and the hospital incidence appears to be rising.**

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Keywords: Urinary bladder, Squamous Cell Carcinoma, *Schistosomiasis*, North-western Nigeria.

RESUMÉ

Contexte: *Une prédominance insolite de cancer de vessie a été remarquée par les practiciens et dans l'enregistrement de cancer d'Hôpital d'Enseignement d'Université de Danfodiyo d'Usmanu, Sokoto. Plusieurs secteurs de cette région ont été sus aussi pour être endémiques pour schistosomiasis urinaire. Cette étude a été entreprise de déterminer les caractéristiques épidémiologiques de cancer de vessie dans la région et évaluer l'impact de schistosomiasis sur ces cas.*

Méthodes: *La revue de clinique et dossiers de de histopathogical 133 cancer de vessie reconnaît vu à l'Hôpital d'Enseignement d'Université de Danfodiyo d'Usmanu, Sokoto du 1999 janvier au 2004 décembre.*

Résultat: *Cent et trente trois cas ont satisfait nos critères pour l'inclusion. Il y avait un régulier 4,7 ascension de pli dans le nombre de cas de cancer de vessie entre 1999 et 2004. Le mâle à la proportion femelle était 11.1:1.0. . L'âge moyen était 46,0 années et étendu de 20 à 82 années. La majorité, 107 (80.5%) were farmers and) were farmers and était des fermiers et des pêcheurs des régions de la distribution de rivières Rima, Sokoto, Ka, Niger ou leurs plus petits affluents. Le Carcinome de Cellule de Squamous (SCC) a compris 65,1% de cas histologiquement vérifiés et dans 50% de SCC ; il y avait de la preuve histologique de schistosomiasis urinaire chronique.*

Conclusion: *Cancer de vessie est une malignité commune dans Sokoto, Nigéria du nord-ouest. L'association avec schistosomiasis urinaire chronique est très forte et l'incidence d'hôpital a l'air d'être élever. WAJM 2007; 26(3): 226 – 229.*

Mots clés : La vessie urinaire, le Carcinome de Cellule de Squamous, Schistosomiasis, Nigéria du nord-ouest.

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Abbreviations: SCC, squamous cell carcinoma; TCC, transitional cell carcinoma

INTRODUCTION

The causal relationship between urinary schistosomiasis and bladder cancer was first reported by Fergusson.[1] There is now compelling body of evidence on the contribution of chronic urinary bladder schistosomiasis to the aetiopathogenesis of urinary bladder cancer.[2-4] In the Western world, carcinoma of the bladder is the fourth most common cancer in men accounting for 6.2% of all cancer cases and the eighth most common cancer in females, accounting for 2. 5% of cancer cases.[5] In Egypt, parts of Middle East and areas where schistosomiasis is endemic, carcinoma of the bladder has been reported to be the most common cancer in males.[2]

Different mechanisms for schistosoma-induced bladder cancer have been suggested. No direct carcinogenic product from the parasite has been isolated. Current evidence suggests enhanced inflammatory cells and bacterial nitrosation of endogenous nitrite to carcinogenic N-nitroso compounds in schistosoma-infected bladder.[6-9]

An unusually high prevalence of bladder cancer was observed by clinicians and the cancer registry of Usmanu Danfodiyo University Teaching Hospital, Sokoto (personal communication). This study was therefore undertaken to determine the epidemiological characteristics of bladder cancer in the region and to assess the impact of schistosomiasis on these cases.

MATERIALS AND METHODS

Clinical and histopathological records of 133 advanced bladder cancer cases seen at Usmanu Danfodiyo University Teaching Hospital, Sokoto between January 1999 and December 2004 were reviewed. Only clinically advanced cases presenting with palpable bladder tumours and supported by ultrasonography and cytology or histologically confirmed cases were included. Information obtained included age, sex, occupation, year of presentation, residential address, history of childhood haematuria, ultrasonographic findings and results of cytology and histology.

All the slides showing bladder carcinoma were further reviewed for histological evidence of schistosomiasis. The data obtained was entered into Epi-Info 2002 (Centre for Disease control and Prevention, Atlanta) and analyzed. The records of other histologically and cytologically diagnosed malignancies in 2004 were also obtained from the cancer registry of Usmanu Danfodiyo University Teaching Hospital.

RESULTS

During the period of study, there were 312 clinically diagnosed cases of bladder cancer but only 133 (42.6%) cases satisfied our criteria for inclusion. There was a 4.7 fold rise in the number of bladder cancer cases with 11 in 1999 and 52 in 2004. Correspondingly, the hospital's patients volume rose 1.8 times, from 62,460 in 1999 to 109,789 in 2004.

Table 1: Histological Features of Bladder carcinoma in study patients

Type of cancer	No.(%) of patients
Squamous Cell	28 (65.1)
Transitional	12 (27.9)
Adenocarcinoma	2 (4.7)
Signet ring	1 (2.3)
Total	**43 (100)**

of bladder tumour supported by cytological reporting of malignancy. The remaining fifty seven (42.9%) had palpable suprapubic mass confirmed to be arising from the bladder by ultrasound scan. Histopathology register of the hospital revealed that among the 182 diagnosed malignancies in 2004, 36 (19.8%) were bladder cancers. This was the most common diagnosed malignancy in 2004. Histological findings in 43 patients were as depicted on table 1. In half of the cases of squamous cell carcinoma, (SCC) there was histological

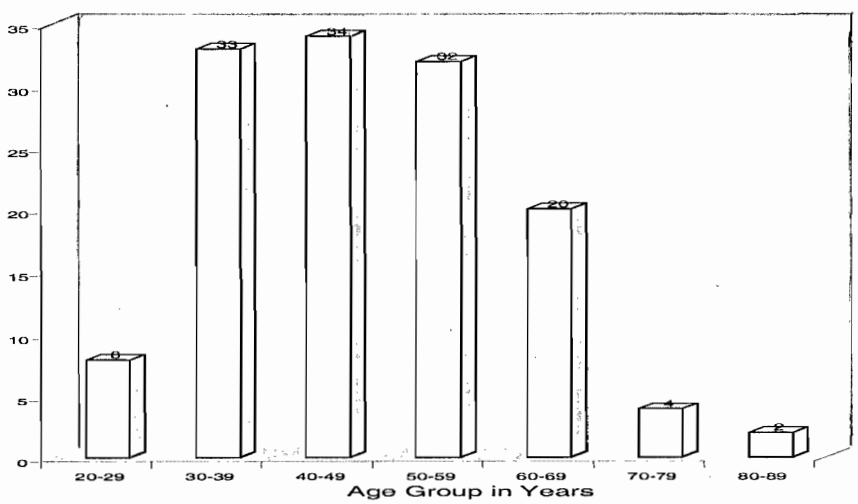

Figure 1: Distribution of patients with Bladder Carcinoma by Age.

There were 122 males and 11 females giving a male to female ratio of 11.1:1.0. The age distribution was as shown in Figure I. The mean age was 46.0 years with a range of 20 to 82 years. Majority, 107 (80.5%) were farmers and fishermen from regions of the distribution of surrounding rivers Rima, Sokoto, Ka, Niger or their smaller tributaries. Ninety seven (72.9%) patients had history of haematuria in childhood.

Forty three (32.3%) patients were histologically confirmed, thirty-three (24.8%) had ultrasound documentation evidence of chronic schistosomiasis. The histology of one of such cases is shown in Figure 2. Two patients with transitional cell carcinoma (TCC) also had histological evidence of schistosomiasis, Figure 3. Among the SCC cases, 14 (50%) were well differentiated, 12 (42.9%) were moderately differentiated and 2 (7.1%) were poorly differentiated tumours.

DISCUSSION

Our study has revealed that bladder cancer was the most common malignancy in the hospital in 2004. Whilst

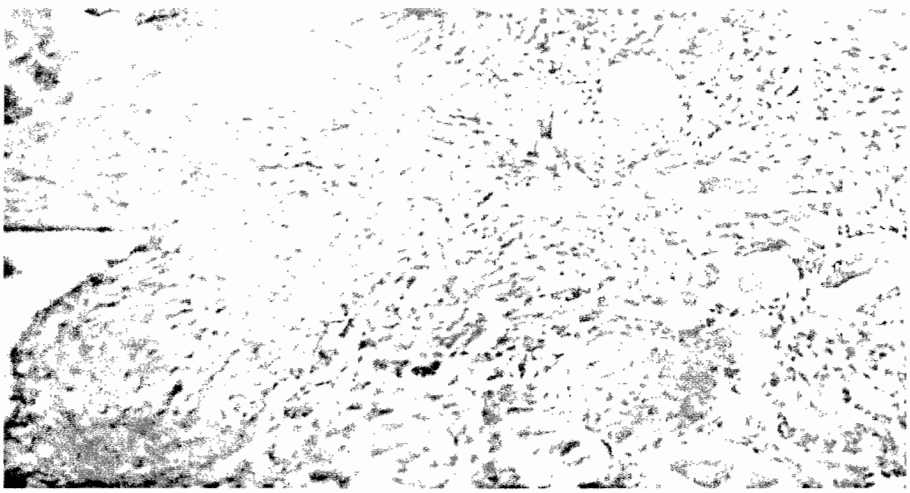

Figure 2: Calcified ova of schistosoma shown with nests of infecting moderately differentiated squamous cell carcinoma of bladder. H & E x 40

Fig. 3: Transitional cell carcinoma with pre-existing heavy schistosomal infestation. H & E x 40

the number of cases increased nearly five fold, the hospital attendance only doubled during the same period, suggesting a rising hospital prevalence of bladder cancer. The number that satisfied our inclusion criteria was only a fraction of the actual cases.

The causal relationship between carcinoma of the bladder and schistosomiasis is well documented and has been extensively studied in several parts of the world.[4,6,8,10] The role of schistosomiasis in this multi-step process of bladder carcinogenesis is based on evidence of geographic correlation, age at diagnosis, gender pattern, distinct pathological characteristics, and experimental evidence in infected animals.[1,2,11,12] The clinico-pathological pattern of carcinoma of the bladder in several studies from Nigeria also suggest schistosomal aetiology.[13-16]

Our patients came predominantly from rural and agricultural areas of the region known to be endemic for schistosomiasis. The patients were mostly males ; with a male to female ratio of 11.1:1 being higher than reported ratios from other Nigerian centres [14,15,16]. The male to female ratio in Egypt is 4:1 [17] The male preponderance in North–Western Nigeria may be related to the more intense exposure in males who are the main agricultural workforce. The age range is in conformity with age pattern seen in schistosomiasis endemic regions.[2]

The histological types were mostly differentiated SCC with histological evidence of chronic schistosomiasis in 50% of SCC cases. Two cases of TCC also showed schistosomal granulomata. All the above features suggest schistosomal contribution in the aetiology of bladder cancer in this region.

In conclusion, this study reveals an association between chronic urinary schistosomiasis and carcinoma of the bladder in this region. The hospital prevalence of this malignancy shows a rising trend.

REFERENCES

1. Fergusson A R. Associated bilharziasis and primary malignant diseases of the urinary bladder, with observation on a series of 40 cases. *J Pathol Bacteriol.* 1911; **16:** 76 – 94.
2. El-Boulkainy M N, Mokhtar N M, Ghoneim M A, Hussein M H. The impact of Schistosomiasis on the Pathology of Bladder Carcinoma. *Cancer* 1981; **48:** 2643 – 3648.
3. Kitinya JN, Lauren PA, Eshleman LJ, Paljarui L, Tanaka K. The incidence of squamous and transitional cell carcinomas of the urinary bladder in Northern Tanzania in areas of high and low levels of endemic schistosoma haematobium infection. *Trans R Soc Trop Med Hyg* 1986; **80:** 935 – 939.
4. World Health Organization. *Evaluation of Carcinogenic risks to humans, Schsitosomes, liver flukes and Helicobacter pylori* IARC Monogr 1994; **61:** 45 – 119.
5. Greenlee RT, Murry T, Bolden S, Wings PA. Cancer statistics 2000. *CA Cancer J Clin.* 2000; 50 – 57.
6. El-Merzabni MM, El-Aaser AA, Zakhary NI. A study on the aetiological factors of bilharzial bladder cancer in Egypt N-Nitrosamines and their precursors in urine. *Eur J cancer.* 1997; 15: 287-291
7. Tricker AR, Mostafa MH, Spiegelhalder B, Preussmann R. Urinary excretion of nitrate and N-nitrosocompounds in schistosomiasis and bilharzial bladder cancer patients. *Carcinogenesis.* 1989; **10:** 547 – 552.
8. Abdel Mohsen, MA, Hassan AA, El-Sewedy SM, Aboul-Azm T,

Mogagnotti C, Fanelli R, Airoldi L. Biomonitoring of n-nitrosocompounds, nitrite and Nitrate in the urine of Egyptian bladder cancer patients with or without schistosoma haematobium infection. *Int J Cancer* 1999; **82:** 789 – 794.

9. Mustafa MH, Sheweita SA, O'Cannor PJ. Relationship between schistosomiasis and bladder cancer. *Clin Microbiol Rev* 1999; **12:** 97 – 111.
10. Abdel Mohsen, MA, Hassan AA, El-Sewedy SM, Aboul-Azm T, Mogagnotti C, Fanelli, R, Airoldi, L., Human bladder cancer, schistosomiasis, N-nitrosocompounds and their precursors. *Int J Cancer.* 2000; **88:** 682 – 683.
11. Badawi A F, Mostafa M H, Probert A, O'Cannor P J. Role of schistosomiasis in human bladder cancer; evidence of association, aetiological factors and basic mechanism of carcinogenesis. *Eur J Cancer Rev.* 1995; **4:** 54 – 59.
12. Warren DJ, Johnson CW, Lowe FC, Tuberculosis and Parasitic Diseases of the Genial Urinary Tract. In Walsh DC (Ed) *Campbell's Urology* ,8th Edition, Sounders, Philidelphia 2002; 743 – 788.
13. El-Boulkany NM, Ghoneim MA, Mansoura MA. Carcinoma of the bilharzial bladder in Egypt, clinical and pathological features. *Br J Urol* . 1972; **44:** 561 – 570.
14. Aghaji AE, Mbonu OO. Bladder tumours in Enugu. Nigeria. *Br J Urol.* 1989; **64:** 399 – 402.
15. Obafunwa JO. Histopathological study of vesical carcinoma in Plateau State, Nigeria. *Eur J Surg Oncol.* 1991; **17:** 489 – 91.
16. Thomas JO, Onyemenen NT. Bladder carcinoma in Ibadan Nigeria: a changing trend. *East Afr Med J* 1995; **72:** 49 – 50.
17. Ochicha O, Alhassan S, Mohammed A Z, Edino S T, Nwokedi E E. Bladder cancer in Kano – a histopathological review. West Afr J Med. 2003; **22:** 202 – 204.
18. Goneim M A, Bilharziasis of the genitourinary tract. *BJU International* 2002; **89:** 22 – 30.