ORIGINAL ARTICLE

Morphologic patterns of testicular lesions in Uyo: A university hospital experience

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ABSTRACT

Background: The testis can be biopsied either for a diagnostic or therapeutic purpose. **Objective:** The aim of this study is to characterize the common indications for testicular biopsy and determine the pattern of testicular lesions. **Materials and Methods:** This was an 8-year retrospective study of all testicular and paratesticular specimens that were histologically diagnosed in the Department of Histopathology in University of Uyo Teaching Hospital between January 2008 and December 2015. **Results:** Sixty-four cases of testicular specimens were received in the histopathology laboratory, accounting for 1.3% of all received specimens. The youngest patient was 4 years, while the oldest patient was 86 years with a mean age of 54.4 ± 21.62. The most common presenting complaints seen in the nonfertility, nonprostate cancer-related cases were testicular swelling, pain, and small-sized testis as seen in 50%, 31.3%, and 12.5% of cases, respectively. In 60.9% of cases, the clinical diagnosis was prostatic cancer, while primary and secondary infertility accounted for 12.5% and 1.6%, respectively, with testicular/paratesticular tumor been the clinical diagnosis in 7.8% of cases. The mean ages for surgical castration patients, male infertility patients, and malignant lesion patients were 68.9, 41.7, and 46.5 years, respectively. Hypospermatogenesis was the most common histopathologic diagnosis of testicular biopsies in infertile men (33.4%). Four malignant lesions were seen, with embryonal rhabdomyosarcoma accounting for 50% of cases. **Conclusion:** Benign neoplastic lesions of the testis are very rare in study population, while embryonal rhabdomyosarcoma is the most common malignant lesion seen. Most men do not present to health facility for infertility management.

Keywords: Infertility, prostate cancer, testicular biopsy, testicular tumors

INTRODUCTION

The normal adult testis is a paired organ that lies within the scrotum suspended by the spermatic cord, with an average weight of each testis been 15–19 g, with the right testis usually been 10% heavier than the left.[1] The major function of the testis, is production spermatozoa and secretion of testosterone.[2] Disorders of the testis could be congenital or acquired (inflammatory or neoplastic). It can also be categorized into benign testicular diseases, malignant testicular diseases, and male infertility.[3] The testis can be biopsied either for a diagnostic or therapeutic purpose.[3] Diagnostic testicular biopsies are usually performed during investigations for male factor infertility, while therapeutic testicular excision biopsies are done for a range of conditions, including surgical castration for the treatment of prostatic cancer, management of testicular torsion, neoplastic conditions, cryptorchidism, and inflammatory conditions. They are done to document testicular damage and to prevent sympathetic injury to the normal contralateral testis. Testicular and paratesticular tissue tumors are rare in men though they constitute the most common solid malignancies in men aged between 15 and 34 years.[4,5] The incidence of testicular cancers is said to be rising in the Western

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and Asian countries, whereas the incidence in the Black populations of Africa and West Indies is low.[4,6,7]

Testicular biopsy is important in male factor infertility management because it helps to differentiate potentially correctible obstructive azoospermia from nonobstructive causes.[8]

The aim of this study is to characterize the common indications for testicular biopsy and determine the pattern of testicular diseases in this environment.

MATERIALS AND METHODS

This was a retrospective study of all testicular and paratesticular specimens that were histologically diagnosed at the Department of Histopathology in University of Uyo Teaching Hospital over an 8-year period from January 1, 2008, to December 31, 2015. This histopathology laboratory is the only facility where histopathology services are rendered in Akwa Ibom state and as such renders services to the host hospital and many privately owned hospitals within the state. These testicular and paratesticular specimens include excision biopsies and incision biopsies. These specimens were received in 10% buffered formalin and processed with auto processors. Paraffin-embedded sections (at 2–3 μm) were routinely stained with hematoxylin and eosin stains. Data were extracted from the departmental registers, patient request forms, and duplicate copies of histology reports of all cases. Information extracted includes age, side/laterality of testis affected, clinical indication, mode of presentation, and histology diagnosis. Data were analyzed using predictive analytical software, version 17 (IBM, SPSS Inc., Chicago, IL, USA).

Simple frequencies were determined for categorical variables and mean was evaluated for continuous data. All reports with ambiguous conclusions were excluded from the study. Furthermore, histopathology reports were excluded with any of the major identification parameters (such as age and diagnosis) missing. The exact number of excluded or discarded records was not kept though they were few. Ethical clearance was obtained from the institution, and there was no conflict of interest. Ethical clearance (ref no UUTH/AD/S/96/Vol XXI/259 dated 13th February 2016) was obtained from the institution ethical committee. All procedures were carried out as per the guidelines given in Declaration of Helsinski 2013.

RESULTS

A total of 64 cases of testicular specimens were received in the histopathology laboratory, accounting for 1.3% of 4838 specimens received during the period of study. The youngest patient was 4 years, while the oldest patient was 86 years with a mean age of 54.4 ± 21.62. In 60.9% of cases, the clinical diagnosis was prostatic cancer, while primary and secondary infertility accounted for 12.5% and 1.6%, respectively, with testicular/paratesticular tumor been the clinical diagnosis in 7.8% of cases as shown in Table 1. Following histopathological analysis, two (3.1%) cases of surgical castration specimens were malignant, which account for the discrepancy in total number of cases for surgical castration due to prostatic cancer as seen in Tables 1 and 2. The mean ages for surgical castration patients, male infertility patients, and malignant lesion patients were 68.9, 41.7, and 46.5 years, respectively.

Table 3 shows the various histopathologic diagnosis of the orchidectomy specimens following surgical castration, of which majority were atrophic but normal for age (82%).

The most common presenting complaints seen in the nonfertility, nonprostate cancer-related cases were testicular swelling, pain, and small-sized testis as seen in 50%, 31.3%, and 12.5% of cases, respectively.

The pattern of presentation of the 16 cases that were neither fertility nor prostate cancer related is as shown in Table 4.

Table 1: Clinical diagnosis and testicular tissue laterality

	Frequency (%)
Clinical diagnosis	
Cancer of prostate	39 (60.9)
Primary infertility	8 (12.5)
Testicular tumor	5 (7.8)
Testicular torsion	4 (6.3)
Undescended testis	3 (4.7)
Secondary infertility	1 (1.6)
Traumatic infarction	1 (1.6)
RVD with hydrocele	1 (1.6)
Not stated	2 (3.0)
Laterality (side)	
Both sides	47 (73.4)
Right side	8 (12.5)
Left side	7 (11)
Not stated	2 (3.1)

RVD with hydrocele: A hydrocele that was seen in a patient with retroviral disease

Hypospermatogenesis was the most common histopathologic diagnosis of testicular biopsies in infertile men (33.4%). Spermatocytic arrest and tubular hyalinization each accounted for 22.2%, respectively, as seen in Table 5.

Table 2: Indication and pathologic diagnosis

Indication	Pathologic category	Frequency	Mean age of cases
Diagnostic	Male infertility	9 (14.1)	41.73±3.9
Therapeutic	Causes	55	
	Surg castration	37 (57.8)	68.86±8.9
	Torsion	6 (9.4)	18.5±6.3
	Malignancy	4 (6.2)	46.5±7.8
	Cryptorchidism	3 (4.6)	21.67±12.2
	Inflammatory	2 (3.1)	58±2.8
	Traum infarction	1 (1.6)	26
	Hydrocele	1 (1.6)	84
	Benign lesion	1 (1.6)	45

Surg castration: Surgical castration for prostatic cancer; Traum infarction: Traumatic infarction

Table 3: Histopathology of prostate cancer orchidectomy specimens

Histopathology	Frequency
Normal spermatogenesis	4 (10.2)
Atrophic but normal for age	32 (82)
Seminoma	1 (2.6)
Hydrocele	1 (2.6)
Metastatic adenocarcinoma	1 (2.6)

Table 4: Mode of presentation for nonfertility or prostate cancer related (*n*=16)

Symptoms	Frequency
Testicular swelling	8 (50)
Testicular pain	5 (31.3)
Small-sized testis	2 (12.5)

Table 5: Histopathology of infertility cases

Diagnosis	Frequency (%)
Hypospermatogenesis	3 (33.4)
Spermatocytic arrest	2 (22.2)
Tubular hyalinization	2 (22.2)
Sertoli cell only	1 (11.1)
Chronic nonspecific inflammation	1 (11.1)

Table 6: Distribution of testicular neoplasms

Testicular neoplasms	Frequency (%)	Mean age
Benign		
Leydig cell tumor	1	45
Malignant		
Rhabdomyosarcoma	2 (50)	9.5±7.8
Seminoma	1 (25)	54
Metastatic adenocarcinoma	1 (25)	76

Table 6 shows the distribution of the testicular neoplasms.

Two cases of rhabdomyosarcoma seen in a 4-year-old male and a 15-year-old male were the most common malignant lesions, while a case each of seminoma and metastatic adenocarcinoma was seen in two cases aged 54 years and 76 years, respectively.

DISCUSSION

Male factor infertility remains a major contributor in cases of infertility among couples. Approximately 20% of infertility cases are caused entirely by a male factor, with an additional 30%–40% involving both male and female factors. Therefore, approximately calculated, male factor is present in one half of infertile couples.[9]

The evaluation of the infertile male includes the following: a thorough clinical history taking and physical examination, semen analysis, hormonal assay, search for antisperm antibody, transrectal ultrasonography, vasography, and testicular biopsy. Testicular biopsy is particularly useful in cases of azoospermia or oligospermia and normal endocrine function because it helps to identify men, who may benefit from corrective surgery for obstructive azoospermia.[8,10] Testicular biopsy is not the only parameter for determining the testicular histopathology pattern but also it is apparently the strongest indicator to foresee the possibility of finding sperms in the testis for therapeutic sperm retrieval in assisted reproductive techniques, and hence, testicular biopsy remains the key investigation for all male (testicular) causes of infertility.[11,12] Only 14.1% of the testes in this study were sent in specifically for infertility assessment. This is far less than the number seen in Nnewi, Lagos, and Saudi Arabia.[3,8,13] The low number may not be unconnected with the male domineering characteristic seen in our environment, where most times inability to conceive is taken to be a problem of the woman and only her should go to the hospital to sort out her problem. This is emphasized by Abdullah and Bondagji *et al*.[13] that stated that investigations of couple infertility have always concentrated on female pathological causes while male clinical conditions leading to infertility are still generally underdiagnosed and undertreated. Most (33.4%) of the infertile men in the index study had hypospermatogenesis. This is at variance with observations in Nnewi and Lagos but similar to findings in Saudi Arabia.[3,8,13] We agree with Oranusi *et al*. that male factor infertility testicular biopsy results,

differ significantly from one part of the country to another, may be due to several underlying etiological factors including social habits, genetic causes, and environmental conditions such as underlying infections, chemicals, radiation, and exposure to heat.[3] More investigations need to be done in this respect to identify the particular reasons.

Majority (60.9%) of the specimens were due to surgical castration following treatment of prostate cancer. This is closely similar to 71.6% reported in Nnewi.[3] Part of the initial treatment of metastatic prostate cancer is androgen deprivation therapy, which may be accomplished by surgical castration.[3] Prostate cancer is rarely encountered in these bilateral orchiectomy specimens though a case of metastatic adenocarcinoma was seen. Furthermore, a case of seminoma was seen in one surgical castration specimen, thus emphasizing the fact that every tissue/organ removed during any surgical procedure should be sent for histological examination. A lot of incidental pathologies (including cancers) have been identified by such means.

Nonneoplastic lesions of the testis were much higher than the neoplastic lesions, with testicular torsion taking the lead. This is similar to findings in Nnewi and India.[3,14] The testicular torsion is a surgical emergency, the most common cause of acute scrotum in the pubertal and postpubertal ages, and is commonly seen in 10–25 years of age.[14,15] The mean age of cases seen this series was 18.5 years.

Benign neoplastic lesions of the testis are very rare; as such, previous works have recommended that any testicular mass in a man should be taken seriously, since majority tends to be malignant.[16] Only a case of benign neoplastic lesion was seen in this series, similar to observation in Ife, while three cases were seen in India, while none was reported in Nnewi.[3,4,14]

Unlike most cancers, testicular carcinoma follows a reverse pattern having a decreasing incidence rate with increasing age. Cryptorchidism, Klinefelter syndrome, and strong family history are the predisposing risk factors in the development of testicular germ cell tumors.[5,14] Malignant testicular and paratesticular tumors accounted for 6.2% (4 cases) of all specimens received. This rate is similar to 5.6% reported in Nnewi.[3] In other studies that concentrated on testicular and paratesticular tumors alone, malignant lesions accounted for 80% in India and 96.2% in Ife.[4,14] The mean age for malignant lesions in the index study is 46.5 years. Over the past four decades, the incidence of testicular cancer has been increasing in most countries, though with marked geographical variation.[5] Ethnicity/geographical location is said to be the single overriding etiological factor in the development of these tumors. White males living in western industrialized countries, particularly in northern Europe, show the highest incidence rates, whereas Black males in Africa show the lowest.[17]

An observation in the index study is that 50% of the malignant lesions were embryonal rhabdomyosarcoma with a mean age of 9.5 years. The only study that mentioned embryonal rhabdomyosarcoma was the study by Salako *et al*. in Ife, where it accounted for the highest number (26.8%) of testicular lesions seen.[4] This is a sharp contrast with other Nigerian, Indian, and Nepal studies which all showed germ cell tumors (seminoma) as the most common, having rate range of 25%–43.7% in those studies.[14,18-20] We agree with Salako *et al*.[4] that the reasons for this observed trend (low rate of seminoma and high rates of rhabdomyosarcoma) in our series are not fully understood but may be due to dietary factors since the population covered by our study is mainly agrarian (like the population studied by Salako *et al*.) with a low incidence of consuming refined food, which Garner *et al*.[21] showed that it plays a significant role. Based on our findings, we also agree with the earlier hypothesis by Salako *et al*.[4] that diet of our agrarian environment may have played a significant role in the low incidence of testicular cancer seen in our setting.

The major limitation of this study is the small sample size and the fact that the main preservative used for the testicular specimens was 10% buffered formaldehyde, instead of the preferred Bouin's solution (which contains picric acid) and Zenker's fluid (which incorporates mercuric chloride). The major limitations to the use of Bouin's solution and Zenker's fluid are cost which reduces their availability, the need for the careful disposal of the mercury and meticulous attention to fixation times, and washing procedure to remove mercury precipitates.[22] However, 10% buffered formalin is a good alternative because it is inexpensive, readily available, compatible with most special stains, and the testicular tissue can remain in it for prolonged periods without deterioration.[23] The major limitation of this study is its retrospective design with attendant possible missed data.

CONCLUSION

We have documented a baseline data of testicular specimens seen in Uyo, and this will serve as a

background for future studies. Malignant lesions of the testis are rare in our environment, while most men do not present to health facility for infertility management.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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