ejpmr, 2018,5(9), 161-165

SJIF Impact Factor 4.897

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Review Article

ISSN 2394-3211

EJPMR

ADENOCARCINOMA OF THE PROSTATE IN NIGERIAN IGBOS; A CLINICO-PATHOLOGIC REVIEW

[1*]Nnadi I. G., [1]Egejuru R. O., and [2]Anyaeze C. M.

[1]Department of Pathology FMC Owerri.
[2]Department of Surgery, FMC Owerri.

***Corresponding Author: Dr. Nnadi Ikechukwu**
Department of Pathology FMC Owerri.

Article Received on 17/07/2018 **Article Revised on 07/08/2018** **Article Accepted on 28/08/2018**

ABSTRACT

AIM: To describe the demographic, clinical and histopathological characteristics of carcinoma of the prostate among Igbos of Eastern Nigeria. **Methodology:** The surgical daybook, request forms and histology reports were perused and the demographic, clinical, chemical pathology reports of the total PSA (PSA) values were recorded. DRE was carried out by Urologists and abnormal DRE findings suspicious of prostate cancer were documented. **Results:** This is a histopathological analysis of 265 consecutive cases of carcinoma of Prostate (CaP) in men of Nigeria Igbos between April 2010 and March 2016 at Federal Medical Centre Owerri. The mean age was 70.7±11.0 with age range of 46 to 104 years. The peak age group was 71-80 years followed by 61-70 years. The mean total prostate-specific antigen (tPSA) was 47.7±30.9ngml^{-1} with a range of 2.0 to 512ngml^{-1}. The mean duration of symptoms was 27.6 months with a range of 2 to 180 months. Lower urinary tracts symptoms were reported by 225 (84.9%) patients. The abnormal digital rectal examination was present in 47 (17.73%) cases. Metastatic disease was present in 15 cases (5.7%). The histological variants of the CaP were adenocarcinoma 98.87% (262 cases), and one case (0.38%) each for Adenoid cystic carcinoma and Mucinous carcinoma. A suspected case of Primary Melanoma of the prostate was also present.

KEYWORD: Prostate adenocarcinoma, southeast, Owerri, Histopathology.

INTRODUCTION

Carcinoma of the prostate (CaP) is the commonest tumor among Nigerian males and several reports indicate that its incidence is on the rise.[1-17] In Ghana, a neighboring West African country; Laryea et al.[18] reported that prostate carcinoma is the second commonest malignancy in males after primary liver cell cancer. The same trend is maintained among men of African descent in the USA, Caribbean, and other Sub-Saharan African (SSA) countries. The estimated number of CaP deaths in SSA in 2008 was more than five times that among African-Americans and is expected to double in Africa by 2030.[19] Though Prostate cancer is now the sixth most commonly diagnosed cancer in the world and represents 9.7% of cancers in men, its low fatality result in long-term survival following diagnosis making it the most prevalent form of cancer among men.[20] Globally the incidence of prostate carcinoma varies widely with the highest occurring in Australia/New Zealand followed by North America (111.6 and 97.2 per 100,000 respectively).[21] However, the incidence, mortality, and prevalence of CaP in Sub-Saharan Africa (SSA) is estimated at 25, 19-24, 135 per 100,000 respectively with the Asian populations having the lowest incidence rates.[21] For instance, it is estimated at 4.5 and 10.5 per 100,000 in South-Central and Eastern Asia.[21] In the Middle East, the incidence rates are 85, 40 and 38 per 100,000 for Israel, Turkey, and Lebanon respectively.[22] However, Israel has the least mortality to incidence ratio in the region.[22]

Odedina et al.[23] reported that there is disproportionate burden of prostate cancer among black men of West African ancestry displaced to the Caribbean Islands, United Kingdom, and the USA during transatlantic slave trade as compared to their counterparts in West Africa. This disparity has been attributed to differences in access to medical care, quality of cancer registry (including completeness of case ascertainment), estimates of populations at risk, screening practices, as well as lifestyle factors in subpopulations.[24] Interestingly, while the total prostate cancer rates in the US were consistently much higher than those in Africa, total rates in East Africa (Uganda and Zimbabwe) were similar to the rate among black Americans during the 1980s.[25] It is expected that with improvement in health education and provision of adequate healthcare professionals, there would be a marked efficiency in proper diagnosis and reporting of prostate cancer in Africa. For instance, prostate cancer was microscopically confirmed in 63%, 97%, 100% of cases in Zimbabwe, Namibia and South Africa respectively, compared to 20% of cases in

Gambia.[24-26] Furthermore, PSA screening is still uncommon in most parts of Sub-Saharan Africa, with a reported prevalence of 2.5% and 4% in Ghana and Senegal respectively.[27] The incidence of prostate cancer has tripled during the past decade, chiefly because of the widespread use of serum prostate-specific antigen PSA testing, digital rectal examination (DRE) and transrectal ultrasound.[7] Ultimately core needle biopsy of the prostate plays a central role in the morphologic evaluation and definitive diagnosis of Prostate cancer.[28]

In this study, we describe the demographic, clinical and histopathological characteristics of carcinoma of the prostate among Igbos of Eastern Nigeria.

METHODOLOGY

Study design: This is a retrospective study of 265 core needle biopsies of the prostate.

Study Area: Owerri, Imo state, Nigeria.

Study population: Owerri consists of three Local Government Areas including Owerri Municipal, Owerri North, and Owerri West, it has an estimated population of about 401,873 as of 2006[29] and is approximately 100 square kilometers (40 sq mi) in the area. Owerri is bordered by the Otamiri River to the east and the Nworie River to the south.[30]

Materials and method: This is an analysis performed on data collected from the Department of Pathology, Federal Medical Centre Owerri, Imo state, Nigeria. The surgical daybooks, request forms, and histology reports were perused and the demographic, clinical, chemical pathology reports of the total PSA (tPSA) values were recorded. DRE was carried out by Urologists and abnormal DRE findings suspicious of prostate cancer, were reported as present when the prostate showed any one or more of the following features; areas of hardness, nodules, surface irregularity and asymmetry of the prostate lobes and sulci. All the patients had a trans-rectal ultrasound guided six core (minimum) needle biopsies of the prostate which was analyzed histologically and diagnosis of carcinoma of the prostate confirmed and appropriate Gleason scores were assigned. The duration of study spanned from 2010 to 2016.

Analytical process: The data was analyzed using SPSS version 20.

Ethical considerations: Ethical clearance for this study was obtained from Research ethics committee Federal Medical Centre Owerri.

Conflict of interest: None.

RESULTS

A total of 265 consecutive cases of carcinoma of Prostate were histologically analyzed. This constituted 54.08% of all urogenital tract biopsies in the period under review. The mean age was 70.7±11.0 with age range of 46 to 104 years. The peak age group was 71-80 years followed by 61-70 years. This is shown in table 1. The mean total prostate specific antigen (PSA) was 47.7±30.9ngml^{-1} with a range of 2.0 to 512ngml^{-1} and median of 64.2ngml^{-1}.

The mean duration of symptoms was 27.6 months with a range of 2 to 180 months. Lower urinary tracts symptoms were reported by 225 (84.9%) patients. Other clinical presentations are shown in table 2.

The abnormal digital rectal examination was present in 47 (17.73%) cases. Rectal mucosa was fixed in 1.5% (4 cases) and median groove of the prostate was obliterated in 2.6% (7 cases). Metastatic disease was present in 15 cases (5.7%).

The histological variants of the CaP were Adenocarcinoma 98.87% (262 cases), and one case (0.38%) each for Adenoid cystic carcinoma and Mucinous carcinoma. A case of primary melanoma of the prostate was also observed.

Table 1: Distribution of carcinoma of the prostate among age group.

S/N	Age group	Freq	%
1	1-10	-	0.00
2	11-20	-	0.00
3	21-30	-	0.00
4	31-40	-	0.00
5	41-50	2	0.75
6	51-60	37	13.96
7	61-70	81	30.57
8	71-80	104	39.25
9	81-90	37	13.96
10	91-100	3	1.13
11	101-110	1	0.38
Total		265	100

Table 2: Showing the common presenting symptoms of patients with prostate carcinoma.

S/N	Symptoms	Freq	%
1	LUTS	225	84.9
2	Low back pain	13	4.9
3	Haematuria	8	3.0
4	Weight loss	6	2.3
5	Paraplegia	6	2.3
6	Change in bowel habit	4	1.5
7	Anaemia	3	1.13
Total		265	100

DISCUSSION

In this study, prostate needle biopsies of 265 patients were analyzed. The mean age was 70.7±11.0 with peak age group among the 71-80 years followed by 61-70 years. These observations agreed with previous studies in Port-Harcourt,[4,5] Nnewi[6] and Ibadan.[13] Similar reports were made from a meta-analysis of multi-center studies

conducted across all the geopolitical zones of Nigeria between 1970 and 2007.[15] However, reports from some parts of Nigeria showed lower mean age and peak age of incidence.[7,8,11,12,17] In Abuja, Oluwole et al.[16] reported a mean age of 64.5 years and bimodal peaks in the seventh and eighth decades. In our study, it is interesting to observe that the age range of our patients was 46 to 104 years. This finding was exceptional as most of the reports from Nigeria and elsewhere recorded youngest ages between 30 to 40 years.[7,11,14,16,31] Salinas et al.[32] reported that early-onset prostate cancer has been shown to have a more significant genetic component indicating that this group may benefit from evaluation of genetic risk and is a distinct phenotype, from both an etiologic and clinical perspective. Moreover, both genetic and epigenetic changes play significant roles in the development of CaP.[13,15,33,34] For instance, Haiman et al.[35] reported that recent GWAS specific to men of African descent included variants in 8q24 and an additional susceptibility locus at 17q21. The 17q21 risk variation is 4 to 7% in men of African ancestry, including Ghanaian men (7%), but is less than 1% in non-African populations. Furthermore, Cook et al.[36] reported that the strongest single nucleotide polymorphism (SNP) associated with CaP in Ghana is located at 10p14. They went on to establish that SNP at 5q31.3 was associated with high Gleason scores (≥7.0) while Xq23 and 6q21 were associated with low Gleason scores.

There has been an increase in prostate cancer incidence since prostate cancer screening with serum PSA was introduced.[33] Though, most countries do not have a routine prostate cancer screening program, PSA has been instrumental in early detection and treatment monitoring of CaP.[15,35,38] Nonetheless, the American College of Preventive Medicine concludes that there is insufficient evidence to recommend routine population screening with DRE or PSA.[39] In this study, the mean tPSA was $47.7\pm30.9 ngml^{-1}$ with a range of 2.0 to $512 ngml^{-1}$ and median of $64.2 ngml^{-1}$. More than ninety-seven percent of the patients had PSA greater than $20 ngml^{-1}$. These findings agreed with previous studies.[8,40,41] In South Africa, Heyns et al.[42] reported that the PSA levels among CaP patients were usually higher in blacks than other racial groups. Other reports from Nnewi, Lagos, and Port-Harcourt demonstrated lower levels of tPSA.[6,17,40] Despite the widespread use of serum PSA as a guide in screening and treatment monitoring for CaP, it must be pointed out that values within or above the accepted normal reference value ($0.4 ngml^{-1}$) may not correlate with a diagnosis of CaP. Bock-Oruma et al.[17] reported that 51.6% of CaP patients had PSA within the normal reference interval.

The abnormal digital rectal examination was present in 47 (17.73%) cases. Rectal mucosa was fixed in 1.5% (4 cases) and median groove of the prostate was obliterated in 2.6% (7 cases). Our observations agreed with previous studies.[1,17,42,43] Furthermore Nwofor et al.[6] reported that DRE had a 66.7% predictive value for CaP.

The clinical presentations of CaP are protean. In this study, lower urinary symptoms (LUTS) were present in 84.9% (225 cases). Reports from Lagos, Maiduguri and Port-Harcourt demonstrated that LUTS occurred in 66.34%, 95.1% and 100% of cases respectively.[44,45,46] The mean duration of symptoms in this study was 26.7 months with a range of 2-180 months. This is far higher than an average of 8 months reported in a neighboring suburban community of Nnewi.[6] Other symptoms were low back pain (4.9%), haematuria (3.0%), weight loss (2.3%), paraplegia (2.3%), change in bowel habit (1.5%) which included fecal incontinence, tenesmus, and constipation. Anemia occurred in 1.13% (3 cases). Anaemia in this study was not associated with either haematuria or rectal bleeding. A Similar observations were made by Eke and Hsing et al.[5,43] in Port-Harcourt, Nigeria, and Ghana respectively. In Northeast Nigeria, 54.56%, 18.81% and 5.94% of patients had severe anemia, paraplegia, and femoral fractures respectively. However, in Port-Harcourt Umanna et al.[44] reported that 14% and 8.8% of patients had hematuria and paraplegia respectively. Clinically advanced diseases usually metastasize to distant sites by contiguous, hematogenous or lymphatic channels. In this study, 5.7% (15 cases) metastasized to the colon (20%), bone (33.33%) and lumbar spine (46.6%). Though 35% of CaP in Lagos were metastatic, a multicentre study of CaP in Nigeria reported that more than 50% of cases had metastasized at the time of diagnosis.[1,15] Similarly, Ito et al.[47] reported that the proportion of patients with metastatic prostate cancer is substantially higher in Asia than the Western countries. For instance, Suzuki et al.[48] reported that metastatic CaP accounted for 5% and 35% of cases in USA and Japan respectively. Nevertheless, it is noteworthy that the incidence of high-risk and metastatic CaP is on the rise in the USA and affects mostly the 55-59 age groups.[49] Rare sites of metastasis include the eye and central nervous system.[50,51]

The histological variants of the CaP were Adenocarcinoma 98.87% (262 cases), and one case (0.38%) each for Adenoid cystic carcinoma and Mucinous carcinoma. In addition, a single independent case of Primary Melanoma of the prostate was also observed. The commonest histologic variants of CaP is Adenocarcinoma, this constitutes 100%, 100%, 99.0% and 93.% in Lagos, Zaria, Benin City and Calabar respectively.[7,10,12,38] Moreover, sarcomatoid carcinoma and rhabdomyosarcoma of the prostate were reported in Lagos and Calabar respectively.[12,52]

REFERENCES

1. Ikuerowo SO, Omisanjo OA, Bioku MJ, Ajala MO, Mordi VPN, Esho JO. Prevalence and characteristics of prostate cancer among participants of a community-based screening in Nigeria using serum prostate-specific antigen and digital rectal examination. PAMJ, 2013; 15: 129.
2. Osegbe DN. Prostate cancer in Nigerians: facts and non-facts. , 1997; 157(4): 1340-3.
3. Yawe KT, Tahir MB, Nggada HA. Prostate cancer in Maiduguri. West Afr J Med., 2006; 25(4): 298-300.
4. Obiorah CC, Nwosu SO. A histopathological study of carcinoma of the prostate in Port Harcourt, Nigeria. Niger J Clin Pract, 2011; 14: 363-7.
5. N Eke, MK Sapira. Prostate cancer in Port Harcourt, Nigeria: features and outcome. Nig J Surg Res, 2002; 4(1-2): 34-44.
6. Nwofor AME, Oranusi CK. Cancer of the Prostate: Experience at Nnewi, Southeast, Nigeria. Niger J Clin Pract, 2004; 7(2): 65-68.
7. Oluwole OP, Rafindadi AH, Shehu MS, Samaila MOA. A ten-year study of prostate cancer specimens at Ahmadu Bello University Teaching Hospital (A.B.U.T.H), Zaria, Nigeria. Afr J Urol, 2015; 21: 15–18.
8. Odubanjo O, Banjo AAF, Ayoola S, Abdulkareem FB, Anunobi CC; Olayinka AA. The Clinicopathologic Pattern of Prostatic Carcinoma in Lagos, Nigeria. N A J Med Sci., 2013; 6(2): 71-75.
9. Adeloye D, David RA, Aderemi AV, Iseolorunkanmi A, Oyedokun A, Iweala EEJ, et al. An Estimate of the Incidence of Prostate Cancer in Africa: A Systematic Review and Meta-Analysis. PLoS ONE, 2016; 11(4): e0153496.
10. Forae GD, Aligbe JU. Histopathological patterns of prostate cancer in an African population: A private practice experience. Trop J Med Res., 2014; 17: 16-9.
11. Nwafor CC, Keshinro OS, Abudu EK. A histopathological study of prostate lesions in Lagos, Nigeria: A private practice experience. Niger Med J., 2015; 56: 338-43.
12. Ugare UG, Bassey IE, Jibrin PG, Ekanem IA. Analysis of Gleason grade and scores in 90 Nigerian Africans with prostate cancer during the period 1994 to 2004. Afr Health Sci., 2012; 12(1): 69–73.
13. Ogunbiyi JO, Shitiu OB. Increased incidence of prostate cancer in Nigerians. J Natl Med Assoc, 1999; 91: 159-164.
14. Okani C, Akang EE, Ogunbiyi O. Incidence of Sub-Clinical Prostatic Disease at Autopsy in the University College Hospital, Ibadan. OJU, 2013; 3: 80-86.
15. Ifere GO, Abebe F, Ananaba GA. Emergent trends in the reported incidence of prostate cancer in Nigeria. J Clin Epidemiol, 2012; 4: 19–32.
16. Oluwole OP, Abimiku BA, Mukhtar AU, Aisuodionoe-Shadrach OI. A 5-year retrospective study of prostate cancer in Gwagwalada, Abuja, Nigeria. Adv Lab Med Int, 2016; 6(1): 19-25.
17. Bock-Oruma A, Iboh SO, Prince DJ. Prostate cancer in primary care, Port Harcourt, Nigeria. J Family Med Prim Care, 2014; 3: 151-3.
18. Laryea DO, Awuah B, Amoako YA, Osei-Bonsu E, Dogbe J, Larsen-Reindorf R et al. Cancer incidence in Ghana, 2012: evidence from a population-based cancer registry. BMC Cancer, 2014; 14: 362.
19. Rebbeck TR, Devesa SS, Chang BL, Bunker CH, Cheng I, Cooney K, Eeles R. et al. Global patterns of prostate cancer incidence, aggressiveness, and mortality in men of African descent. Prostate Cancer, 2013; 2013: 560857.
20. Epstein JI, Alagba F, Allsbrook Jr WC, et al. Acinar adenocarcinoma/ Tumours of the prostate (Chapter 3), Eds: Eble JN, Sauter G, Epstein JI, et al. Tumours of the Prostate (Chapter III), Pathology and Genetics of Tumours of the Urinary System and Male Genital Organs, World Health Organization Classification of Tumours, Lyon, France, IARC Press, 2004; 162-192.
21. GLOBACOM report 2012: Estimated Incidence, Mortality and Prevalence Worldwide.
22. Chen R, Ren S, Chinese Prostate Cancer Consortium, Yiu MK, Fai NC, Cheng WS et al. Prostate cancer in Asia: A collaborative report. Asian J Urol, 2014; 1: 15-29.
23. Odedina FT, Akinremi TO, Chinegwundoh F, Roberts R, Yu D, Reams RR et al. Prostate cancer disparities in Black men of African descent: a comparative literature review of prostate cancer burden among Black men in the United States, Caribbean, United Kingdom, and West Africa, IAC, 2009; 4(Suppl 1): S2.
24. Parkin DM, Whelan SL, Ferlay J, Storm H. Cancer Incidence in Five Continents, vol. 1–8, IARC Cancer Base, 2005.
25. Surveillance, Epidemiology, and End Results (SEER) Program, SEER Stat Database: Incidence-SEER 9 Regs Research Data, November 2009 Sub (1973–2007) <Katrina/Rita Population Adjustment>Linked To County Attributes-Total U. S., 1969–2007 Countries. National Cancer Institute, DCCPS, Surveillance Research Program, Cancer Statistics Branch, 2011. www.seer.cancer.gov.
26. P. W. Setel, S. B. Macfarlane, S. Szreter et al., "A scandal of invisibility: making everyone count by counting everyone," The Lancet, 2007; 370(9598): 1569–1577.
27. Jalloh M, Zeigler-Johnson C, Sylla-Niang M et al., "A study of PSA values in an unselected sample of Senegalese men." Can J Urol., 2008; 15(1): 3883-5.
28. Daniyal M, Siddiqui ZA, Akram M, Asif HM, Sultana S, Khan A. Epidemiology, Etiology, Diagnosis and Treatment of Prostate Cancer. Asian Pac J Cancer Prev, 2014; 15(22): 9575-9578.
29. Federal Republic of Nigeria Official Gazette (15 May 2007). "Legal Notice on Publication of the Details of the Breakdown of the National and State

Provisional Totals 2006 Census" (PDF). Archived from the original (PDF) on 2007-07-04. Retrieved 2007-05-19.
30. Alex D.W. Acholonu (2008). "Water quality studies of Nworie River in Owerri, Nigeria". Mississippi Academy of Sciences. Retrieved 2009-10-14.
31. Lalitha K, Suman G, Pruthvish S, Mathew A, Murthy NS. Estimation of time trends of incidence of Prostate Cancer-an Indian scenario. Asian Pac J Cancer Prev, 2012; 13: 6245-50.
32. Salinas CA, Tsodikov A, Ishak-Howard M, Cooney KA. Prostate Cancer in Young Men: An Important Clinical Entity. Nat Rev Urol, 2014; 11(6): 317–323.
33. Nelson WG, De Marzo AM, William B, Isaacs WB. Prostate Cancer. N Engl J Med, 2003; 349: 366-381.
34. Manoharan M, Ramachandran K, Soloway MS, Singal R. Epigenetic Targets in the Diagnosis and Treatment of Prostate Cancer. International Braz J Urol, 2007; 33(1): 11-18.
35. Haiman CA, Chen GK, Blot WJ, et al., "Genome-wide association study of prostate cancer in men of African ancestry identifies a susceptibility locus at 17q21," NG, 2011; 43(6): 570–573.
36. Cook MB, Wang Z, Yeboah ED, Tettey Y, Biritwum RB, Adjei AA et al. A genome-wide association study of prostate cancer in West African men. Hum Genet, 2014; 133(5): 509–521.
37. Waterbor JW, Bueschen AJ. Prostate cancer screening (United States). CCC, 1995; 6: 267.
38. NHS Cancer Screening Programmes. Prostate cancer risk management programme, 2012.
39. Lim LS, Sherin K; ACPM Prevention Practice Committee. Screening for prostate cancer in U.S. men ACPM position statement on preventive practice. Am J Prev Med, 2008; 34(2): 164-70.
40. Ezenwa E, Tijani K, Jeje A, Ogunjimi A, Ojewola R. Prevalence Of Prostate Cancer Among Nigerians With Intermediate Total Prostate Specific Antigen Levels (4-10ng/Ml): Experience At Lagos University Teaching Hospital, Nigeria. Internet J Urol., 2012; 9(3).
41. Emokpae MA, Das SC, Orok T, Mohammed AZ, Al Hassan S. Early detection of prostate cancer: evaluating the diagnostic performance of prostate specific antigen by comparing with histological technique among Africans. Indian J Clin Biochem, 2004; 19(1): 62-66.
42. Heyns CF, Fisher M, Lecuona A, van der Merwe A. Prostate cancer among different racial groups in the Western Cape: presenting features and management. S Afr Med J., 2011; 101: 267-270.
43. Hsing AW, Yeboah E, Biritwum R, Tettey Y, De Marzo AM, Adjei A, High Prevalence of Screen-Detected Prostate Cancer in West Africans: Implications for Racial Disparity of Prostate Cancer. Urol., 2014; 192(3): 730-735.
44. Umanah AU, Osagbemiro BB, Arigbede AO. Ekeke ON, Amusan OE, Eke N. Management of prostate cancer in Port Harcourt, Nigeria: Changing patterns. JWACS, 2012; 2(3): 58-77.
45. Ezenwa E, Tijani K, Jeje A, Ogunjimi A, Ojewola R. Prevalence of Prostate Cancer Among Nigerians With Intermediate Total Prostate Specific Antigen Levels (4-10ng/Ml): Experience At Lagos University Teaching Hospital, Nigeria. Internet J Urol, 2012; 9(3).
46. Ibrahim AG, Aliyu S, Dogo HM, Babayo UD, Zarami AB. Carcinoma of the Prostate - A Five-Year Experience in Maiduguri North Eastern Nigeria. Int J Appl Res, 2015; 1(8): 512-514.
47. Ito K. Prostate cancer in Asian men. Nat Rev Urol., 2014; 11: 197–212.
48. Kazuhiro Suzuki. Epidemiology of Prostate Cancer and Benign Prostatic Hyperplasia. JMAJ, 2009; 52(6): 478–483.
49. Weiner AB, Matulewicz RS, Eggener SE, Schaeffer EM. Increasing incidence of metastatic prostate cancer in the United States (2004–2013). Prostate Cancer Prostatic Dis, 2016; 00: 1–3.
50. Green S, Som PM, Lavagnini PG. Bilateral Orbital Metastases from Prostate Carcinoma: Case Presentation and CT Findings. AJNR, 1995; 16: 417–419.
51. Pugsley D, Bailly G, Gupta R, Wilke D, Wood L. A case of Metastatic Adenocarcinoma of the prostate arising in a Meningioma. Can Urol Assoc J., 2009; 3(3): E4-E6.
52. Adekoyejo Abiodun P, Adetola D, Charles A, Kehinde Habbeb T, Martins M. Sarcomatoid Carcinoma of Prostate: A Rare Entity. JCR, 2014; 4: 33-37.