



Study Into The Patterns of Male Genital Tract Tumors

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Abstract

Pattern of a particular disease in any population is studied with the idea of getting information about the clinical presentation, the varied morphology and the aetiological factors that can be assessed in relation to the prognosis. Our study was undertaken with the view to getting information about the prevalence, clinical presentation and morphological patterns of the tumors of the male genital tract. A total number of 111 histological proven cases of male genital tumors diagnosed over a period of 11 years were studied. The overall prevalence rate of male genital tumors was 0.94/1000 surgical admissions for histologically proven cases. The peak prevalence of male genital tumors was seen in the age group of 51-60 years. Penile cancers were the most commonly encountered malignancies accounting for 39.63% followed by prostatic adenocarcinomas 35.13%. Third in frequency were testicular tumors 34.32%. A single case (0.9%) of adenomatoid tumor of epididymis was seen.

Key Words

Cancer, Histology, Prostate, Testis, Epididymis, Male Genital Tract Tumors

Introduction

Male genital tract tumors account for a fairly large number of malignancies and sizeable quantum of mortality throughout the world. Incidence of male genital cancer has increased rapidly over the period of time (1).

Male genital cancers are histologically diverse. Each site has its own dominant histological type as follows: prostate cancer - adenocarcinomas; testicular cancer - germ cell tumors; penile and scrotal cancer - epidermoid carcinomas and spermatic cord cancers- sarcomas. Highest incidence rates of prostatic cancer are observed among blacks in US(2). In India (Mumbai), the incidence is 6.7/lac population and it comprises 2.95% of all the malignant growth in males (3). There is no relation of prostatic cancer with diet venereal disease and sexual habits (4).

Cancers of the testes is the second most frequent male genital cancer. It accounts for 1-2% of male genital tract tumors. In India, incidence is low i.e. 15.92% (3).

Penile cancers are seen in older men with an abrupt increase in incidence in the sixth decade and peak at 80 years. Incidence of penile cancer in India varies from 2.8% to 20% (3). Primary malignant melanoma of penis is rare(5,6). Most of the reported cases are in the 6th and 7th decade of life. Tumors of testicular adenexa include adenomatoid tumors which are the commonest and

account for 30% of all the paratesticular tumors(7,8,9). Tumors of male urethra are even rarer, majority being squamous cell carcinoma. Thus, the current study was undertaken with the view to getting information about the prevalence, clinical presentation and morphological patterns of the tumors of the male genital tract

Materials & Methods

For the retrospective study all the histologically diagnosed cases of male genital tumors during the last ten years (1996-2005) constituted the subjects of study. During this period a total number of 102 cases were reported. In the prospective study, 9 cases of male genital tumors were diagnosed in the Department of Pathology Govt. Medical College, Jammu. For the study into the patterns of male genital tumors, the paraffin sections of all biopsy proved cases were examined. For the study of greater morphological details, fresh sections were obtained from the paraffin blocks of all the cases, stained with H&E and special stains like PAS and PAS with diastase.

Results

The study work pertains to all the consecutive histologically proven cases of male genital tumors diagnosed in the Department of Pathology of Government

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**Table 1. Data of Distribution of Cases of Male Genital Tumors**

Male genital tumors	No. of Cases	Percentage
Testicular tumors	27	24.32
Prostatic carcinomas	39	35.13
Penile carcinomas	44	39.63
Epididymal tumors	1	0.90
Total	111	100

Table 2. Degree of Differentiation of Penile Squamous Cell Carcinomas

Degree of Differentiation	No. of Cases	Percent
Verrucous	5	11.90
Well differentiated	29	69.06
Moderately differentiated	5	11.90
Poorly differentiated	3	7.14
Total	42	100

Table 3. Details of Gleason Scoring

Gleason Score	No. of Cases	Percent
2 – 4	3	7.69
5 – 7	19	48.72
8 – 10	10	25.64
Could not be estimated	7	17.95
Total	39	100

Table 4. Degree of Differentiation of Prostatic Adenocarcinomas

Differentiation	No. of Cases	Percent
Well	3	9.37
Moderate	19	59.38
Poor	10	31.25
Total	32	100

Medical College, Jammu over a period of 11 years (10 years retrospective i.e. 1996 to 2005 and one year prospective i.e. from Dec. 2005 - Nov. 2006). A total of 111 cases were studied (Table 1). The penile carcinomas were the most commonly encountered malignancies i.e. 44 cases (39.63%) followed by prostatic adenocarcinomas i.e. 39 cases (35.13%). Third in frequency were testicular tumors i.e. 27 cases (24.32%). Only 1(0.9%) case of epididymal tumor was reported.

As per the records available for a period of 11 years (from 1st Jan 1996 - Nov. 30th 2006), from the Government Medical College Hospital, Jammu, the total numbers of surgical admissions during the said period were 11,7124. Number of cases diagnosed as male genital tumors during this period were 111. An overall prevalence rate of male genital tumors amongst the surgical admission in this hospital for the said period of 11 years was 0.94.

The ages of the patients ranged from 1 - 92 years. Maximum number of cases i.e. 29 (26.12%) were seen in 51 -60 years age group followed by 61 - 70 years age

group i.e. 21 cases (18.92%). Youngest patient was 1 year old infant.

Penile Malignancies: They constituted the largest group of present study comprising of 44 cases. The commonest symptoms with which the patients of penile cancers presented were itching and discharge i.e. 15 cases (34.09%) . Pain, Dysuria, redness of glands and prepuce and phimosis were other associated symptoms .

Squamous cell carcinomas formed the majority of the cases (42) of penile malignancies. Their age range was between 23 - 92 years. The size varied from 1.2 - 7.0 cm. Grossly, the tumors had a wide range of appearance - fungating, ulcerated, cauliflower like. 4 cases of squamous cell carcinomas presented as metastatic deposits in the inguinal lymph nodes. Histologically, they were categorized as verrucous, well, moderate and poorly differentiated. The tumor cells depicted mild nuclear pleomorphism. The well differentiated tumors showed tumor cells arranged in nests, sheets with malignant keratin pearls. Nuclear pleomorphism and abnormal mitotic figures were more



pronounced in moderately and poorly differentiated tumors. Out of the total of 42 cases of penile squamous cell carcinomas studied (including the 4 cases which showed metastatic deposits of the same in the inguinal lymph node), the maximum number of cases i.e. 29 were well differentiated, five cases were categorized as verrucous carcinoma, another 5 cases were moderately differentiated and 3 cases were poorly differentiated (Table 2). Malignant melanoma was reported in one case (2.27%) out of 44 cases in a 60 years old male. Grossly, it presented as a blackish growth on prepuce measuring 2.5 cm in diameter. Its consistency was soft and friable. Histologically, the tumor cells in the dermis were arranged in nests showing marked cytological atypia, junctional activity, prominent nucleoli, melanin pigmentation and mitotic figures. Carcinoma in situ was seen in one case in a 90 years old patient. Penile cancers were mainly seen in Hindus accounting for 43 out of 44 cases. Only 1 case was seen in a Muslim patient.

Prostatic Adenocarcinoma comprising of 39 cases were next in frequency to penile carcinomas. The most frequent clinical presentation of the patients of prostatic carcinomas was urinary retention 18 cases. Their age range was 41 - 92 years. Size of the tumor varied from 0.3 - 8 cm. The majority of the prostatic tumors were adenocarcinomas i.e. 38 cases. In one case i.e. 2.57% (previously diagnosed as adenocarcinoma) metastatic deposit was seen in the inguinal lymph node. No case of epidermoid carcinoma was reported. Gleason grading was done based on degree of glandular differentiation and the growth pattern of the tumor in relation to the stroma as evaluated on low power examination (10,11). The predominant tumor pattern (referred to as primary) was graded from 1 to 5 and the secondary pattern was graded similarly, with the two numbers being added to obtain the Gleason's Score (Table 3). 19 cases were given a score between 5-7, 10 cases were given a score between 8-10 and 3 cases a score between 2-4. In 7 cases score could not be estimated because of inadequate biopsy specimen. Based on Gleason scoring, the prostatic adenocarcinoma were divided into well, moderate and poorly differentiated. Those with a score of 2-4 were categorized as well differentiated, 5-7 as moderately differentiated and 8-10 as poorly differentiated (Table 4). Out of the total 39 cases of prostatic adenocarcinoma, only 32 cases were scored according to Gleason scoring. 19 cases were moderately differentiated adenocarcinomas, 10 were poorly differentiated and only 3 cases were well differentiated adenocarcinomas. Microscopically, in the well differentiated cases, the glands were single layered, lying back to back with loss of fibromuscular sling and absence of prostatic concretions.

The moderately differentiated tumors showed a greater degree of nuclear pleomorphism, mitotic activity and raggedly infiltrating glands with papillary and cribriform pattern. Histologically, poorly differentiated. Tumors showed ragged masses of cells with extreme degree of nuclear anaplasia, mitosis and only few gland formation. The presence of nucleoli was not a consistent feature as it was present in only 15 cases. Perineural invasion was demonstrated in 5 cases (11.36%). The number of cases showing perineural invasion were less in the present study, the reason being that in most of the cases the amount of tumor in needle biopsies and transurethral resection specimens was small which may not necessarily equate with the amount of tumor in the radical prostatectomy specimen.

Testicular Tumors: The testicular tumors were third in frequency comprising of 27 cases. The majority of the cases i.e. 26 (96.29%) were of germ cell origin. Only one case (i.e. 3.70%) of testicular lymphoma was reported. No case of sex cord stromal tumor, mixed germ cell sex cord tumor and metastatic tumor was reported. Among the seminoma, classical variant comprised of 9 cases (33.3%), spermatocytic seminoma - 1 case (3.70%) and anaplastic seminoma - 2 cases (7.40%). Among the nonseminomatous germ cell tumors, embryonal carcinoma comprised of 5 cases (i.e. 18.51%), mature teratoma - 2 cases (7.4%) and yolk sac 1 case (3.70%), 1 case (3.7%) of mixed nonseminomatous germ cell tumor and 5 cases (18.51%) of mixed seminoma and nonseminomatous germ cell tumors were seen.

Among the 27 cases of testicular tumors studied, 25 (92.59%) were malignant and 2 cases (7.41%) were benign tumors (mature teratoma). History of pain and trauma were noted in 6 (22.22%) and 2 cases (7.40%) respectively. 3 cases (11.11%) were associated with hydrocele and 4 cases (14.81%) were associated with cryptorchid testes. One case (3.70%) was associated with inguinal lymphadenopathy and in one case (3.70%) right sided lung opacity was seen on chest X-ray.

Seminoma: They constituted the largest group amongst germ cell tumors accounting for 12 cases. Classical Seminoma: It was the most frequent occurring variant (9 cases i.e. 75%) of seminomas. Their age range varied between 28 - 60 years. Cut surface showed solid, homogenous areas. Histologically, the tumor cells were uniform with abundant clear cytoplasm, sharply outlined cell membrane, a large centrally located nucleus, clumped chromatin and a prominent nucleolus. The tumor cells were arranged in nests outlined by fibrous bands and infiltrated by lymphocytes. 3 cases of classic seminoma were associated with cryptorchid testes and in 1 case there was history of inguinal lymphadenopathy. Diastase



sensitive PAS positivity was demonstrated in all the cases.

Anaplastic Seminoma: 2 cases (16.67%) of anaplastic carcinoma were observed. Their age range was 42 - 45 years. Their size ranged from 5-7 cm. Cut surface showed areas of hemorrhage and necrosis. Histologically, the cells were highly pleomorphic with hyperchromatic nucleus. Many tumor giant cells and abnormal mitotic figures >3/HPF were present in a necrotic and hemorrhagic background. One case had a foci of syncytiotrophoblastic differentiation.

Spermatocytic Seminoma: One case (8.33%) of spermatocytic seminoma was seen in a 45 year old patient on the right side and was associated with hydrocele. Tumor measured 4 cm. Cut surface showed gelatinous appearance. Microscopically, cells were pleomorphic with indistinct cell borders, majority were small lymphocyte like, few medium sized and bizarre giant cells were also seen. The chromatin pattern was spireme like. One foci of rhabdomyoblastic differentiation was also seen.

Non Seminomatous Germ Cell Tumors: They formed the second largest group of germ cell tumors accounting for 8 cases (30.76%) Embryonal Carcinoma: was the most frequent non-seminomatous germ cell tumor i.e. 5 (62.5%) The age range was between 17 - 32 years. Size of the tumors ranged from 4 - 10 cm. Cut surface showed variegated appearance along with hemorrhagic and necrotic foci. Microscopically, solid sheets of undifferentiated cells with abortive tubules, papillae and gland formation were seen. The cells were highly pleomorphic with prominent nucleoli. In one case vascular invasion in pampiniform plexus was seen. Invasion of tunica albuginea was observed in one other case. 1 case was associated with cryptorchid testis and 1 case had lung opacity on chest X-ray.

Mature Teratoma: 2 cases (25%) of mature teratoma were observed. Ages of the patients were 25 and 30 years respectively. In one case, the size of tumor was 5.5 cm. Cut surface showed gelatinous and cystic areas. Microscopically, hyaline cartilage and many keratin filled cysts were seen. Size of the other tumor was 2.5 cm. Cut surface showed cystic as well as calcified areas. Microscopically, cystic spaces lined by flattened epithelium, few squamoid areas and well differentiated glandular structures were seen. No atypia, architectural complexity or invasion was noted in both cases of teratoma.

Yolk Sac Tumor: One case (12.5%) of yolk sac tumor was seen in a 1 year old infant. Its size was 2.5 cm. Grossly, yellowish areas and microcystic spaces were seen. Microscopically, microcystic, glandular and papillary

formations were seen. Cystic spaces were lined by flat endothelial cells. Spindle shaped stromal elements, few hyaline globules and schiller-duval bodies were seen.

Mixed Non-seminomatous Germ Cell Tumors: One case (3.84%) of mixed nonseminomatous germ cell tumor was seen in a 20 year old patient. Its size of tumor was 3 cm. Cut surface showed solid as well as cystic areas along with hemorrhagic and necrotic foci. Microscopically, areas of teratoma and embryonal carcinoma were seen.

Mixed Seminoma and Non-seminomatous Germ Cell Tumor 5 cases (19.23%) of mixed seminoma and nonseminomatous germ cell tumors were observed in the age group of 19 -35 years. The size varied from 4 -7 cm. Cut section showed solid, cystic, hemorrhagic and necrosed areas. Microscopically, variety of combinations were seen - seminoma with areas of embryonal carcinoma, seminoma with teratomatous areas and a combination of all three.

Testicular Lymphoma: One case (3.7%) of testicular lymphoma was seen in a 50 years old patient. Its size was 3 cm, Cut section showed solid areas, Microscopically, the whole testis was replaced by a monomorphic infiltrate of small lymphocyte like cells.

Epididymal tumors: One case (0.9%) of adenomatoid tumor was observed in a 28 year old patient. Size of the tumor was 1.3 cm. Grossly, solid as well as cystic areas were seen. Microscopically, there was proliferation of cells having vacuolated cytoplasm and were forming solid cords. Cystically dilated spaces and lymphoid stroma were also seen.

Discussion

The incidence of male genital tumors varies from country to country, place to place, thus pointing to several social, ethnical or biological factors. Prevalence rates of male genital tumors for this region have been computed from both retrospective and prospective analysis of the record of hospital attending population, reporting in the surgical division of Government Medical College Hospital, Jammu for the last 11 years. It goes without saying that the observations made on biopsy proven cases would be more scientific and nearer the truth.

The overall prevalence rate of male genital tumors for the hospital attending population in Surgical division of Government Medical College Jammu was found to be 0.94/1000 surgical admissions. These prevalence rates could be regarded as minimum incidence of male genital tumors, since a prospective study directly generating incidence is difficult to conduct because of the absence of any population based registers (making it almost impossible to capture missed cases) and failure of those



cases to report to the hospital who succumb to the disease or seek treatment elsewhere. Prevalence rate of penile carcinoma, prostatic carcinoma, testicular tumors, adenomatoid tumor of epididymis was 0.39,0.32,0.24,0.0008/1000 surgical admissions. Our results are in accordance with Yeole and Jussawalla (3).

The peak prevalence of male genital tumors in the current study was seen in the age group of 51-70 years. The ages of the patients ranged between 1 - 92 years. Sharma *et al* (12) found that age range of the patients was between 25 -80 years, Our findings are more or less in accordance with the above mentioned authors.

The commonest symptom with which the patients of penile cancers presented was itching and discharge Pain, dysuria, redness of glans and prepuce and phimosis were other associated symptoms (13). It is thought that phimosis, paraphimosis and poor hygiene are not a direct cause, but predisposing factors due to the chronic inflammatory process set up by the accumulation of smegma and tissue debris (14).

The most frequent clinical presentation of patients of prostatic carcinomas was urinary retention. Increased frequency of urination, dysuria and hematuria were also seen. The most well established risk factor for testicular cancer has been the presence of an undescended testes. Gilliland and Key (2) and Canedo Patzi (15) also found this association.

Penile cancers were mainly seen in Hindus accounting for 97.73% of the cases. Similar report was given by Sharma *et al* (12) and Yeole and Jussawalla (3). Only one case was seen in a Muslim patient. The wide variation in the frequency of penile carcinomas in various parts of India cannot be explained purely on the basis of practice of circumcision among different communities. Personal hygiene and socio-economic status also play a role. The histological patterns of male genital tumors observed in the present study are in keeping with those described by known workers like Spires *et al* (16) Sharma *et al* (12), Lucia M.S, Miller G J (17) and Hankey B F, Feur E.J *et al* (18).

Conclusion

The strength of this article is that it fairly provides an insight into the histological patterns of male genital tract tumors in our institution. Since the Government Medical College Hospital, Jammu caters in addition to Jammu Province, adjacent parts of Kashmir, Punjab and Himachal Pradesh as well, the results of the present study can be safely considered as reflection of the disease pattern in this region of the country.

References

1. Nagpal BL, Prabhakar BR, Kataria SP, Kapoor K, Bal MS. Male genital tract tumors in Punjab, India. *J Environ Pathol Toxicol Oncol* 1992; 11(5-6): 331-34.
2. Gilliland FD, Key CR. Male genital cancers. *Cancer* 1995; 75 (Suppl 1): 295-315
3. Yeole BB, Jussawalla DJ. Descriptive epidemiology of the cancers of the male genital organs in Greater Bombay. *Ind Jr of Cancer* 1997; 31: 30-39.
4. Nelson W.G, Marzo D, Angelo M. Prostate cancer - mechanism of disease. *New Eng J Med* 2003; 349: 4.
5. Oliva E, Quinn TR, Amin MB. Primary malignant melanoma of the penis. *Am J Surg Pathol* 2000;24: 785 - 96.
6. Oldbring J, Mikulowski P. Malignant melanoma of the penis and male urethra. *Cancer* 1987; 59: 581-87.
7. Young RH. Testicular tumors-some new and a few perennial problems. *Arch Pathol Lab Med* 2008;132:548-64.
8. Kuroda N, Toi M, Hiroi M, *et al*. Diagnostic pitfalls in diagnosis of adenomatoid tumor. *Histopathology* 2007;51:719-21.
9. Lehsnau M, Hecht L. Adenomatoid tumor of the testes - a rare entity. Clinical, diagnostic and therapeutic aspects. *Urologe A* 2006 ; 45 (11): 1431 - 34.
10. Allsbrook WC, Mangold KA. The Gleason grading system, an overview. *J Urol Pathol* 1999, 10: 141- 58
11. Epstein JI. The diagnosis and reporting of adenocarcinoma of the prostate in core needle biopsy specimens. *Cancer* 1996; 78 (No. 2): 350-55.
12. Sharma S, Nath P, Srivastava AN, Singh KM. Tumors of the male urogenital tract - A clinicopathologic study. *J Ind Med Assoc* 1994; 92(1): 357-60.
13. Brinton LA, Jun-Yao, Rongshov De, Suzanne H. Risk factors for penile cancer. *Int J Cancer* 1991; 47: 504-09.
14. Pukkala E, Weiderpass E. Socioeconomic differences in incidence rates of cancer of the male genital organs in Finland. *Int J Cancer* 2002; 102 (6): 643-48.
15. Canedo Patzi AM, Leon Bajorge B. Testicular and adenomatoid tumors of the genital tract. Clinical, pathological and immunohistochemical study in 9 cases. *Gac Med Mex* 2006 ; 142 (1) : 59 - 66.
16. Spires ES, Michael L, Wood DP, Miller S, Spires SM. Gleason histological grading in prostatic carcinoma. *Arch Path Lab Med* 1994; 118: 703.
17. Lucia MS, Miller GJ. Histopathology of malignant lesions of Penis. *Urol clin North Am* 1992, 19 : 227 - 46.
18. Hankey BF, Feur EJ, Clegg LX. Cancer surveillance series - Interpreting trends in prostatic cancer - Part-I: Evidence of the effects of screening in recent prostatic cancer incidence, mortality and survival rates. *J National Cancer Institute* 1999; 91: 1017.