Original Article

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Pathology Section

Histopathological Spectrum of Male Genital System Tumours in a Tertiary Care Hospital Faridkot, Punjab

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ABSTRACT

Introduction: The male genital system consists of the prostate, seminal vesicle, testes, epididymis, vas deferens, bulbourethral gland, ejaculatory duct, penis and scrotum. Male genital cancers are histologically diverse. They are difficult to detect and treat because of their anatomic locations, biological characters and complications.

Aim: To study the histopathological spectrum of tumours of the male genital system according to World Health Organisation (WHO) classification.

Materials and Methods: The present study is a hospital based descriptive study conducted in the Department of Pathology, Guru Gobind Singh Medical College and Hospital, Faridkot, Punjab, India, during February 2019 to August 2020 which included 128 cases. All biopsies, specimens and review blocks and slides of male genital tract tumours were processed and slides were stained with Haematoxylin and Eosin (H&E) stain. Serum tumour markers and immunohistochemical stains were used. The clinical information including symptoms related to the male genital system, histopathological findings and diagnosis were recorded on the predesigned proforma. Other necessary information was collected from the requisition form received along with the biopsy material. The association between categorical variables was explored using Pearson's Chi-square test. A p-value <0.05 was considered statistically significant for this study.

Results: The present study included 128 cases, of which the majority of the cases 82 cases (64%) were that of prostate, 28 cases (21.9%) of the penis, 15 cases (11.7%) of testes, two cases (1.6%) were that of the scrotum and one case (0.8%) was of the epididymis. The histopathological spectrum showed adenocarcinoma was present in 80 (62.5%), leiomyosarcoma in 01 (0.8%), lymphoma in 01 (0.8%), mixed germ cell tumour in 9 (7%), seminoma in 5 (3.9%), postpubertal teratoma in 1 (0.8%), basaloid in 1 (0.8%), papillary-basaloid in 2 (1.6%).

Conclusion: Prostate tumours outnumbered all other tumours of the male genital tract with adenocarcinoma of prostate followed by squamous cell carcinoma of the penis and mixed Germ Cell Tumour (GCT) of testes. The present study provides updated information regarding the histopathological spectrum of male genital system tumours.

Keywords: Adenocarcinoma, Mixed germ cell tumours, Penis, Scrotum, Seminomas

INTRODUCTION

Tumours of the male genital system form a small group of total male tumours but geographically present with important variations, with top place in the country like Indonesia (13%), the incidence is low in Japan (1%) [1]. In India, malignant neoplasms of the male genital tract account for 4% of all malignancies [2]. National Cancer Registry Programme in 2010 revealed 77.6% prostate cancers, 11.6% penile and 10.5% testicular cancers [3]. These male genital tract tumours had an incidence of 3.49% in 2011, while their incidence dropped to 2.94% in 2016, making a considerable impression on the various professionals [4].

Tumours of the male genital system form a highly important spectrum in pathology practice. Histologically, every site in a male genital system has its own type as follows: prostate cancer (Adenocarcinomas), testicular cancer {Germ Cell Tumour (GCT)}, penile and scrotal (Squamous cell carcinomas) and Spermatic cord cancers (Sarcomas). Prostate and testicular carcinomas are more commonly found in developed countries while penile carcinoma occurs more frequently in developing countries [5]. They constitute a group of lesions that are difficult to detect and treat because of their anatomical location, biological characteristics, and complications. The urologists, the radiologists, and the chemotherapists are dependent upon histological diagnosis of tumour and histopathological features have a major role in determining the prognosis and therapeutic option [6]. Hence, this descriptive study was conducted to study spectrum of tumours of the male genital system according to age, clinical presentation, histopathological features, and grade of the tumour.

MATERIALS AND METHODS

The present study is a hospital based descriptive study conducted in the Department of Pathology, Guru Gobind Singh Medical College and Hospital, Faridkot, Punjab, India, during February 2019 to August 2020 which included 128 cases. The study was carried out after seeking permission from the Institutional Ethics Committee no. 12165 Guru Gobind Singh Medical College and Hospital, Faridkot. Written informed consents were taken from all the participating patients. Samples included all biopsies, specimens, and review blocks and slides of male genital tract tumours. The clinical information including symptoms related to the male genital systems like increased frequency of micturition burning sensation, nocturia, scrotal swelling, lesion or growth on the penis, and histopathological findings and diagnosis were recorded on the predesigned proforma. Other necessary information was collected from the requisition form received along with the biopsy material.

Inclusion criteria: All the resected specimens and biopsies and all slides and blocks for review of the male genital tract which was diagnosed as male genital tract tumours received from the Surgery Department which was diagnosed as male genital tumours in the department of pathology, Guru Gobind Singh Medical College, Faridkot were included.

Exclusion criteria: Inadequate biopsies and poorly preserved/ autolysed specimens were excluded.

Study Procedure

The tissue processing of biopsies or specimens received in the Department of Pathology was carried out as per the standard

devised protocol of the department. The specimens were fixed as early as possible in 10% buffered formalin and grossed. The received specimens were examined and dimensions were recorded. Multiple tissue pieces from different areas of specimen, i.e., suspicious, abnormal and normal areas were taken. Then processed by a fully automatic tissue processor paraffin-embedded tissue was sectioned and stained by H&E staining method and mounted by Dibutylphthalate Polystyrene Xylene (DPX). Serum tumour markers and Immunohistochemical stains were used. Special stains and immunohistochemical staining of OCT3/4, CD117, CD30, α-fetoprotein (AFP) were done wherever required. Then slides were analysed under light microscopy. The collaborative results were interpreted to make suitable recommendations and the final diagnosis and clinical data were recorded and analysed.

Specimen Collection and Preparation

A 2 mL of the venous blood sample was drawn from each subject under aseptic condition for estimation of serum Prostate Specific Antigen (PSA) level. After the formation of blood clot, the sample was centrifuged at 3000 rpm for 10 minutes to separate serum. The serum was assessed for PSA level. This was measured on fully automated chemiluminescence (Automated analyser Access 2) using chemiluminescence principle.

STATISTICAL ANALYSIS

The data of clinical details were entered in the form of a data matrix in Microsoft Excel and analysed using IBM® Statistical Package for the Social Sciences (SPSS) version 20.0. The descriptive statistics for categorical variables were represented in the form of frequencies and percentages. The association between categorical variables was explored using Pearson's Chi-square test. A p-value of <0.05 was considered statistically significant for this study.

RESULTS

The present study found that out of total 128 total specimens majority of the cases were that of prostate 82 cases, 28 cases were that of the penis, 15 cases were that of the testis, two cases were that of the scrotum and one case was of the epididymis [Table/Fig-1]. The present study included a total of 82 cases of prostate tumours, out of which most frequent tumours 80 cases were adenocarcinoma followed by 1 case of leiomyosarcoma, and 1 case of lymphoma. Out of a total of 15 cases of testicular tumours, 9 cases were of mixed GCT, 5 cases were of seminoma and only 1 case (6.7%) was of postpubertal teratoma. All the cases of penile tumours 28 cases observed were squamous cell carcinoma. Two cases of the scrotum and one case of epididymis were diagnosed as squamous cell carcinoma and adenomatoid tumour respectively [Table/Fig-2].

Name of organ	Number of tumours	Percentage (%)
Prostate	82	64%
Testis	15	11.7%
Penis	28	21.9%
Scrotum	02	1.6%
Epididymis	01	0.8%
Total	128	100%

[Table/Fig-1]: Showing distribution of various tumours of male genital tract (n=128).

A maximum number of prostate carcinoma patients were seen in the age group of 61-70 years. The mean age of presentation was 70 years. Seventy cases presented with increased frequency of urination followed by urinary incontinence 26 cases, dysuria 21 cases, and urinary obstruction 12 cases [Table/Fig-3]. Gleason score 7 (4+3) with Grade group 3 was seen in the majority of cases. Out of 80 cases, 28 cases were reported as Gleason grade

Histopathological type	Number of cases	Percentage (%)
Prostate tumours		
Adenocarcinoma	80	62.5%
Leiomyosarcoma	01	0.8%
Lymphoma	01	0.8%
Testicular		
Mixed germ cell tumour	9	7%
Seminoma	5	3.9%
Postpubertal teratoma	1	0.8%
Penial tumour		
Basaloid	1	0.8%
Papillary-basaloid	2	1.6%
Squamous cell carcinoma-Usual Type (SCC-UT)	20	15.6%
Verrucous	5	3.9%
Scrotum (Squamous cell carcinoma)	2	1.6%
Epididymis (Adenomatoid tumour)	1	0.8%
Total	128	100%

[Table/Fig-2]: Distribution of histopathological type of male genital tract tumours.

group 3 with Gleason score 7. Twelve cases showed a Gleason grade group 2 with a Gleason score 7 (3+4). Grade group 4 (Gleason score 8) and grade group 5 observed in 22 cases and 18 cases, respectively. Whereas, no case of Gleason Grade group 1 with Gleason score 6 (3+3) was seen [Table/Fig-4]. The current study showed that 98.8% hade elevated serum PSA above 10.0 ng/mL while 1.2% with serum PSA within the range of 4-10 ng/mL. The present study revealed a statistically positive relation between the serum PSA and the Gleason score with the Gleason grade group of prostate cancer (p-value <0.001). Perineural invasion was noted in 52.4% of the total cases. Lymphovascular invasion was present in 9 cases out of 82 cases. Present study found a positive relation between tumour score and lymphovascular invasion (p-value=0.042).

Presenting symptoms	Number of cases	Percentage (%)
Increased urinary frequency	70	85.36%
Urinary incontinence	26	31.70%
Dysuria	21	25.6%
Urinary obstruction	12	14.63%
Haematuria	24	29.26%
Urgency	12	14.63%

[Table/Fig-3]: Distribution of cases of prostate adenocarcinoma according to presenting symptoms.

Gleason grade group	Gleason's score	Number of cases	Percentage (%)
2	3+4=7	12	15%
3	4+3=7	28	35%
4	4+4=8 3+5=8 5+3=8	22	27.5%
5	4+5=9 5+5=10	18	22.5%
Total		80	100%

[Table/Fig-4]: Showing distribution of Gleason's score with grade group (n=80).

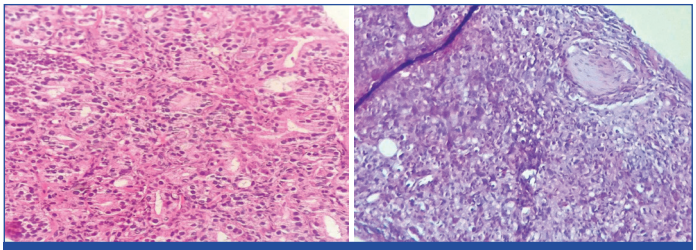
The most frequent age of affected testicular carcinoma patients in our study was 31-40 years. Out of 15 cases, 9 cases were on the right side and 6 cases on the left side. Majority of the patients i.e., 8 cases (53.4%) were presented with painless scrotal swelling followed by 5 cases (33.3%) with painful scrotal swelling and 2 cases (13.3%) with undescended testis [Table/Fig-5]. The present

study showed that GCT constituted all 15 cases (100%). The most common histological subtype of GCT was mixed GCT constituting 60% followed by seminoma and other GCTs constituting 33.3% and 6.7%, respectively. Embryonal carcinoma, yolk sac tumour, and teratoma were the most common combination of histological subtypes of mixed GCTs.

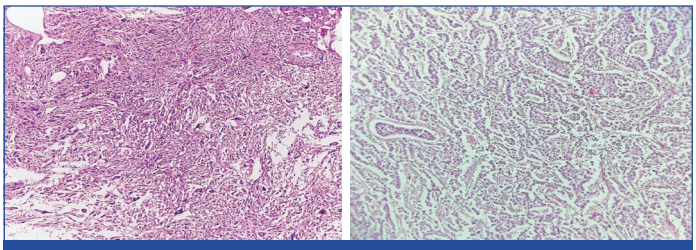
Presenting complaints	Frequency	Percentage (%)
Painless scrotal swelling	8	53.4%
Painful scrotal swelling	5	33.3%
Undescended testis	2	13.3%
Total	15	100%

[Table/Fig-5]: Showing presenting complaints of testicular carcinoma (n=15).

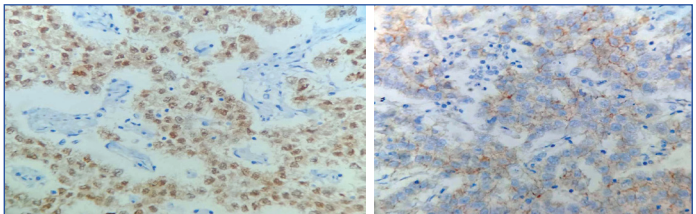
The current study showed that the most common histological variant of penile tumours observed was squamous cell carcinoma usual type constituting 20 cases followed by five cases were of verrucous carcinoma, two cases were of papillary-basaloid and one case was of basaloid carcinoma [Table/Fig-6-21]. Maximum numbers of the patient were seen in the age group of 61-70 years. The mean age of presentation was 62 years. The most common presenting symptom was ulcerative growth constituting 19 cases followed by pain, exophytic growth, discharge, phimosis, and urinary obstruction constituting 60.7%, 32.1%, 25%, 21.4%, and 14.3%, respectively [Table/Fig-22]. The most common location of penile cancer was glans followed by foreskin and coronal sulcus. Penile shaft was the least common site of occurrence of penile carcinoma. The maximum number of cases i.e., 57.1% were moderately differentiated, followed by 28.6% cases were well differentiated and only 14.3% were poorly differentiated.



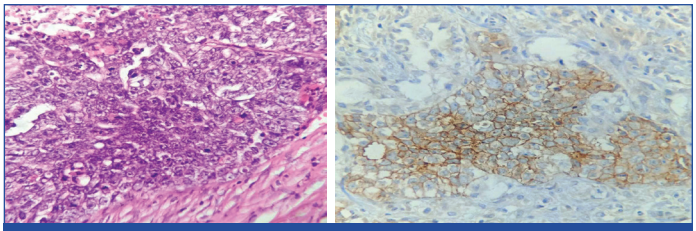
[Table/Fig-6]: Gleason pattern 4 carcinoma characterised by cribriform glands (H&E 400X).
[Table/Fig-7]: Gleason pattern 5 characterised by solid sheet-like growth with Perineural Invasion (H&E 400X). (Images from left to right)



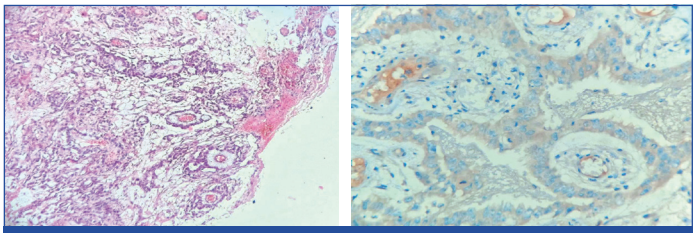
[Table/Fig-8]: Prostatic Leiomyosarcoma- characterised by neoplastic spindle cells with nuclear atypia (H&E 100X).
[Table/Fig-9]: Seminoma component of MGCT: Nests of large tumour cells are separated by fibrous septa heavily infiltrated by lymphocytes (H&E 100X). (Images from left to right)



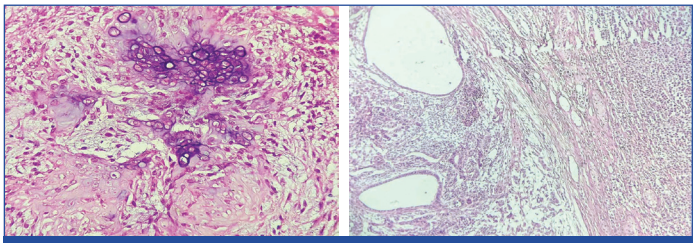
[Table/Fig-10]: Seminoma component- Positive nuclear expression of OCT3/4 (H&E 400X).
[Table/Fig-11]: Seminoma component- Positive cytoplasmic expression of CD117 (H&E 400X). (Images from left to right)



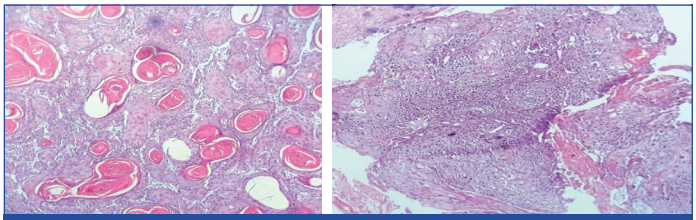
[Table/Fig-12]: Embryonal carcinoma component with overlapping nuclei and marked pleomorphism (H&E 400X).
[Table/Fig-13]: Embryonal carcinoma component showing positive membranous staining of CD30 (H&E 400X). (Images from left to right)



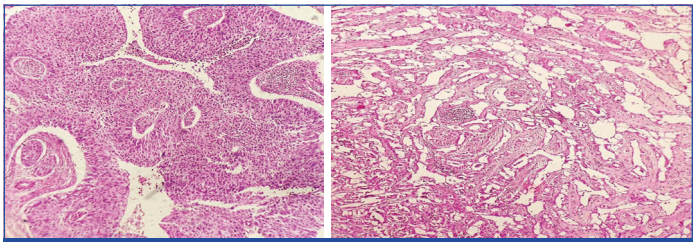
[Table/Fig-14]: Yolk sac tumour component with reticular pattern and characteristic perivascular schiller-duval bodies (H&E 100X).
[Table/Fig-15]: Yolk sac tumour exhibiting weak positive cytoplasmic expression of AFP (H&E 400X). (Images from left to right)



[Table/Fig-16]: Postpubertal teratoma component (H&E 400X).
[Table/Fig-17]: Mixed Germ Cell Tumour (GCT) exhibiting seminoma component and yolk sac tumour component (H&E 400X). (Images from left to right)



[Table/Fig-18]: Well differentiated invasive squamous cell carcinoma, usual type (H&E 400X).
[Table/Fig-19]: Moderately differentiated invasive squamous cell carcinoma, usual type (H&E 400X). (Images from left to right).



[Table/Fig-20]: Invasive basaloid carcinoma variant of SCC of penis (H&E 400X).
[Table/Fig-21]: Adenomatoid tumour of epididymis- showing cystically dilated spaces lined by cuboidal cells (H&E 100X). (Images from left to right)

Presenting symptoms	Frequency	Percentage (%)
Ulcerative growth	19	67.8%
Exophytic growth	9	32.1%
Pain	17	60.7%
Phimosis	6	21.4%
Discharge	7	25%
Urinary obstruction	4	14.3%

[Table/Fig-22]: Showing presenting complaints of patients of penile tumours (n=28).

DISCUSSION

The present study concluded that prostatic tumours were the most common tumours constituted 64% among male genital tract tumours followed by penile tumours, testicular tumours and other genital tract tumours constituted 21.9%, 11.7%, and 2.4%, respectively. The findings were similar to the study conducted by Kaur J et al., and Nagpal BL et al., while discordant with the study of Takiar R and Kumar S reported in their study that prostate tumour is the most common followed by testicular tumour, penile tumour, and other male genital tract tumours [7-9]. While in a study by Taneja D et al., the majority of male genital tumours were of prostate followed by a similar frequency of penile and testicular tumours [Table/Fig-23] [5,7-9].

Author (year of study)	Prostate (%)	Testis (%)	Penis (%)	Other (%)
Nagpal BL et al., 1992 [8]	40.3%	15%	42.4%	0.7%
Kaur J et al., 2014 [7]	34.7%	17%	39%	3.8%
Takiar R and Kumar S 2014 [9]	77.6%	17%	11.6%	0.3%
Taneja D et al., 2017 [5]	36.67%	8.33%	8.33%	5.01%
Present Study	64%	11.7%	21.9%	2.4%

[Table/Fig-23]: Comparison of frequency of male genital tract tumours [5,7-9].

Maximum numbers of patients with prostatic tumours were seen in the age group of 61-70 years (36.6%). Findings were in concordance with studies conducted by Kim K et al., Shirish CS et al., and Devadass CW et al., who concluded 54.2%, 47%, 43.6%, respectively [10-12]. We concluded that 98.8% had elevated serum PSA levels above 10.0 ng/mL and this was in concordance with the study done by Abubakar M et al., (92.4%) and by Mohammad U et al., (94.1%) [13,14]. There is a statistically positive association between the serum PSA and the Gleason score with the Gleason grade group of prostate cancer (p-value <0.001) in the present study which was in concordant with the study done by Abubakar M et al., (p-value <0.001) [13].

In the present study, testicular tumours were observed as the third most common male genital tumours with a frequency of 11.7%. Moghe KV et al., who reported a similar frequency of 10.7% for testicular tumours while the study of Kaur J et al., inferred a higher frequency of testicular tumour constituting 17% [7,15]. In the present study, GCT constituted all 15 cases. This is similar to the study observed by Singh S et al constituting 100% of cases [1].

Penile tumours were the second in frequency among male genital tumours in the present study. The mean age of presentation was 62 years. The findings were close to the study of Kaur J et al., Scheiner MA et al., and Guimaraes GC et al., who concluded the mean age of presentation of penile tumours as 57 years, 57.8 years, and 58 years, respectively [7,16,17]. The most common presenting symptom in present study was ulcerative growth (19 cases, 67.8%) followed by pain, exophytic growth, discharge, phimosis and urinary obstruction constituting 60.7%, 32%, 25%, 21.4% and 14.3%, respectively. The findings were concordant with the study conducted in 2017 by Sakkaravarthi V et al., who reported 53% of cases with ulcerative growth [18]. While in the study of Latha PS et al., in 2014 and Venkateswaran P et al., in 2018, the most common type of growth was exophytic or proliferative [19,20]. Out of all the cases of penile tumours 28 cases (100%) observed were squamous cell carcinoma. The findings were in concordance with the study done by Kaur J et al., (100%) and Prabhakar BR et al., (100%) [7,21]. The present study showed the frequency of scrotal carcinoma was 2.4%. The findings were comparable with the study of Kaur J et al., which constituted 3.8% [7]. However, Nagpal BL et al., reported a lower frequency i.e., 0.7% of scrotal carcinoma among male genital system tumours [8].

All the cases of scrotal malignancies show the histological type of squamous cell carcinoma constituting 100% of cases. Similar results were also inferred by Kaur J et al., and Wright JL et al., in their study [7,22]. In the present study, a single case of adenomatoid tumour of epididymis was reported constituted 0.8% of total 128 cases of male genital system tumours. The results were in accordance with the study of Gupta A et al., [23].

Limitation(s)

Clinical follow-up of the patient and after effects of the chemotherapy and radiotherapy could not be assessed.

CONCLUSION(S)

Prostate tumours outnumbered all other tumours of the male genital tract followed by penis and testis. Mixed GCT was the commonest malignant tumour observed in testicular tumours. Other male genital tract tumours constituted 2.4% of all 128 cases which included two cases of scrotum and one case of epididymis. Tumours of the male genital system form a highly important spectrum in pathology practice. The urologists, the radiologists, and the chemotherapists are dependent upon histological diagnosis of tumour and histopathological features have a major role in determining the prognosis and therapeutic option.

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