Original Research Article

Histomorphological appraisal of orchidectomy specimens in a tertiary care centre of North Maharashtra-A descriptive observational study

Dhiraj B Nikumbh[1], Ajay D Subhedar[2], Shakuntala L Shelke[3], Roopali D Nikumbh[4]

[1]Associate Professor, Department of Pathology, SBH Government Medical College, Dhule, Maharashtra, India
[2]Associate Professor Department of Surgery, SBH Government Medical College, Dhule, Maharashtra, India
[3]Associate Professor Department of Radiology, SBH Government Medical College, Dhule, Maharashtra, India
[4]Assistant Professor, Department of Anatomy, SBH Government Medical College, Dhule, Maharashtra, India

Received: 07-08-2021 / Revised: 18-09-2021 / Accepted: 25-09-2021

Abstract

Introduction: Testicular lesions are ranges from varied spectrum of non-neoplastic to neoplastic ones with diverse etiologies. Non-neoplastic testicular lesions usually preceded by neoplastic ones. The malignant tumors of testis constitute fourth most common cause of death in young males. **Objectives**:The present study was undertaken to study varied spectrum of neoplastic and non-neoplastic lesions of testis in our tertiary care institute with emphasis on study of histomorphological patterns of testicular tumors.**Material and Methods**- Our study was a retrospective, descriptive and observational study over a period of 6 years from May 2015 to April 2021 in our tertiary care centre. We received 60 orchidectomy specimens over a study period. Histopathological slides were collected and reviewed for specific tumor/non-tumor category and results were analyzed.**Results**- We studied 60 orchidectomy specimens over a period of six years. As per age groups distribution, the childhood predominates in non-neoplastic category and 2nd to 4th decade in malignant category. Out of 60 cases (100%), majority (57%) were malignant testicular tumors. In the malignant category, non seminomatous germ cell tumor (56%) were most frequent finding with mixed germ cell tumor (68%) as predominant histopathological diagnosis. Leydig cell tumor and pure yolk sac tumor was rare findings. In non-neoplastic category, vascular causes (61%) like torsion, ischemic necrosis were major findings. Epidermoid inclusion cyst, acute and chronic orchitis, atrophy are rare findings.
Conclusion – Neoplastic lesions were preceded by non-neoplastic lesions in our study. Variable testicular tumors were encountered in present study as per different age groups. Histopathological spectrum of testicular lesions was comparable with other parts of the country. We highlight the role of histopathological examination of each resected orchidectomy specimens as it's most important to diagnosis and rule out malignant tumors.
Key words - Testicular lesions, mixed germ cell tumor, orchidectomy, seminomatous tumors, histopathology.

Introduction

Testis is affected by varied spectrum of both non-neoplastic and neoplastic etiologies at various stages of life1. Non-neoplastic lesions includes cryptorchidism, atrophic testis, testicular torsion, infertility, infections like acute/chronic granulomatous orchitis like tuberculosis in developing countries like India [1]. Malignant tumors of testis comprise 1% of all the male cancers worldwide [2]. Geographical and racial distribution is observed in malignant tumors of testis with distinct age distribution compared to other malignancies [3]. Majority (95%) of the testicular tumors arise from the germ cell lineage, though it can be derived from any cell type found in testicles. The disease process begins in early in fetal life, comprises abnormal proliferation of primordial germ cell is the hypothesis behind it [4,5]. The exact etiology was not well understood of testicular neoplasms, the various factors like cryptorchidism, trauma, infections, genetic and endocrinal causes plays a role in their development [6].The diagnosis of testicular lesions are primary dependant and confined on histopathological examination, in spite of availability of advances in imaging and tumor markers assay respectively [7]. Histopathology also have a definite role in its prognostic and therapeutic options [7].

***Correspondence**
Dr. Roopali D. Nikumbh
Assistant Professor, Department of Anatomy, SBH Government Medical College,Dhule, Maharashtra, India.
E-mail: drrdnikumbh@gmail.com.

Objectives

The main purpose of our study was to highlight the diverse histomorphological patterns of non-neoplastic and neoplastic lesions of orchidectomy specimens in our institute and thus offering the specific diagnostic which is of paramount clinical importance.

Material and methods

We studied all orchidectomy specimens received in our tertiary care hospital over a period of 6 years from May 2015 to April 2021.The type of our study was retrospective, descriptive and observational. We received 60 orchidectomy specimens over a span of 6 years, slides retrieved, reviewed with all clinical details like age, laterality, any special test, specific histopathological diagnosis. The tumors were classified as per WHO classification 2004[8].

Inclusion criteria- All orchidectomy specimens were included in the specified period.

Exclusion criteria- Small testicular biopsies and bilateral orchidectomy specimen for prostatic cancer were excluded from our study. All the data was collected, analyzed and compared with similar other research studies by different authors for specific conclusions.

Results

In the present study, a total of 60 orchidectomy specimens were studied for clinical and histomorphological diagnosis of the lesions. Various lesions were encountered in wide range of age groups. The age group ranges from youngest patient of 7 days baby to 58 years adult in our study. The first decade was predominantly affected by non-neoplastic lesions whereas 2nd and 3rd decade peak was observed in neoplastic category (Table no.1). Out of 60 specimens, we found 42 cases of orchidectomy specimens of left side and laterality of 18 cases was seen in right side in the present study. Regarding spectrum of lesions, we encountered 34 cases that is majority of neoplastic lesions and 26

lesions of non-neoplastic category (Table no.2) on histomorphological basis. In non-neoplastic lesions, out of 26 cases, majority of the lesions were of vascular lesions (16 cases) like torsion, gangrene and ischemia followed by chronic granulomatous orchitis (06 cases), acute necrotizing orchitis (03 cases), and one interesting case of epidermoid inclusion cyst of testis and testicular atrophy in cryptorchidism (Table no.3).

Neoplastic spectrum of 34 cases was dominated by non seminomatous germ cell tumor (NSGCTs) that is 19 cases, followed by seminomatous germ cell tumors (SGCTs-15 cases) tumor (Table no.4).Testicular tumors were more prevalent in age group of 31 to 40 yrs. Out of 19 cases of NSGCTs ,majority were mixed germ cell tumors(13 cases), followed by yolk sac tumor(YST)-03 cases, embryonal carcinoma(EC)-03 cases and one interesting case of sex cord stromal tumor i.e. leydig cell tumor (Table no.5). We haven't encountered a case of non Hodgkin lymphoma, choriocarcinoma or pure teratoma etc in our study.

Table 1: Age group distribution of Orchidectomy specimens

Age groups	Non-neoplastic frequency-cases / Percentage	Neoplastic frequency-cases / Percentage
Birth -1 year	04 / 16 %	00/-
1.1-10 yrs	14 /54 %	02 /05 %
11-20 yrs	05 / 19 %	02 /05 %
21-30 yrs	03 / 11 %	07 / 22 %
31-40 yrs	00 /-	18 / 52 %
41-50 yrs	00 /-	03 / 11 %
51-60 yrs	00 /-	02 / 05 %
Total	**26/ 100%**	**34 / 100%**

Table 2: Frequency of testicular lesions

Histopathological diagnosis	No of cases	Percentage / %
Non-neoplastic	26	43
Neoplastic	34	57
Total	**60**	**100**

Table 3: Spectrum of Non-neoplastic lesions

Histopathological diagnosis	No of cases	Percentage / %
Torsion/gangrene	16	61
Chronic granulomatous orchitis	05	19
Acute necrotizing orchitis	03	12
EIC testis	01	04
Atrophy/cryptorchidism	01	04
Total	**26**	**100**

Table 4: Spectrum of Neoplastic tumors

Histopathological diagnosis	No of cases	Percentage / %
Seminomatous germ cell tumors /SGCTs- Classical	15	44
Non seminomatous germ cell tumors/NSGCTs	19	56
Total	**35**	**100**

Table 5: Spectrum of Neoplastic tumors-NSGCTs

Histopathological diagnosis	No of cases	Percentage / %
Mixed germ cell tumors	13	68
Yolk sac tumor	02	11
Embryonal carcinoma	03	16
Leydig cell tumor	01	05
Lymphoma,Choriocarcinoma,Teratoma	00	--
Total	**19**	**100**

Table 6Comparison of histological spectrum of testicular neoplasms by various studies

Tumor types	Reddy S et al[1] (n=14)	Chakraborty PR et al [19] (n=37)	Deore KS et al [22](n=15)	Sanjay M et al [23](n=23)	Sharma M et al [24] (N=04)	Present study (n=34)
Mixed germ cell tumor	**43%**	**32.4%**	**33.3%**	**38.9%**	**25%**	**38%**
Seminoma	**42.9%**	**35.14%**	**26.7%**	**38.9%**	**25%**	**44%**
Teratoma	**-**	**2.7%**	**13.3%**	**11.1%**	**25%**	**-**
Yolk sac tumor	**-**	**2.7%**	**6.7%**	**5.5%**	**25%**	**06%**
Embryonal carcinoma	**7.2%**	**-**	**-**	**-**	**-**	**09%**
Others-Leydig cell tumor	**7.2%**	**27%**	**20%**	**11.1%**	**-**	**03%**

Fig .1:Gross photograph of non-neoplastic orchidectomy specimens

a) Gross and cut section of excised torsion orchidectomy specimen replaced by brown to black mass
b) Chronic granulomatous orchitis showing grey white areas of fibrosis
c) Cut section of tuberculous orchitis showing caseation necrosis, fibrosis and effaced architecture
d) Acute necrotizing orchitis showing exudation and necrosis
e) Gross specimen of EIC with whitish keratinous material on cut section
f) Small and atrophic testis in undescended one.

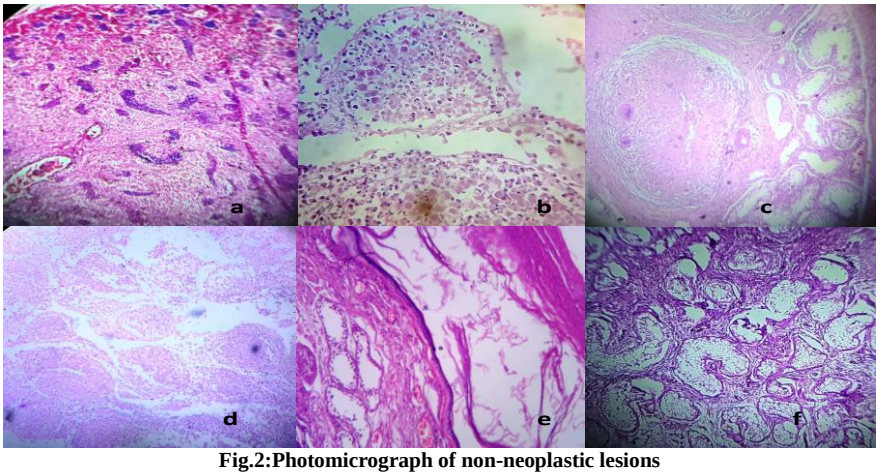

Fig.2:Photomicrograph of non-neoplastic lesions

a) Testis is replaced by areas of hemorrhagic necrosis in torsion (H&E,x100)
b) Loss of all nuclear and cytological details in torsion (HE,X400)
c) Granulomas of epitheliod cells, Langhan's giant cells and necrosis in tuberculous orchitis (H&E,x100)
d) Microabscess, neutrophilic exudates and necrosis in acute orchitis (H&E,x100)
e) Cyst lined by stratified sqamous epithelium and lumen contains abundant keratinous material in EIC (H&E, x100)
f) Small atrophic tubules and peritubular fibrosis in undescended testis (H&E,x100)

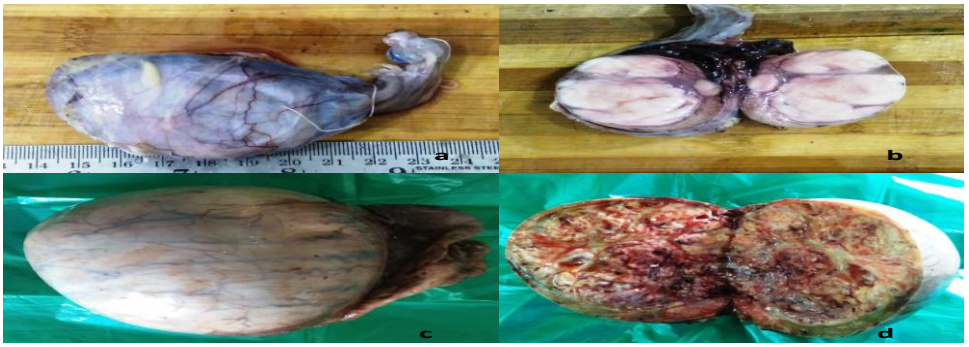

Fig 3: Gross photograph of neoplastic testicular tumors.

a,b) Gross & cut section of circumscribed, well defined, homogeneous SGCTs without areas of hemorrhages, necrosis
c,d) Gross & cut section of NSGCTs with variegated appearance

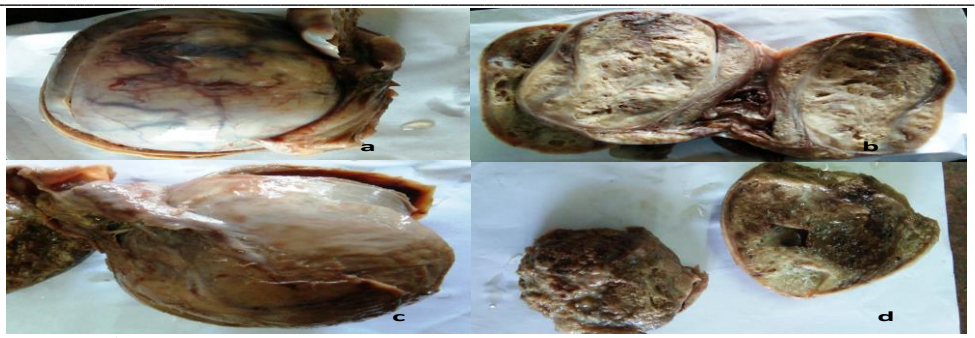

Fig.4 – Gross photograph of NSGCTs-mixed germ cell tumors
a,c) Gross specimen of mixed germ cells with irregular outlines, congested vessels
b,d) Cut section of NSGCTs with areas of hemorrhages, necrosis, cystic change and foci of invasion

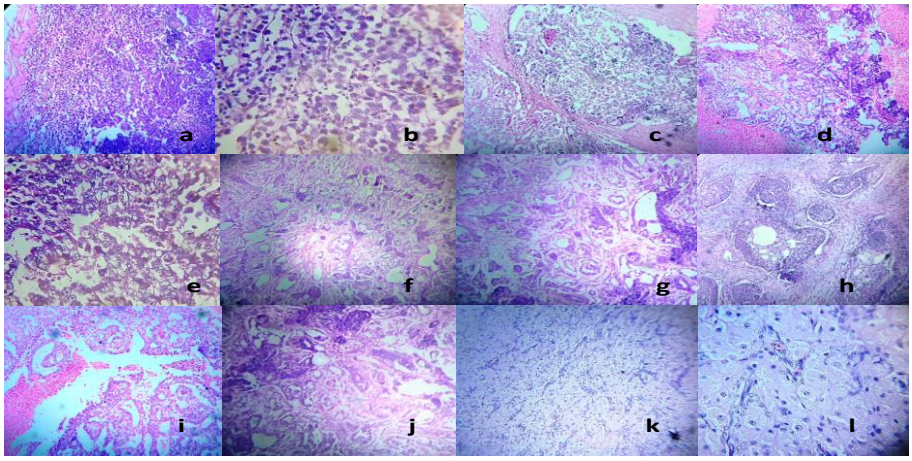

Fig.5:Photomicrograph of neoplastic tumors of testis
a)Uniform tumor cells separated by thin fibro vascular septae and lymphocytes in seminoma (H&E,x100)
b) Polyhedral tumor cells with prominent nuclear features, distinct cytoplasmic borders in SGCTs (H&E,x400)
c &d) Microcystic,papillary, alveolar sheets and various patterns of NSGCTs(H&E,x100)
e) Round to polygonal cells with clear cytoplasm with indistinct outlines of NSGCT on high power (H&E,x400)
f,g,h) Mixed germ tumors with combinations of YST,embryonal carcinoma and teratoma with and primitive elements (H&E,x100)
i)Schiller –Duval bodies of YST (H&E,x100)
j)Embryonal carcinoma with various patterns of undifferentiated cells (H&E,x100)
k,l) Nodules of leydig cell tumor with polygonal cells with abundant granular cytoplasm and Reinke's crystals (H&E,X100,X400)

Discussion –
Testicular tumors incidence was varies from places to places in country to country due to its varying causative agents and diverse etiologies [8,9]. Various researchers studied the incidence of non-neoplastic and neoplastic lesions of the testis. In our study,the frequency of neoplastic lesions were 57% whereas non-neoplastic lesions were 43%. Majority of the studies found non-neoplastic lesions more then neoplastic ones. But our study was in concordance with Gupta A at al [10] and Patel MB et al [11]. Ignorance, late presentations of lesions, social taboo and cultural rituals may be responsible factors of increased percentage of malignant cases in our study.In the present study, peak incidence of malignant spectrum was seen in 3rd and 4th decades of life which is in accordance with studies from African and European countries [12,13].
The majority of the cases of non-neoplastic lesion were from 1st decade constituting the major vascular causes like torsion, gangrene and ischemia of testis, followed by acute necrotizing orchitis, chronic granulomatous orchitis as secondary/primary tuberculosis due to high incidence in our country and one interesting case of epidermoid inclusion cyst and atrophy. In torsion, grossly we received a tiny grey brown testicular mass of varying sizes ranges from 1.5 to 3.5 cms. C/S-revealed the entire parenchyma is replaced by areas of hemorrhagic necrosis and brownish material (Fig.1a). Microscopy revealed complete loss of normal architecture of testicular parenchyma and replaced by hemorrhagic necrosis (Fig.2a,b). Torsion is acute urological emergency which needs quick and urgent timely intervention [14] Torsion of testis mainly occurs due to twisting of spermatic cord leading to vascular compromise of testis blood supply. Overall, it takes 4-8 hrs before significant ischemic damage [15] The bell clapper congenital anomaly constitute 12% of males leading to torsion [16]. In this anomaly, there is high attachment of tunica vaginalis hence the testis can rotate freely on the spermatic cord within the tunica vaginalis, long axis of the testicle is oriented transversely rather than cephalocaudal[15].The bell clapper deformity allows the testicle to twist spontaneously on the spermatic cord. Extravesical torsion constitutes 5% of the torsions and several case reports describe familial torsions [17]. Delayed presentation or familial causes were predominates in our study leading to torsion. Opaque and lusterless mass was seen in acute orchitis with covered exudation and fibrosed (Fig. 1d), irregular mass with surrounding fibrosis and caseating necrotic masses was evident in granulomatous lesions (Fig. 1b,c). Large micro abscess with necrosis was noted with areas of fibrosis, calcification and thrombosed vessels in acute necrotizing orchitis in testicular parenchyma (Fig.2d). Chronic granulomas of aggregates of epithelioid cells, Langhan's giant cells and caseation necrosis with

fibrosis was seen chronic tuberculous orchitis (Fig.2c). One interesting case of epidermoid inclusion cyst (EIC) was noted in a 30 yrs old male presented with a painless right testicular mass [18]. On local examination an irregular hard mass measuring 4cm was found on the lower pole of right testis. On investigations, all the hematological, serological and biochemical parameters including tumour markers (Alfa fetoprotein and Beta-HCG) were within normal limits. After complete excision of mass, we received grey white, circumscribed and well encapsulated mass measuring 3.5x3x2cms. On cut section, the cystic mass noted, filled with whitish pale, friable paste like material (Fig.1e).Microscopy revealed a cyst lined by attenuated stratified keratinizing squamous epithelium. Lumen of the cyst was filled with abundant keratinous material with laminated keratin flakes (Fig.2e). On serial sections there were no teratomatous elements or dermal adnexal structures in the wall. The final histopathological diagnosis was given as benign intratesticular epidermoid cyst. Histopathological diagnosis is the gold standard for diagnosis of intratesticular epidermoid cyst as the treatment modalities differs [18] A 22-years male undergone orchidectomy for right undescended testis to rule out malignancy(Fig.1f). Light microscopy revealed small atrophic seminiferous tubules, with only sertoli cells in few with no sperms and peritubular fibrosis with no evidence of intratubular germ cell neoplasia or malignancy (Fig.2f) Laterality was evident on left side in non-neoplastic category and to the right side in neoplastic category, which is in concordance with Chakraborti PR et al [19].Neoplastic spectrum was predominated by germ cell tumors with highest incidence in 2nd to 4th decade, which is in accordance with Chakraborti PR et al [19]. In germ cell tumors (97%) category, NSGCTs (56%) and SGCTs (44%) were diagnosed on histopathology. Mixed germ cell tumor category was preceded in NSGCTs and was comparable with other studies [20,21]. In our study , mixed germ cell tumors composed of combinations of YSTs +ECs,ECS +YSTs +foci of choriocarcinoma, teratoma with foci of embryonal carcinomas etc.Our findings were in concordance with Reddy H et al[1] , Chakrabarti PR et al [19], Deore KS et al[22], Sanjay M et al [23], Sharma M et al [24] (Table no.6). Seminomas comprise 15 cases out of 34 cases and we don't found a case of spermatocytic seminoma.These findings were in comparable with studies by Reddy H et al [1], Baidya R et al [20] and Mustafi et al[21]. Grossly SGCTs and NSGCTs were diagnosed due to its characteristic features. Seminomas are well circumscribed, creamy yellow to grey white, rounded homogeneous firm mass, ranges from 4-12 cms without invading tunica albugenia (Fig.3a).No evidence of necrosis or hemorrhages noted(Fig 3b).NSGCTs has classical variegated appearance (Fig.3c)with large areas of hemorrhages and necrosis, cystic change with foci of invasion into tunica (Fig.3d.). Grossly mixed germ cell tumors showed areas of invasion with irregular surfaces (Fig.4a,c) and on cut section showed cystic , myxoid change with areas of hemorrhages and necrosis (Fig.4 b,d).

Light microscopy of seminoma reveals nests of uniform tumor cells population divided into poorly demarcated lobules by delicate fibrovascular septa with lymphocytes (Fig.5a). The individual tumor cells are large,round to polyhydral having distinct cytoplasmic outlines and central prominent nucleoli , nucleoli with clear cytoplasm (Fig.5b). Immunohistochemistry was not in these cases. The hallmark of NSGCTs on microscopy was variegated appearance with invasion and different architectural patterns with indistinct cytoplasmic borders (Fig.5c,d). We encountered predominantly mixed GCTs with varying elements of YSTs, ECs and foci of choriocarcinoma or teratomas (Fig.5f). In this cases levels of alfa fetoprotein and B –HCG were noted in elevated amount.In mixed cell tumors large areas of necrosis are noted admixed with large sheets, few acini and papillae,cords of undifferentiated cells(Fig.5g). The tumor cells are round to polygonal having hyperchromatic nuclei, prominent nucleoli and indistinct cytoplasm (Fig.5e).Teatatocarcinoma showed variegated gross appearance and combination of embryonal carcinoma and teratoma (Fig.5h,j). Yolk sac tumor was found in 3 yrs and 8 yrs child has different architectural patterns like microcystic, glandular aleveolar, papillary with characteristic perivascular Schiller –Duval bodies (Fig.5i). These our findings in malignant category was in accordance with other research studies in parts of country [1,10,11,22,23,24] as shown in table no.6 We found one interesting case of sex cord stromal tumor –Leydig cell tumor in a 47 year old male presented with testicular mass, suspected as malignancy. Orchidectomy showed 2x1 cms brown nodule mass in the testis with surrounding atrophic testis. Microscopy confirmed the diagnosis of leydig cell tumor in view of nodular mass (Fig.5k) comprising round to polygonal cells with pleomorphic hyperchromatic nuclei with prominent nucleoli with abundant indistinct eosinophilic cytoplasm and occasional hyaline globules (Fig.5l). We don't encountered the cases like Non Hodgkins lymphoma,pure teratoma etc. Some variations observed regarding histological types, laterality,age groups etc may be because of small number of cases especially of tumours. The larger study population and longer duration is recommended for more conclusive results in view of scarcity of studies on testicular lesions.

Conclusion

The incidence of reported testicular cancers still remains low in our population in view of paucity of published literature. Studies of various testicular lesions are important for pathologist and clinician because grossly identifiable benign pathology may harbor foci of hidden malignancy. Histopathological diagnosis of testicular lesions can't replace the newer technique in imaging and tumor markers assay in view of varied histology. The present study highlight that any testicular swelling should be evaluated thoroughly with clinicopathological correlation to rule out malignancy.

References

1. Reddy H,Chawda H, Dombale VD. Histomorphological analysis of testicular lesions. Indian Jr Of Pathology and Oncology.2016; 3(4):558-63
2. Purdue DA, Brown RS, Brock CS et al. Trends in testicular carcinoma in England and wales.BJU Int.2001;87:361-65
3. Liu S, Wen SW, Mao Y, Mery L, Pouleau J. Birth cohort effects underlying the increasing testicular cancer incidence in Canada. Can J Public Health 1990;90:176-80
4. Sagalowsky AI. Current consideration in the diagnosis and initial treatment of testicular cancers. Compr Ther.1994;20:688-90
5. Bray F,Richiardi L,Pukkala E,Cuninkova M,Moller H.Trends in testicular cancer incidence and mortality in 22 European countries:continuing increase in incidence and decline in mortality.Int J Cancer.2006;188:3099-111
6. Mcglynn KA,Devesa SS,Grabard BI,Castle PE.Incresing incidence of testicular germ cell tumors among black men in the united states.J Clin Oncol.2005;23:575-61
7. Patel MB,Goswamy HM,Parikh UR,Mehta N.Histopatholgical study of testicule lesions.Gujarat Medical Journal.2015;70 (1):41-46
8. Eble JN,Sauter G,Epstein JI .Pathology and genetics of tumors of the urinary system and male genital organs,IARC press,Lyon.2004:315
9. Buge AK,Buge KH,Khonde D et al.Histopathological study of non-neoplastic & neoplastic testicular lesions.A retroscpective study.IJHCR.2020;3(7):191-4
10. Gupta A,Gupta S,Gupta Sunil,Gupta V.Testicular tumors:A histopathological study of 50 cases.IJPO.2016;3(4):544-547
11. Patel MB,Goswani HM,Parikh UR et al.Histopatholgical study of testicular lesions.Gujarat Medical Jr.2015;70(1):41-46
12. Oliver RTD.Testiclular cancer.Curr Opin ONCOL.2001;13:191-98
13. Richiardi L,Bellocco R,Adami HO,Torrang A,Barlow L,Hakulinen T.Testicluar cancer incidence in eight northern European countries :secular recent trends .Cancer Epidemol Biomarkers Prev.2004;13:2157-66
14. Dogra BB. Testicular torsion. Med J DY Patil Univ .2015; 8:623-4
15. Gatti JM, Murphy JP. Acute testicular disorders. Pediatr Rev 2008;29:235-41

16. Dogra V, Bhatt S. Acute painful scrotum. Radiol Clin North Am 2004;42:349-63
17. Cubillos J, Freyle J, Lowe FC, Palmer LS. Familial testicular torsion. J Urol 2011;185:2469-72.
18. Suryawanshi KH, Nikumbh DB, Mujawar P, Pagare P, Kanthikar SN. Benign Intratesticular Epidermoid Cyst of the Testis: Diagnostic Dilemma. Online J Health Allied Scs. 2014;13(1):10.
19. Chakrabarti PR, Khare G.Histopatholgical trends of testicular neoplasm:An experience over a decade in a terirary care centre in the Malwa belt of Central India.2016;10(6):EC16-18
20. Baidya R,Sigdel B,Baidya NL.Histopathological pattern of testicule lesion.Jr of Pathology of Nepal.2017;7:1087-90
21. Mostofi FK,Prince EB,Jr.Tumors of the male genital system.Atlas of tumor pathology ,fascilce7,series 2.Armed Forces Institute of Pathology,Washington DC.1973:1186-20
22. Deore KS, Patel MB, Gohil RP, Delvadiya KN, Goswami HM. Histopathological analysis of testicular tumours - a 4 year experience. International Journal of Medical Science and Public Health 2015;4(4):554-557.
23. Sanjay M, Sushma HM. Histomorphological spectrum of tumour and tumour like lesions of testis and paratesticular structures- A cross sectional study. Indian Journal of Pathology and Oncology, 2016;3(4);528-534.
24. Sharma M,Mahajan V,Suri J,Kaul KK. Histopathological spectrum of testicular lesions- A retrospective study. Indian Journal of Pathology and Oncology, 2017;4(3):437-441

Conflict of Interest: Nil
Source of support: Nil