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Incidence and Histomorphological Patterns of Scrotal Masses from a Tertiary Care Centre – A 20 year Retrospective Study

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Abstract

Background: Testicular malignancies, though less common neoplasms typically present in middle aged men. Some established risk factors such as cryptorchidism, in utero exposure to oestrogens and occupational risks are associated with them and often pose diagnostic challenges. **Aims and Objectives:** To study the incidence and histo-morphology of non-neoplastic and neoplastic lesions of scrotum (includes testis, epididymis, spermatic cord and tunica vaginalis) and to assess the trend and pattern of scrotal masses over 20 years. **Materials and Methods:** This is a single centre 20 years retrospective study on the incidence and distribution of scrotal masses between 15 to 80 years of age conducted in pathology department of a tertiary centre. Gross and histomorphological features of all specimens related to scrotal pathology were evaluated as per institutional protocol. **Results:** Around 433 scrotal masses were studied over a period of 20 years. Of which 289 were paratesticular masses, 82 cases (19%) were testicular masses and 62 cases (14%) were lesions of scrotal skin. Among 39 neoplastic testicular masses, 16 (41%) were classical seminoma and 14 (36%) were mixed germ cell tumors. Thus the incidence of neoplastic scrotal masses ranged from 0.01% to 0.1% per year and the incidence of non-neoplastic masses ranged from 0.2% to 0.4% per year. **Conclusion:** Majority of scrotal masses were non-neoplastic and seen between 16 to 35 years of age. Most of testicular neoplasms were germ cell tumour. Hydrocele, infective lesions and varicocele were the commonest lesions observed in tunica vaginalis, epididymis and cord structures respectively.

Key words: Germ cell tumour, Scrotal masses, Testicular neoplasms.

Key message: Incidence of neoplastic scrotal masses ranged from 0.01% to 0.1% per year and the incidence of non-neoplastic masses ranged from 0.2% to 0.4% per year. Majority of scrotal masses were non-neoplastic and seen between 16 to 35 years of age. Most of testicular neoplasms were germ cell tumours.

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Introduction

Testicular malignancies are one of the rare tumors in men in many countries. Overall they constitute 1 to 2 percent of all malignancies,[1] out of which germ cell tumors comprise 98 percent of testicular cancers.[2] As per Surveillance, Epidemiology & End Results study (SEER),[3] median age of testicular malignancy is approximately 33 years of age. Of these,

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48% of cases diagnosed between 20 to 35 years and 6.1% cases come under 20 years. However, the etiology of testicular cancer is not well understood. Most of the established risk factors, including cryptorchidism, carcinoma in situ, in utero exposure to oestrogens, occupational risks, lifestyle, socioeconomic and other risk factors have demonstrated mixed associations with testicular cancer.[4,5] With advances in diagnosis and therapeutic approaches, testicular tumors are now highly responsive to treatment, providing long-term survival. We sought to assess the incidence and evaluate and study the histomorphology of scrotal masses received in the pathology department of our tertiary care centre over a period of 20 years.

Materials and Methods

This study includes testicular and paratesticular specimens of adult population between the age of 15 to 80 years, that were histologically diagnosed in the Department of Histopathology, Nair Hospital Mumbai over a period of 20 year. These specimens were received in 10% buffered formalin, grossed and processed. Paraffin-embedded sections (at 2–3 µm) were routinely stained with hematoxylin and eosin stains and microscopically examined. Patients' clinical data (name, age, chief complaints, clinical diagnosis) and baseline lab investigations (complete blood count, urine examination, tumor markers) along with ultrasonography or CT scan of abdomen and scrotum were extracted from the histopathological examination requisition forms.

Results

There were around 4000 to 7000 surgical specimens received in our histopathology laboratory per year with an average of 5800 specimens per year. We evaluated 433 scrotal masses received over a period of 20 years in our institute. Among total number of specimens (as 5800 per year) we received, 13 to 28 scrotal masses were non-neoplastic per year and 1 to 5 cases were neoplastic scrotal masses per year. Therefore the incidence of neoplastic scrotal masses ranged from 0.01% to 0.1% per year and the incidence of non-neoplastic masses ranged from 0.2% to 0.4% per year.

Distribution of Neoplastic & Non- neoplastic Masses

Among 433 scrotal masses, 90% cases were non-neoplastic and only 10% cases were neoplastic. Among 433 scrotal masses, 113 cases (26%) were in the age group of 26-35 years followed by 102 cases (23%) in the age group of 16- 25 years and 95 cases (22%) in the age group of 36-45 years. Only 3 cases were above 75 years of age. (Figure-1)

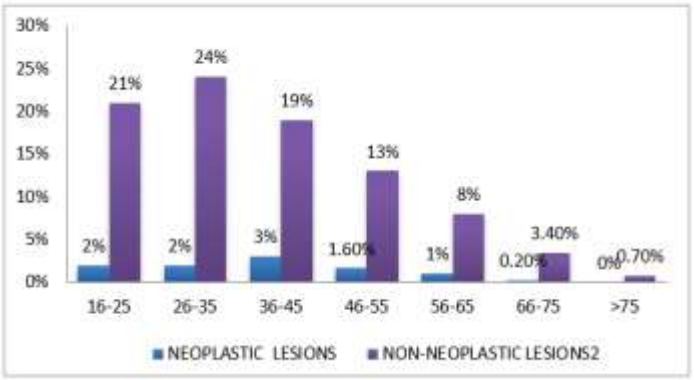

Figure 1: Age wise distribution of Scrotal lesions

Anatomical Distribution of Scrotal Masses

Among 433 scrotal masses, 289 cases were due to paratesticular masses [209 cases (48%) were lesions of tunica vaginalis, 46 cases(11%) were lesions of epididymis, 34 cases (8%)

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were lesions of cord structures] 82 cases (19%) were testicular masses and 62 cases (14%) were lesions of scrotal skin.(Figure-2)

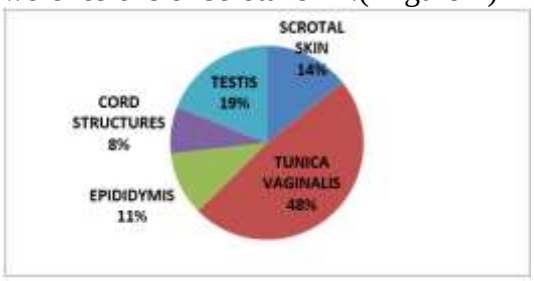

Figure 2: **Anatomical Distribution of Scrotal Masses**

Neoplastic Testicular Masses:

Among 82 cases of testicular masses, 43 cases (52%) were non-neoplastic, and 39 cases (48%) were neoplastic masses. Among 39 cases of neoplastic testicular masses, 16 cases (41%) were classical seminoma, 14 cases (36%) were mixed germ cell tumor, 6 cases (15%) were embryonal carcinoma 2 cases (5%) were lymphoma and 1 case was anaplastic seminoma. (see Figure-3)

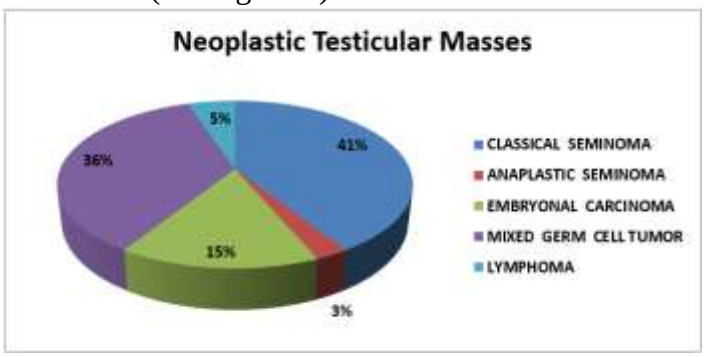

Figure 3: Neoplastic Testicular Masses

Among 43 cases of non- neoplastic testicular masses, 36 cases (84%) were torsion testis, 5 cases (11%) were testicular abscess, and 2 cases (5 %) were granulomatous orchitis.

Distribution Of Paratesticular Masses

Among 289 cases of paratesicular masses, 285 cases (99%) were non- neoplastic lesions of tunica vaginalis, epididymis, and cord structures and 4 cases (1%) were neoplastic paratesticular masses. Among 4 cases of neoplastic paratesticular masses, 3 cases were Rhabdomyosarcoma of cord, 1 case was adenomatoid tumor. Among 46 cases of epididymal masses, 19 cases (41%) were acute on chronic epididymo-orchitis, 12 cases (26%) were tuberculous epididymo-orchitis, 9 cases (20%) were epididymal cyst and 6 cases (13%) spermatocele.

Among 209 lesions of tunica vaginalis, 120 cases (57%) were hydrocele, 49 cases (24 %) were hematocele, and 40 cases (19%) were pyocele. Among 34 lesions of cord structures, 30 cases (88%) were varicocele, 3 cases (9%) were lymphangiocele and 1 case (3%) was cord hematoma.

Lesions of scrotal skin

Among 62 scrotal skin lesions, 59 cases (95%) were non-neoplastic and 3 cases (5%) were neoplastic. Among 3 cases of neoplastic scrotal skin masses, 2 cases were squamous cell carcinoma, and 1 case was lymphangioma scrotum. Among 59 cases of non-neoplastic scrotal skin masses, 15 cases (25 %) were scrotal calcinosis, 14 cases (24%) were sebaceous cyst, 13 cases (22%) were fourniers gangrene, 1 case of condyloma.(Figure-4)

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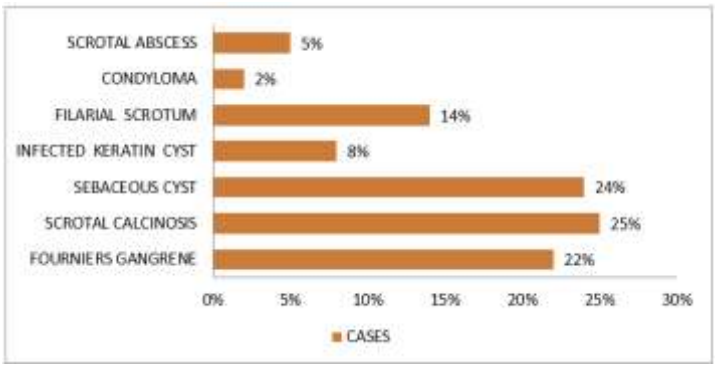

Figure 4: Non- Neoplastic Lesions of Scrotal Skin

Discussion

This study of scrotal masses included 433 cases evaluated over a period of 20 years in our tertiary care centre from 1992 to 2011. This included 45 (10%) neoplastic masses and 388 (90%) non-neoplastic masses. This is similar with the study done by Rholl *et al.*[6] which showed nearly 80% scrotal masses are non- neoplastic**.**

There were 213 scrotal masses (49%) out of total 433 scrotal masses in the age group of 16 to 35 years. Majority of neoplastic scrotal masses were seen in this age group. This coincides with the Surveillance, Epidemiology & End Results (SEER) Study, group cancer statistics review where testicular malignancies mainly occur in men between 20 to 50 years of age.[7]

Out of 82 testicular masses, 43 cases (52%) cases are non-neoplastic. This is similar to the finding by Perez-Guillero *et al.*[8] who in their study of 89 palpable lesions of the scrotum, testicle and epididymis, found non- neoplastic lesions (74.1%) to be more frequent than neoplastic masses.

In the present study of 39 cases of testicular tumours, 37 (95%) were germ cell tumours which includes 17 cases of seminoma, 6 cases of embryonal carcinoma and 14 cases of mixed germ cell tumour. These findings are in concordance with findings of Dixon *et al.* [9] who have found 142 germ cell tumors of one histological type out of total 154 germ cell tumours (92.20%). The neoplastic testicular lesions presented with painless gradual swelling in the scrotum between 6 months to 2 years duration. No bilateral testicular tumour was reported in our study. According to Mahalik S.K. *et al.*, 15 – 50% of patients with testicular tumours have associated hydrocele.[10] In our present study, 1 case (2%) had cryptorchidism and developed seminoma. We found associated lymphadenopathy in 4 cases (10%). The patients had inguinal (n=1), retroperitoneal (n=3) on radiological findings. Grossly, testis in seminoma was replaced by a large, homogenous, lobulated, firm grey white mass (figure 5) and microscopically, tumour cells were arranged in compact nests and separated by fibrous septa. Interstitial pattern of growth is seen in all cases. Lymphocytic infiltration of septa is seen in all cases. Granulomatous inflammation was noted in two cases. Cellular features of anaplasia, extensive necrosis and mitoses were seen in 1 case (5%) out of 17 cases of seminoma. Involvement of scrotal skin was not seen in any case in our study. Invasion of epididymis and spermatic cord is noted in 1 case (5%). The characteristic intratubular germ cell neoplasia was noted in 1 case out of 17 seminomas (5%). In our study there were 6 cases (15%) of embryonal carcinoma. Microscopically embryonal carcinomas showed variable growth patterns like solid, acinar, tubular or papillary. Hemorrhage and necrosis was seen in almost all cases. One of our case of mixed GCT showed element of choriocarcinoma. There was one diagnosed case of mixed germ cell tumour, in which the teratoma component showed focus of adenocarcinoma that is, teratoma with malignant transformation (figure-6). Grossly, testis in lymphoma was replaced by a solid, homogenous mass with foci of

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infarction. Microscopically, there was diffuse infiltration of interstitium by lymphoid cells pattern with relative tubular preservation (figure-7). We did not come across any case of plasmacytoma or leukaemic infiltrate in the testis in our series. Out of 37 germ cell tumours of testis, HCG was raised in 10 cases (27 %), AFP in 9 cases (24%) and LDH in 16 cases (43%). HCG levels was raised in 2 cases (12%) of seminomas, 4 cases (66%) of embryonal carcinomas and 4 cases of mixed germ cell tumours (29 % of all mixed GCT). According to the findings of Albrecht W *et al.* 2004, HCG is raised in 15% seminomas, 80% embryonal carcinomas and 100% choriocarcinoma.[11] Out of these 16 cases with raised LDH levels, 12 cases (71 %) were seminomas and 4 cases (20%) were NSGCT's. This was similar to the findings of Gilligan T.D. *et al.*, who concluded that LDH is raised in 40-60% of patients with testicular germ cell tumours.[12] In our centre, non- neoplastic testicular lesions account for 43 out of 82 cases. Of these, 34 cases (84 %) were due to torsion testis. Grossly, the testis was swollen and tense and on cut surface there was congestion and hemorrhage and microscopically there was hemorrhage within the interstitium and infarction of tubules (figure 8). In our present study, granulomatous orchitis was seen in 2 cases. Microscopically, there were multiple granuloma centered around the tubules with disintegrated sperms in the centre (figure 9). There were 46 cases due to masses in epididymis. Genitourinary tuberculosis accounts for 20-73% of all cases of extra-pulmonary tuberculosis in the general population and epididymo-orchitis accounts for 22% of all cases of genitourinary tuberculosis.[13] We encountered 6 cases (13%) of spermatocele and 9 cases (20%) of epididymal cyst in the present study**.** Grossly, epididymal cyst presented as a cystic swelling in the upper pole of the testis. Microscopically, the cyst wall was lined by flattened to cuboidal epithelium (Figure-10). In a series by Holden and List,[14] epididymal cysts were more common in the general population, accounting for approximately 75% of lesions. Morphologically, hematocele showed presence of fibrin and blood clot and microscopically there was thickened fibrocollagenous wall with congestion of vessels, fibrin and cholesterol clefts (Figure-11). Out of 59 cases of scrotal skin masses, scrotal calcinosis constitute 15 cases (25%) (Figure-12) and showed classical histologic features of scrotal calcinosis with a variable amount of calcification in the dermis. A study of 20 patients by Shah V, Shet T [15] showed classical histologic features of scrotal calcinosis. There were 14 cases (24%) of sebaceous cyst which showed grossly multiple cystic swelling in the scrotal skin and microscopically, there was scrotal skin with cyst lined by squamous epithelium, adnexal structures and keratin flakes in the lumen.(Figure-13). In our present study we encountered, 13 (22 %) cases of fourniers gangrene. Grossly, scrotal skin was dusky with congested subcutaneous tissue and microscopically, there was necrotising vasculitis, congested vessels and moderate mixed inflammation in the subcutaneous tissue Figure-14).

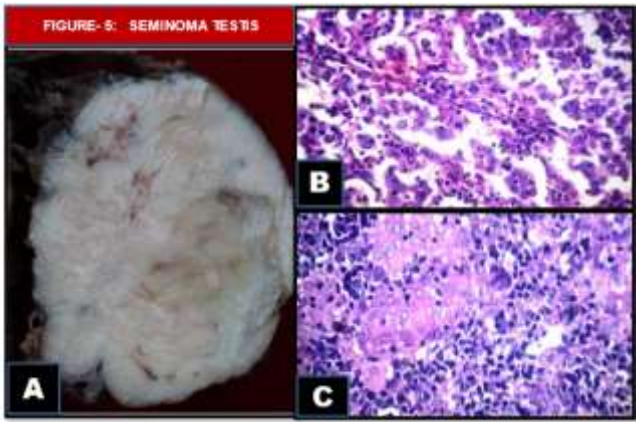

Figure 5: Seminoma Testis

A-Gross-Testis is replaced by a solid, Grey white, homogenous lobulated mass.

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B- Combact nests of tumour cells separated by fibrous septa with lymphocytic infiltration.(H&E×100)
C- Seminoma associated with granuloma formation in the septa. (H & E×400)

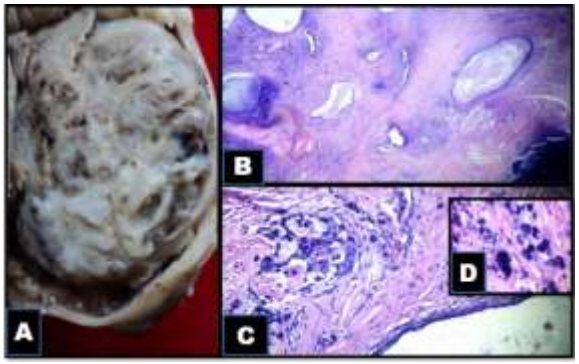

Figure 6: Mixed Germ Cell Tumour of Testis (Teratoma)
A- GROSS-Testis is replaced by solid tumour with multiple cystic areas and shiny glistening translucent areas
B- Islands of cartilage, cyctic spaces and glandular epithelium (H&E×40)
C- Foci of adenocarcinoma in teratoma. (H & E×100)
D- Inset showing malignant epithelial cells (H & E×400)

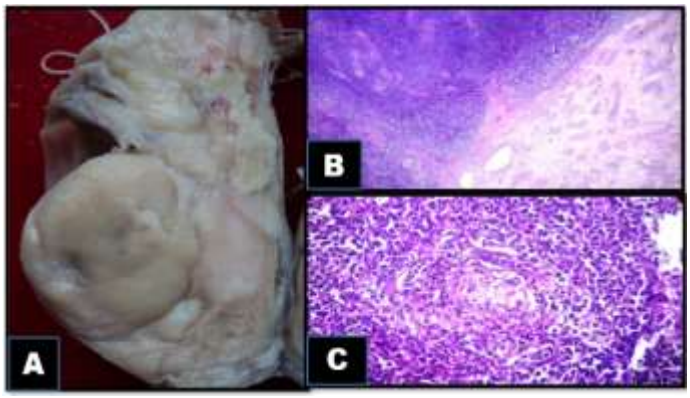

Figure 7: Lymphoma-Testis
A-Gross- Testis is replaced by homogenous, solid mass with focal area of infarction.
B- There is diffuse infiltration a Interstitium by lymphoid cells. (H & E×40)
C- Lymphoid cells surround and separate these mini ferrous tubules. (H & E×400)

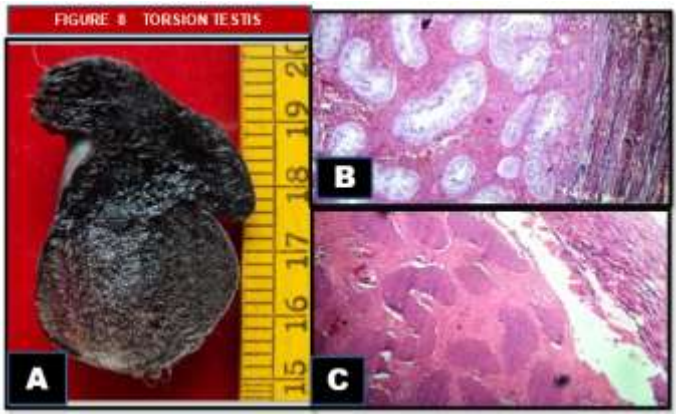

Figure 8: Tortion-Testis

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A- Gross-cut surface of testis showing haemorrhage and congestion
B- Hemorrhage in the interstitium with ischemia of tubules. (H & E ×100)
C- Hemorrhage in the interstitium with infarction of tubules. (H & E ×100)

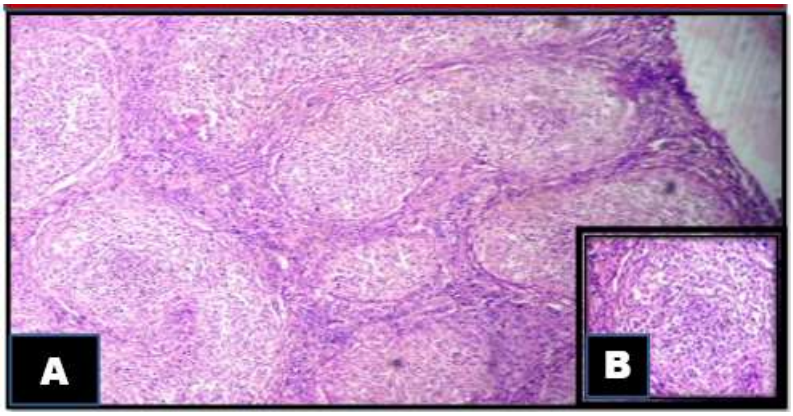

Figure 9: Granulomatous Orchitis
A- Granuloma centeredin the seminiferoustubules. (H & E ×100)
B- Granuloma composed of epithelioid cells, macrophages, lymphocytes with disintegrated sperms in the centre (H & E ×400)

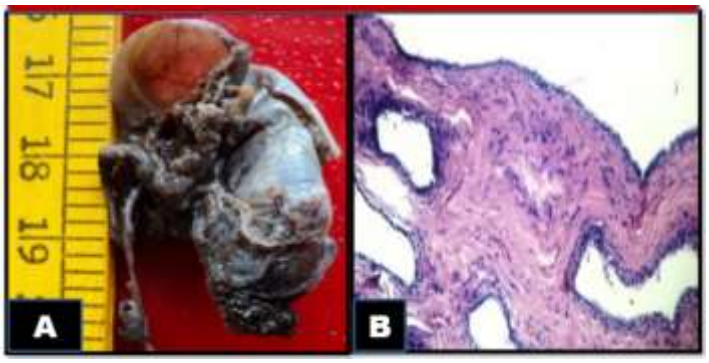

Figure 10: Epididymal cyst
A- Gross-cystic structure seen in the upper pole of testis with smooth inner wall.
B- cyst wall lined by flattened touboidal epithelium. (H & E ×100)

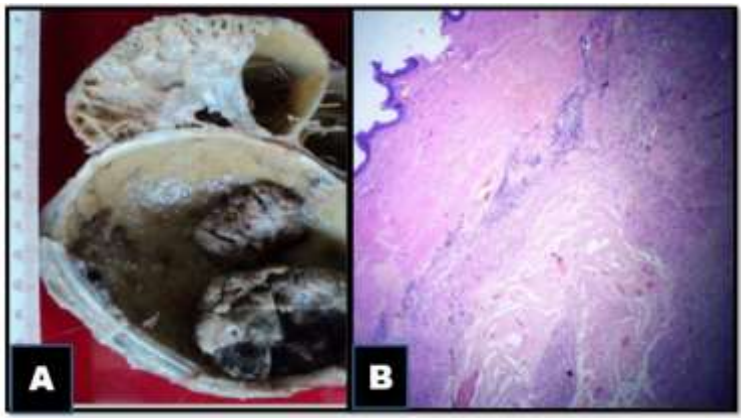

Figure 11: Hematocele
A- Gross- Thickened congested tunica with blood clot inside the sac.
B- Thickened, congested fibrocollagenous wall with fibrin and cholesterol clefts. (H & E ×40)

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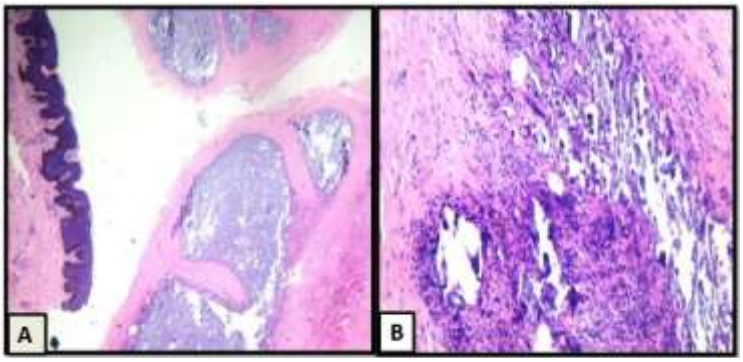

Figure 12: Scrotal Calcinosis

A- Skin with underlying amorphous basophilic, calcidic material in the subcutaneous tissue. (H & E×40)

B- Large areas of amorphous, calcific material surrounded by mild inflammation. (H & E×100)

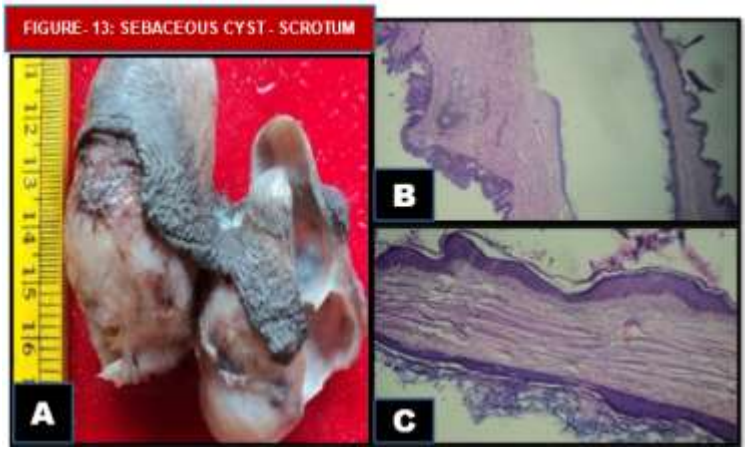

Figure 13: Sebaceous Cyst-Scrotum

A- Gross-Multiple cystic swelling in the scrotal skin.

B- Scrotal skin with cyst lined by squamousepithelium, adnexal structures and keratin flakes in the lumen. (H & E×40)

C- High power of the cyst. (H & E ×100)

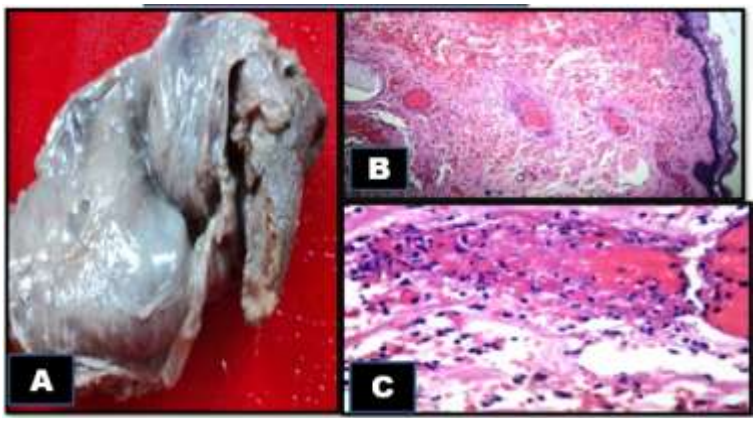

Figure 14: Fourniers Gangrene

A- Gross- Scrotal skin with dusky and congested subcutaneous tissue

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B- Skin with congested vessels, moderate inflammation and hemorrhage in the subcutaneous tissue. (H & E 40)
C- Necrotising vasculitis seen in the subcutaneous tissue. (H & E 400)

Conclusion

Majority of scrotal masses were non- neoplastic and seen between 16 to 35 years of age. Most of neoplastic testicular lesions were seen in this age group and 99% of neoplasms were germ cell tumour. Thus ‘’painless scrotal swelling (especially intratesticular lesions) in young patient to be considered malignant is reaffirmed in our study. Hydrocele, infective lesions especially tuberculous etiology and varicocele were the commonest lesion observed in tunica vaginalis, epididymis and cord structures respectively. Sebaceous cyst and scrotal calcinosis were the commonest lesions of scrotal skin followed by Fourniers gangrene in our centre.

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