*Original Article*

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# Histomorphological Study of Skin Adnexal Tumors and Review

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**Abstract**

*Introduction/Context:* Neoplasms of skin appendages are infrequently encountered in practice. Histopathology is the gold standard investigation for the final diagnosis. *Aim of the Study:* Approach to the diagnosis of skin adnexal tumors on the basis of histomorphological patterns and cell morphology. *Materials and Methods:* The present study is a retrospective study done in the department of pathology. All cases are collected from 2004–2018, total of 14 years retrospective study. *Inclusion Criteria:* All skin biopsy diagnosed as skin adnexal tumors. *Exclusion Criteria:* Inflammatory condition, inadequate biopsy, Cyst and tumor like lesions. *Results:* Total 90 cases of skin adnexal tumors were included in the present study. Out of 90 cases, 42 (47%) are male patients and 48 (53%) are female. According to histomorphological pattern, 78% have solid patterns, 17% have solid and cystic, and rest are cystic. As per cell morphology, basaloid cells forms predominant in skin adnexal tumors with 50% of cases. *Discussion:* In the present study, a new concept of histomorphological pattern is included, which is rarely studied. The histomorphological pattern is classified into solid, solid and cystic and predominant cystic pattern. Solid pattern constitutes 78% of adnexal tumors. It is predominantly seen in eccrine gland tumors like Eccrine spiradenoma, Eccrine hidradenoma. Cystic pattern is seen in 5% of adnexal tumors. It is seen in pilar tumors like pilomatrixom a,trichoepithelioma. Solid and cystic pattern is seen in 17% of adnexal tumors. It is seen in both eccrine, apocrine and pilar tumors. *Conclusion:* Hence, combining the histomorphological pattern and cellular morphology helps pathologist to diagnose with ease.

**Keywords:** Adnexal tumors; Basaloid; Clear cells; Solid pattern.

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## Introduction

Neoplasms of skin appendages are infrequently encountered in practice. These are the rare tumors with less frequent excision. Histopathology is the gold standard investigation for final diagnosis. Skin adnexal tumors can differentiate in the direction of any of the four types of skin appendages *i.e.,* eccrine sweat glands, apocrine glands, sebaceous glands and hair follicles. Most of skin adnexal tumors are benign with rare malignant counter part. Simpler approach for the diagnosis of skin adnexal tumors is done in this study by using cellular pattern and morphology.[1,2]

### *Aim of the Study*

Approach to the diagnosis of skin adnexal tumors on the basis of histomorphological patterns and cell morphology.

## Materials and Methods

The present study is a retrospective study done in the department of pathology, Shri B M Patil Medical

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College, Hospital and Research Center, Deemed to be University, Vijayapur. All cases are collected from 2004–2018, total of *14 year* retrospective study.

### *Inclusion Criteria*

All skin biopsy diagnosed as skin adnexal tumors.

### *Exclusion Criteria*

Inflammatory condition, inadequate biopsy, Cyst and tumor like lesions. Statistical analysis is done.

## Results

Total of 90 cases of skin adnexal tumors were included in the present study. This study includes the cases from *Oct 2004 to Oct 2018*, totally *14 year* duration. All cases belong to the department of pathology, BLDE University.

### *Gender Distribution*

Out of 90 cases, 42 (47%) are male patients and 48 (53%) are female, (Shown as in **Fig. 1.** and also in **Tables 1–3**).

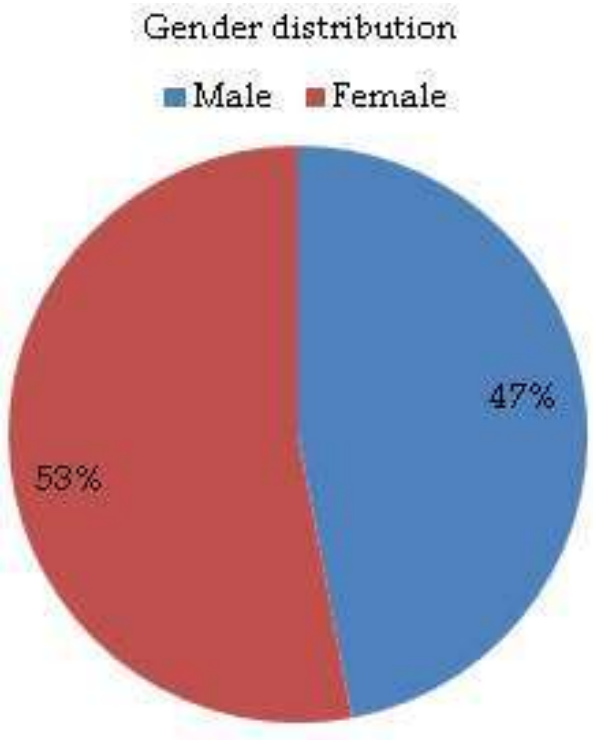


**Fig. 1:** Bar diagram representing the gender wise distribution of skin adnexal tumors

**Table 1:** Table depicting the distribution of skin adnexal tumors according to histomorphological pattern

| Gross findings | Number of cases | % of cases |
|---|---|---|
| Solid | 70 | 78% |
| Solid and cystic | 15 | 17% |
| Cystic | 05 | 05% |
| Total | 90 | 100% |

**Table 2:** Table depicting the distribution of skin adnexal tumors according to cellular morphology

| Microscopic pattern | Number of cases | % of cases |
|---|---|---|
| Basaloid pattern | 45 | 50% |
| Clear cell pattern | 02 | 2.2% |
| Squamoid pattern | 09 | 10% |
| Basaloid and clear cell pattern | 30 | 33.3% |
| Basaloid and squamoid pattern | 02 | 2.2% |
| Squamoid and clear cell pattern | 02 | 2.2% |
| Total cases | 90 | 100% |

### *Adnexal tumors with solid pattern*

Differential diagnosis are Eccrine glands (Eccrine spiradenoma, Eccrine hidradenoma, Eccrine poroma, Eccrine carcinoma, Eccrine acrospiroma), PIlar origin (pilomatrixoma, trichoepithelioma, Trichilemmoma), etc.

### *Adnexal tumors with cystic pattern*

Differential diagnosis are trichoepithelioma, pilomatrixoma

### *Adnexal tumors with solid and cystic tumors*

Differential diagnosis are eccrine tumors and trichilemmal tumors.

**Table 3:** Table depicting the distribution of skin adnexal tumors according to histomorphological pattern and cellular morphology

| | Solid | Solid and cystic | Cystic |
|---|---|---|---|
| Basaloid | Eccrine gland tumor<br>Pilar tumors<br>Sebaceous gland tumor | Eccrine gland tumor<br>Pilar tumors | Pilomatrixoma<br>tricoepithelioma |
| Squamoid | Eccrine gland tumor | Trichilemmal tumor<br>Eccrine gland tumor | Nil |
| Clear cell | Eccrine gland tumor | Nil | Nil |
| Basaloid and squamoid | Sebaceous adenoma | Nil | Nil |

| | | | |
|---|---|---|---|
| Basaloid and clear | Eccrine gland tumor Pilar tumors | Sebaceous gland tumor Eccrine gland tumor | Nil |
| Squamoid and clear cell | Eccrine gland tumor | Nil | Nil |

## Discussion

Adnexal tumors are rare tumors, predominantly benign and most often of chronic duration. Salient features of adnexal tumors are described below:

### *Tumors of hair follicle (pilar) origin*[1,2,3]

*Trichofolliculoma*: It arises from abortive differentiation of cutaneous pluripotent stem cells towards hair follicles. Histologically, it consists of keratin filled unilocular or multilocular cyst lined by infundibular squamous epithelium with prominent granular layer. It gives a "caput medusa" appearance due to radially branching of secondary and tertiary hair follicles from central cavity.

*Trichoepithelioma*: Aka epithelioma adenoids cysticum. It is most commonly seen in hair bearing regions of head and neck in adults. It can be associated with multiple familial trichoepithelioma. Histologically, it consists predominantly of uniform basaloid cells in nests with peripheral palisading. Stroma is fibrotic. Keratin filled horn cysts are seen frequently.

*Trichoadenoma*: It is a rare tumor of skin with epithelial islands and keratin filled cystic spaces in a fibrotic stroma.

*Trichilemmoma*: It arises from outer root sheath of hair follicle, mainly of the bulb region. It is most commonly seen over face of elder patients.

*Histologically:* Epidermis is hyperplastic with verruca vulgaris like changes. Dermis consists of lobules of PAS positive cells arranged in lobules. Basement membrane is thickened with peripheral palisading of basophilic cells.

*Fibrofolliculoma*: It is most commonly seen over face and neck. Histologically, it is composed of hair follicle surrounded by thick mantle of basophilic mucoid stroma.

*Trichodiscoma*: It is tumor arising from retropilar hair disk. Histologically, it consists of loosely aggregates of collagenous and elastic fibers in hyaluronidase sensitive mucinous matrix.

*Pilar sheath acanthoma*: It is usually seen on the skin of upper lip. It presents as skin color nodule with central pore. Histologically, cystic cavity with multiple lobulated masses of tumor cells radiating from the wall into the dermis.

*Pilomatrixoma*: It is most commonly seen in children and adolescents. The most common site is head and neck. Histologically, it consists of basaloid cells lining the cystic cavity filled with eosinophilic anucleated shadow/ghost cells with keratin.

*Trichoblastoma*: It is a rare tumors of hair germ that are purely epithelial. Histologically it consists of nests and cords of solid basaloid germinative epithelial cells that show pallisading. Follicular papillae are characteristically present.

*Trichilemmal Carcinoma*: It presents as pale tan or reddish papule seen over sun exposed hair bearing areas. Histologically, it consists of solid, lobular, trabecular pattern surrounded by PAS positive membrane. Few dyskeratotic cells with plenty of mitotic figures.

### *Tumors of sebaceous glands*[1,2,3]

*Sebaceous adenoma*: It is the most common benign skin adnexal lesions seen more commonly in middle age to elderly individuals. It is most commonly seen over forehead and cheeks. Histologically, lobules of mature sebaceous cells with covering of one to two layers of basaloid cells are seen.

*Sebaceoma*: Aka sebaceous epithelioma, histologically, it consists of basaloid epithelial cells of varying sized lobules.

*Sebaceous carcinoma*: It is most commonly seen over eyelids. It is also associated with Muir Torre syndrome. Histologically, it has infiltrative growth pattern composed of pleomorphic basaloid cells arranged in sheets. Atypical mitosis are seen.

*Steatocystoma multiplex*: It is seen more commonly over presternal area, neck and axilla. Histologically, cyst lies in the dermis, lined by squamous epithelium with corrugated eosinophilic cuticle surface. Presence of sebaceous glands is characteristically seen in the cyst wall.

### *Tumors of eccrine differentiation*[1,2,3]

*Eccrine hidrocystoma*: It is most commonly seen over face as skin color bluish lesion. Histologically, cyst is lined by single layer of cuboidal cells.

*Eccrine poroma*: It is most commonly seen on palms and sole. Histologically, it form tumor masses extending from lower portion of epidermis. It consists of keratinocytes with well defined cell membranes. Marked acanthosis and lack of pseudohorn cysts are characteristics of poromas.

*Spiradenoma*: It presents as tender nodules over trunk. Histologically, it consists of lobules of two types of cells: Small darker cells and Larger paler cells. These cells arranged around PAS positive material containing lumina.

*Porocarcinomas*: It is usually found on lower extremities. Histologically, it is characterized by nodular growth pattern with infiltrative borders. Tumor cells shows basaloid features with high N:C ratio and prominent nucleoli.

*Syringoma*: It is benign adnexal tumor most commonly seen over cheek. Histologically, it is composed of small ducts embedded in a sclerotic stroma. The ducts are lined by 2 rows of cuboidal to flattened epithelium with lumen containing PAS positive amorphous material.

*Eccrine acrospiroma*: It is a benign tumor composed of small monomorphous polyhedral cells arranged in nests and nodules in upper dermis. Margin is pushy. Clear cell change may be prominent.

***Tumors of apocrine differentiation*[1,2,3]**

*Syringocystadenoma papilliferum*: Most of the cases are first noted at birth, usually presents as papule. Histologically, the epidermis is acanthotic, papillomatous with cystic invagination into the dermis. Papillary projections are lined by 2 layers of epithelial cells, columnar luminal cells and cuboidal outer layer. Malformed sebaceous glands and hair structures may be present.

*Cylindroma*: Slow growing rubbery lesion over scalp, head and neck region. Histologically, it is a dermal tumor without attachment to epidermis. It is composed of oval to polygonal cells arranged in an interlocking jigsaw like pattern. There are two types of cells, small basophilic and large pale stained. Occasionally, it can undergo malignant transformation.

*Hidradenoma papilliferum*: It usually occurs in vulva and perianal region. Histologically, these are partly solid and cystic tumors containing papillary and glandular areas. These are lined by two type of epithelium: Tall columnar cells and myoepithelial cells. Rare malignant transformation are seen.

Skin adnexal tumors are relatively rare entity. In the present study, total 90 cases have been included. Out of 90 cases, 42 cases (47%) are seen in males and 48 cases (53%) seen in females. The study conducted by yakoob *et al*.[4] also shows similar findings of gender distribution.

In the present study, a new concept of histomorphological pattern is included, which is rarely studied. The histomorphological pattern is classified into solid, solid and cystic and predominant cystic pattern.

Solid pattern constitutes 78% of adnexal tumors. It is predominantly seen in eccrine gland tumors like Eccrine spiradenoma, Eccrine hidradenoma. Cystic pattern is seen in 5% of adnexal tumors. It is seen in pilar tumors like pilomatrixoma, trichoepithelioma. Solid and cystic pattern is seen in 17% of adnexal tumors. It is seen in both eccrine, apocrine and pilar tumors.

Depending on cellular morphology, three types of basic cells are identified: basaloid, squamoid and clear cells. Predominantly basaloid cells are seen in eccrine tumors like syringoma, spiradenoma, poroma, trichoepithelioma, pilomatrixoma. Predominantly clear cells are seen in eccrine adenocarcinoma, eccrine clear cell hidradenoma. Combined basaloid and clear cells are seen in eccrine adenocarcinoma, Combined clear and squamoid cells are seen in eccrine clear cell hidradenoma, malignant trichilemmal tumor. Clear cells are predominantly seen in microcystic adnexal carcinoma. The study conducted by Alsaad *et al.* shows the similar way of approach in the diagnosis of skin adnexal tumors depending of histomorphological pattern. Clear cells, basaloid cells, squamoud cells and its combination has been used for diagnosis. Even solid and cystic pattern is also used for assessment. The findings are aptly correlates with our study.[5]

The study conducted by Alhumidi shows the approach to adnexal tumors with or without connection to epidermis. In cases, where there is no connection to epidermis, the approach will be the same as we have done in our study on cellular morphology. Similar approach of types of cells like basaloid, clear cells are taken in to consideration. Few cells with eosinophilic cytoplasm also considered which is not included.[6]

The study conducted by Stanoszek LM *et al.* shows the study of differential diagnosis of basal cell carcinoma. Here they studied in detail about the basaloid cells arrangement with minor difference. Basaloid cells are seen in basal cell carcinoma, trichopeithelioma, trichoblastoma, sebaceous carcinoma. These differential diagnoses are matching with our study also.[7]

The study conducted by Kaur *et al.* shows histomorphological study of adnexal tumors in relation to cell morphology and pattern of arrangement. The gender wise distribution of adnexal tumors shows similar results as seen in present study.[8]

The study conducted by pujani *et al.* shows approach to various adnexal tumor depending on the morphology as done in the present study. It classified the adnexal tumors based of origin of tissue. The gender distribution of cases is similar to our study. The median age of presentation is *39 years*. Head and neck is the most common site of adnexal tumors as seen in our study.[9]

According to the study conducted by Vijayan P, approach for the adnexal tumors done as done in the present study. The criteria for diagnosis are location of tumor, solid, solid-cystic, cystic, two cell population etc. More common site is head and neck only as seen in our study. Incidence is more common in female than male. Eccrine tumors are more common adnexal tumors as seen our study.[10]

The study conducted Srinivas kumar *et al.* shows a *ten year old* study of adnexal tumor. Total 136 cases have been studied, according to its tissue of origin *e.g.*, pilar, sweat gland and sabeceous gland. Most of the tumors are benign (98%) with similar findings as seen in the present study. Adnxal tumors are most commonly arising from sweat gland. Most common site is head and neck region as seen in various study as well as in our study.[11]

Sai Prasad *et al.* had done the research study related to histopathological evaluation of adnexal tumors. Cases are seen more in female than male patient as seen in the present study. Gross appearance like solid, solid-cystic is used to classify adnexal tumors as used in the present study.[12]

According to the study conducted by Kaur *et al.*, pilar tumors are more common adnexal tumors with predominant benign in nature. The approach for adnexal tumors depends on architectural features as done in the present study.[13] Thus, combining histomorphological pattern and cellular morphology, the approach for the diagnosis of adnexal tumors is easy and reliable.

## Conclusion

Skin adnexal tumors are rare tumors with frequent overlap of histopathological findings. Hence, combining the histomorphological pattern and cellular morphology helps pathologist to diagnose with ease.

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***Conflict of Interest:*** Nil

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