Original Article

Histopathology of Common Cutaneous Adnexal Neoplasms with Special Reference to The Line of Differentiation – 3 Year Institutional Study in Northeast India

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Abstract

Background: Cutaneous adnexal neoplasms comprise a wide spectrum of benign and malignant tumors that exhibit morphological differentiation towards one or more types of adnexal structures found in normal skin. Most adnexal neoplasms are relatively uncommonly encountered in routine practice, and only a limited number of frequently encountered tumors can be identified. Syndromic associations may be seen in some of the tumors. The aim of this study is to evaluate the prevalence and histopathological features of different skin adnexal neoplasms according to line of differentiation. **Material and Methods:** It is a 3-year prospective cross-sectional study done in a tertiary care center of north east India. All total 110 cases were studied. Patients of all age groups and both sexes who have given consent are included and inadequately preserved specimens, Improper clinical record (History and examination) patients who do not give consent were excluded from the study. **Results:** Skin adnexal tumours were identified in 110 patients, with follicular differentiation accounting for 37.33% of the tumours, sweat gland differentiation for 33.11%, and sebaceous differentiation for 29.56%. The ratio of males to females was 1.03:1, with ages ranging from 5 to 85. Only 15.5% of the tumours were malignant; the majority, 84.4%, were benign. The most common benign tumour was pilomatricoma (22/110, or 20%), while the most common malignant tumour was sebaceous carcinoma (17/110, or 15.45%). **Conclusion:** Skin adnexal tumors are rare, accurate diagnosis through specialized pathology is crucial due to potential malignancy and syndrome links.

Keywords: Skin adnexal tumors, Histopathology, Benign, Malignant.

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Introduction

Cuteneous adnexal tumors (CATs) are a heterogeneous group of benign and malignant neoplasms originating from pilosebaceous units, sweat glands (eccrine and apocrine), and sebaceous glands.[1] Although uncommon, these tumors present diagnostic challenges due to their varied clinical and histopathological features. They arise from multipotential undifferentiated stem cell present within the epidermis or its appendages.[2,3] CATs are classified based on their histological resemblance to normal skin appendages such as Follicular tumors: Trichoepithelioma, Trichoblastoma, Pilomatricoma, Trichilemmoma, Sebaceous tumors: Sebaceous adenoma, Sebaceoma, Sebaceous carcinoma, Eccrine tumors: Eccrine poroma, Syringoma, Hidradenoma, Spiradenoma, Apocrine tumors: Apocrine hidrocystoma, Apocrine adenoma, Apocrine carcinoma.[1,2]

Clinically most CATs occur on the head, neck, and trunk. Benign tumours are usually slow-growing and asymptomatic. Malignant tumours may present with rapid growth, ulceration, or regional lymphadenopathy.[3]

Syndromic associations may be seen in some of the tumors - Multiple trichoepitheliomas (Brooke-Spiegler syndrome), sebaceous neoplasms (Muir-Torre syndrome).[1] Accurate diagnosis of CAT is essential for effective management and, in some cases, identification of syndromic associations. Recognition and classification are important for therapeutic and prognostic considerations.[4,5]

This study aims to provide a histopathological diagnosis and prevalence of various skin adnexal neoplasms with respect to age sex and location.

Materials and Methods

The present study was a prospective cross-sectional study conducted over a period of 3 years from April 2022 to March 2025 in a tertiary care center of north east India. This study includes 110 patients that were histopathologically determined to be CATs. Patients of all age groups and both sexes who have given consent are included and inadequately preserved

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specimens, improper clinical record (History and examination) patients who do not give consent were excluded from the study. Formalin-fixed, paraffin-embedded tissue slices stained with haematoxylin and eosin were subjected to histopathological examination. Follicle, sebaceous, eccrine, and apocrine tumours were the classifications given to the tumours based on their primary pattern of differentiation. Statistical analysis was done using Ms Exel sheet and data were expressed using various tables and charts. P value <0.05 was taken as significant.

Results

A total of 110 cases—56 males and 54 females, with a male to female ratio of 1.03:1—were identified as CATs. The age range was 5 to 85 years old. The majority of malignant tumours primarily affected people over 50. However, in the 20–40 age range, malignant tumours of eccrine origin were documented.

Table 1: Distribution of CAT according to clinicopathological parameters

Age group	No. of cases(n=110)	Percentage
0-19	14	12.73%
20-39	45	40.91%
40-59	29	26.36%
>60	22	20%
Gender distribution	56	50.91%
Male Female	54	49.09%
Distribution of CAT according to site	72	65%
Head & Neck Extremities	27	25%
Trunk	11	10%
Distribution of CAT according to nature of lesion	92	84.41%
Benign Malignant	18	15.59%
Distribution of CAT according to differentiation	43	37.33%
Follicular Sweat gland	37	33.11%
(Eccrine &Apocrine) Sebaceous	30	29.56%

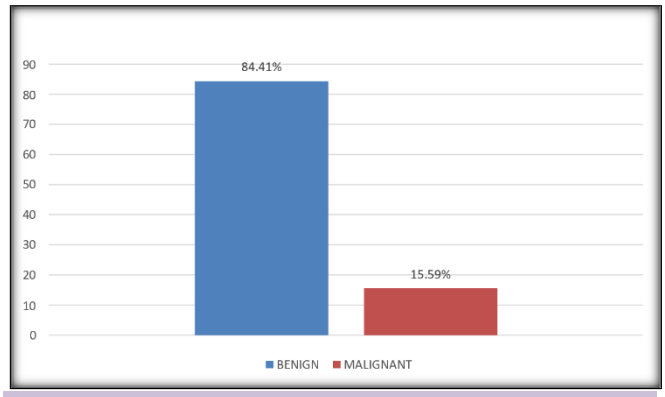

Figure 1: Distribution of CAT according to Nature of lesion

Table and Figure depicts that in this study, with 37.33% of instances, follicular differentiation tumours made up the largest group followed by tumors with sweat gland differentiation and sebaceous gland tumors.

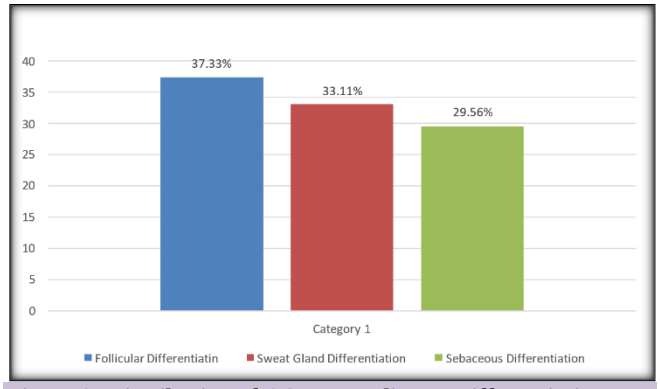

Figure 2: Distribution of CAT according to Differentiation

Table 2: Frequency distribution of Benign adnexal skin tumors based on differentiation

Tumor type		No. of cases	Percentage
Follicular differentiation	Trichoepithelioma	10	9%
	Pilomatricoma	22	20%
	Proliferating trichilemmal cyst	2	1.81%
	Trichofolliculoma	5	4.54%
	Keratoacanthoma	2	1.81%
Sebaceous differentiation	Nevus sebaceous	11	10%
	Sebaceous adenoma	2	1.81%
Apocrine differentiation	Syringocystadenoma papilliferum	2	1.81%
	Cylindroma	3	2.72%
Eccrine differentiation	Syringoma	9	8.18%
	Eccrine poroma	2	1.81%
	Eccrine spiroadenoma	4	3.63%
	Nodular hideradenoma	10	9.09%
	Chondroid syringoma	1	0.90%

Table 3: Distribution of Malignant cases based on tumor type

Tumor type		No of cases	Percentage
Follicular differentiation	Pilomatrix carcinoma	2	1.81%
Sebaceous differentiation	Sebaceous carcinoma	17	15.45%
Apocrine differentiation	Adenocarcinoma	1	0.90%
Eccrine differentiation	Adenoid cystic carcinoma	3	2.72%
	Porocarcinoma	2	1.81%

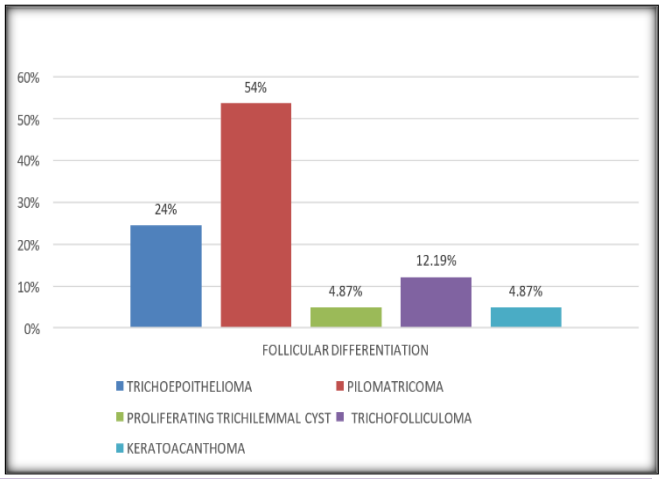

Figure 3: Follicular differentiation

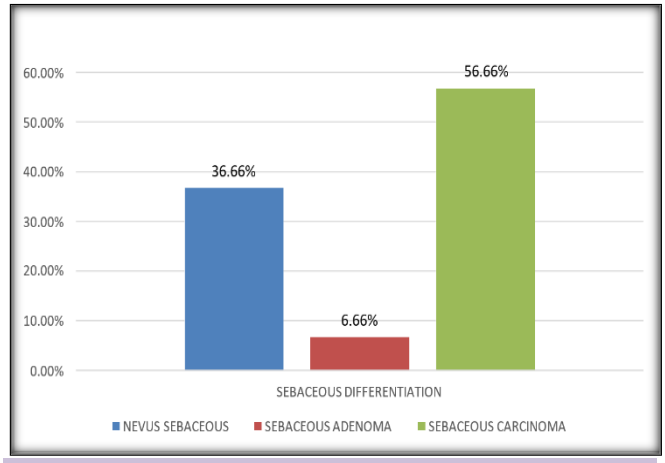

Figure 4: Sebaceous Differentiation

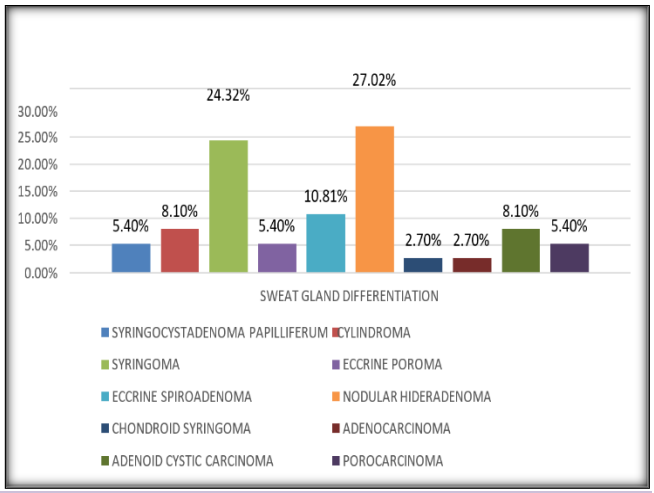

Figure 5: Eccrine and Apocrine (Sweat Gland) Differentiation

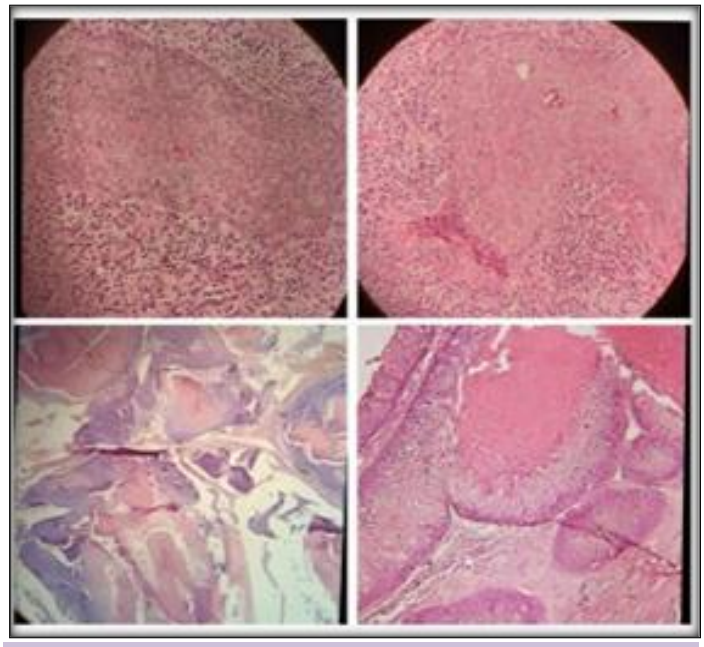

Figure 6: A,B Trichoepithelioma (10X40, H&E), C-Pilomatricoma (10X10, H&E). D-Proliferating Trichilemmal cyst (10X40,H&E)

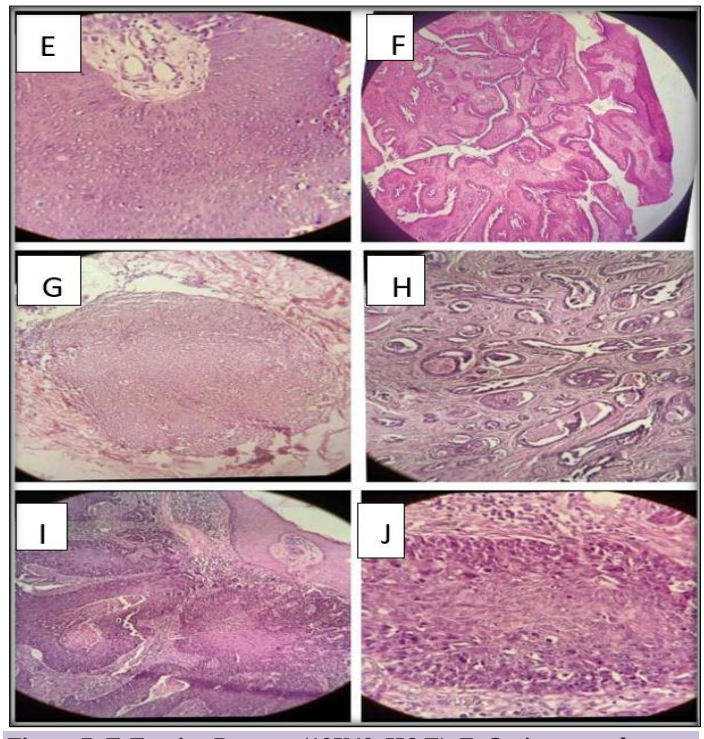

Figure 7: E-Eccrine Poroma (10X40, H&E). F- Syring cystadenoma Papilliferum (SCAP) (10X10, H&E). G- Nodular Hydradenoma (10X40,H&E). H- Eccrine Tubular adenoma (10X10, H&E). I,J-Sebaceous Carcinoma (I-10X10,J-10X40, H&E)

Discussion

Cutaneous adnexal tumors (CAT) are histologically challenging tumors to diagnose. Apart from their malignant counterparts, benign lesions need to be differentiated from squamous cell carcinoma and basal cell carcinoma. Adnexal tumors originate from multipotent undifferentiated stem cells.[3] The current study found that the histological prevalence of adnexal tumours among the 9,200 pathology records examined over a three-year period was 1.2% (110 instances). Over a 4-year period, the study by K Kamyab Hesari et al.6 found a 3.3% prevalence rate. Nevertheless, a lower prevalence has been seen in other investigations. One study by Kaur K et al. found that the prevalence rate was 0.3%, whilst another study in Nigeria found that the prevalence rate was 0.9%. Prevalence of cutaneous adnexal neoplasm is more in our study because ours being a tertiary care centre and more patients are reffered here for better treatment which has increased the rate of excision biopsies.

In the present study, it was observed that majority of patients belong to the age group of 41-50 years with a mean aged group of 44.72 years which is similar to the study done by El Ochi8 et al in 2015 with the most common age group in the study being 31-40 years.

In our study, head and neck was the most common site involved 65% (72/110). This is comparable to the study done by Sharma et al in 2014,[9] Rajlakhmi et al in 2013,[10] Saha et al in 2010.[11] The eccrine and pilosebaceous glands are widely dispersed across the head and neck area, creating a hebetic environment that promotes the development of the greatest number of skin adnexal lesions.

In histopathological evaluation follicular tumours accounted for 37.33% of all cases, followed by sweat gland-differentiated tumours (33.11%) and sebaceous tumours (29.56%). Kamalpreet et al.'s 2017,[1] study and El Ochi8 et al.'s 2015 study both made similar findings. In 2014, Nair,[12] and Sharma et al,[9] discovered that sweat gland tumours were the most prevalent, followed by follicular and sebaceous tumours.

In the present study 92/110 (84.41%) were of benign origin whereas only 18/110 (15.59%) were malignant tumors. It is in concordance with the study done by Sharma et al,[9] with 80% beningn tumors and also with study done by Kamalpreet1 et al with 82.72% benign tumors. Since Pluripotent stem cells without differentiation are the primary source of skin adnexal tumours, they are more likely to function in a benign manner. The benign nature of the lesion is ascertained by the fact that they present as asymptomatic nodules and have a long history & duration of symptoms.[13] The milieu of the epidermis and dermis, local vascularity, and genetics all affect tumours, both benign and malignant.[12,14] Because incomplete excision increases the risk of recurrence and malignancy, benign tumours should be fully removed with wider excisional margins.[15] Although they are uncommon, malignant cutaneous adnexal tumours have a poor prognosis and are more likely to progress to lymphatic and haematogenous metastases. In our analysis, pilomatricoma accounted for 20% of all tumours. Other investigations reported similar findings, although some noted that syringoma and nodular hidradenoma were the most prevalent tumours. Most common malignant tumor was sebaceous carcinoma (15.45%).

Majority of the skin adnexal tumors are benign in nature, hence wide excision performed by clinicians is therapeutic in nature. The clinical outcome for most of the cuteneous adnexal neoplasms are favorable, since excision biopsy in curative. However, the early detection of the fact that these cuteneous adnexal neoplasms might occasionally show symptoms of specific syndromes linked to internal cancers makes them significant as well.[15]

Table 4: Comparision of Findings of various studies with present study

Studies	Samail a et al,[7]	Radhika et al,[16]	Saha et al,[11]	Sharma et al,[9]	Rajlaksm i et al,[10]	El Ochi et al,[8]	Nair et al,[12]	Kanwal Preet et al,[1]	Present study
Study period	January 1991 to December 2006	January 1993 to December 2003	June 2007 to May 2008	June 2004 to June 2010	2009-2013	January 2009 to December 2014	3 years	January 2013 to December 2015	April 2022 to March 2025
Total cases	52	35	23	56	21	96	33	100	110
Most common age group affected	33 years	20-30 years	29.19 +11.6 8	51-60	30-40	31-40	11-20	20-39	39-40
Male to female ratio	1:1	0.7:1	1:1.9	1.07:1	1.1:1	1.7:1	1:2.3	1.03:1	1.7:1
Most common site	Head and neck	Head and neck	-	Head and neck	Head and neck	Head and neck	Hea d and neck	Head and neck	Head and neck
Benign tumors	88.5	77.14	100	80.36	90.48	97.7	100	82.72	
Malignant tumors	11.5	29.63	-	19.64	9.52	2.3	-	17.28	
Most common benign tumor	Eccrine acrospi roma	Nodular hiderade noma	syring oma	Clear cell hidraad enoma; pilomat ricoma	pilomatri coma	pilomatrico ma	syrin gom a	pilomat ricoma	pilomatrico ma
Most common	Sweat gland	Sweat gland carcinom a	-	Sebace ous	Aggressive digital papillary	Porocarcinoma; Eccrine sweat	-	Sebaceous carcinoma	Sebaceous carcinoma

malignant tumor	carcino ma			carcino ma	adenocarcinoma; malignant dermal eccrine cylindroma (one case each)	carcinoma (one case each)			

Conclusion

The majority of epidermal appendage tumours are benign, and malignant tumours are uncommon. Due to their vague presentation, clinical diagnosis is challenging in the majority of instances. The gold standard for diagnosis is histopathology. This can aid in therapeutic intervention and raise the diagnostic rate.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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