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Histopathological analysis of skin adnexal tumors at tertiary care hospital

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Abstract
Background: Skin adnexal tumors encompass very broad variety of rare dermatopathologic entities. Adnexal Tumors are a group of skin tumors which are mostly benign in nature. Skin adnexal tumors principally arise from undifferentiated pluripotent stem cells present in the epidermis or appendageal structures that finally differentiate to specific tumors. They are classified into tumors with differentiation towards eccrine or apocrine sweat glands, hair follicle and sebaceous glands.
Materials and Methods: The present study includes cases from January 2015 to June 2024 over period of 9.5 years. Total 72 cases of Skin adnexal tumors were included in this study. Histopathological examination was done on Haematoxylin and eosin sections of paraffin embedded & formalin fixed tissue.
Results: Benign skin adnexal tumors constituted majority of tumors with 71 out of 72 (98.6%) while only one case of malignant skin adnexal tumor was encountered. The sweat gland tumors present for largest numbers of cases with 47/72 (65.3%) followed by hair follicle tumors 22/72 (30.6%) and sebaceous gland 3/72 (4.1%).
Conclusion: Skin adnexal tumors are rare neoplasms with benign being far more common than malignant. Skin adnexal tumors often misdiagnosed clinically, so histopathological examination is the gold standard for establishing accurate diagnosis and better patient management.

Keywords: Skin adnexal tumors, benign, sweat gland

Introduction

Skin adnexal tumors encompass a very broad variety of rare dermatopathologic entities. Based on histogenetic origin they are classified into tumors with differentiation towards eccrine or apocrine sweat glands, hair follicle and sebaceous glands [6]. Adnexal tumors arising from the skin are usually missed clinically and often confirmed by histopathology, Immunohistochemistry may further help in confirmation of the diagnosis [1].

Skin adnexal tumors principally arise from undifferentiated pluripotent stem cells present in the epidermis or appendageal structures that finally differentiate to specific tumors [6]. This neoplastic transformation is a multifactorial process which is related to genetic background, activation of particular molecular pathways, epithelial-mesenchymal interplays and local tissue microenvironment. That is why Skin adnexal tumors may sometimes display more than one line of appendageal differentiation, making precise classification of these neoplasms difficult [6].

Adnexal Tumors are group of skin tumors which are mostly benign in nature. These tumors are usually found as solitary or sporadic lesions [4]. Some appendageal tumors have got importance because they behave as marker for internal visceral malignancies such as trichelemmomas in Cowden's disease and sebaceous tumors in Muir-Torre syndrome [5].

Most of the skin adnexal tumors are benign and remain localized to the site. A malignant counterpart of almost every adnexal tumor has been seen. These tumours are rare, locally aggressive, have the potential for nodal involvement, distant metastasis and hence have a poor clinical outcome [4]. Therefore, establishing the diagnosis of malignancy in skin tumors is important for therapeutic and prognostic purposes [5].

In this histopathological analysis we determine the histopathological type, frequency, nature (benign or malignant) and distribution (age and sex of patient) of skin adnexal tumors.

This study was undertaken to analyze clinical and histopathological features of skin adnexal tumors at tertiary care hospital over period of 9.5 years (Jan 2015 - June 2024).

Aims and objectives

- To study histopathology of Skin adnexal tumors.
- To assess various Skin adnexal tumors with respect to their types, frequency, nature and distribution in age and sex of patient.

Inclusion criteria

All skin biopsy specimens that turned out to be Skin adnexal tumors are included in this study.

Exclusion criteria

Autolysed specimen and inadequate skin biopsies were excluded from the study.

Material and Methods

The present study includes cases from January 2015 to June 2024 over period of 9.5 years. Total 72 cases were included in this study, which were reported by histopathology section of department of pathology at B.J. Medical college, Ahmedabad. The clinicopathological data of cases was retrieved from LIS (laboratory information system) for the given period. The histopathological examination was done on formalin fixed tissues and paraffin embedded blocks were made. Thin sections of tissue prepared using rotary microtome. Haematoxylin and eosin stained sections were examined under microscope. Few special stains like reticulin and PAS (Periodic acid-schiff) were performed wherever required.

Results

Present study which span over period of 9.5 years, total 72 skin adnexal tumors were analysed. Benign skin adnexal tumors constituted majority of tumors with 71 out of 72 (98.6%) while only one case of malignant skin adnexal tumor was encountered. The sweat gland tumors accounts for largest numbers of cases with 47/72 (65.3%) followed by hair follicle tumors 22/72 (30.6%) and sebaceous gland 3/72 (4.1%).

Skin adnexal tumors seen slightly higher in males 39/72(54.2%) compared to females 33/72(45.8%). Age of patients with skin adnexal tumors ranges from 11 to 66 years. Highest numbers of skin adnexal tumors seen in age group of 20-40 years with 27/72 (37.5%).

Highest number of skin adnexal tumors seen in Head & neck region with 31/72 (43.1%) followed by Trunk 22/72 (30.5%) and Extremities 19/72 (26.4%). Most common skin adnexal tumor is Nodular Hidradenoma with 12/72 (16.7%) followed by Pilometricoma 10/72 (13.9%). Only one malignant tumor of sweat gland which is Malignant eccrine poroma seen in present study.

Various clinicopathological characteristics of cases like age, sex, location, differentiation and nature of skin adnexal tumors given in Table 1. Morphological types and Frequency of distribution of skin adnexal tumors given in Table 2.

Discussion

Adnexal tumors are thought to have a genetic basis. Mendelian inheritance and P53 mutations are important contributing factors. Cell of origin is supposed to be from either primary epithelial germ cells or pluripotent cells. Primary epithelial germ cells may give rise to either hyperplasia or neoplasia [1].

The skin adnexal tumors poses great diagnostic difficulties due to variety of reasons like many types of tumors with their variants, occurrence of multiple lines of differentiation in single tumor and complicated nomenclature. Skin adnexal tumor cells originate from multipotent undifferentiated cells stem cells rather than mature cells which have capability to differentiate along multiple pathways [2].

The diagnosis of adnexal tumors is usually not suspected clinically. The usual presentation being flesh coloured nodules, papules and disfiguring lesions such as ulcers which are mistaken for keratinous cysts. Histopathology remains the gold standard for the diagnosis of adnexal tumors as the clinical presentation is vague. Special stains such as periodic acid schiff, reticulin, mucicarmine and alcian blue may help in arriving at definitive diagnosis. (4)

It is also important to note that malignant skin adnexal tumors, often histologically mimic cutaneous metastasis and vice versa. Morphologic distinction between primary skin adnexal tumors and metastatic malignancy can be difficult but it has a key impact on further diagnostic and therapeutic management of the patient. Immunohistochemistry and thorough clinico-pathological correlation help to differentiate primary skin adnexal tumors from metastasis. (6)

Most common tumor in present study is Nodular hidradenoma (Sweat gland skin adnexal tumor) also known as Eccrine acrospiroma, arises from distal excretory duct. It forms nodules with occasional cystic foci high in dermis. Cells have abundant clear cytoplasm hence also known as Clear cell hidradenoma. Immunohistochemically there is reactivity of keratin, S-100 protein and vimentin. Microscopic picture of Nodular hidradenoma shown in Figure 1 [7].

Chondroid syringoma (Sweat gland skin adnexal tumor) also known as Mixed tumor of skin are nodular and nonulcerated tumors that occur predominantly on face, head and neck but also on extremities and trunk. Microscopically, these tumors formed by clusters of small ducts lined by epithelium which is two cells thick. Cells have abundant hyaline cytoplasm. Sometimes eosinophilic globules with radiating fibrillary structures are seen within and around the lumina. Histologically and ultrastructurally their appearance is comparable to that of mixed tumors of salivary gland origin. Microscopic picture of Chondroid syringoma shown in Figure 2 [7].

Eccrine spiradenoma (Sweat gland skin adnexal tumor) is sharply delimited. It can occur almost anywhere in body and can be extremely painful. It originate from lower portion of Eccrine duct and microscopically highly cellular with basaloid appearance. There is also heavy infiltration by lymphocytes is present between tumor cells. Microscopic picture of Eccrine spiradenoma shown in Figure 3 [7].

Second most common tumor in present study is Pilomatricoma or Pilomatrixoma (Hair follicle skin adnexal tumor) formerly known as calcified “epithelioma of Malherbe”. It is nodular, benign tumor arising from hair matrix. It predominantly occurs in children and young adults and most cases are located on head, neck and upper extremities. Microscopically, it shows solid nests of small basaloid cells which undergo abrupt keratinization, leading to formation of “ghost” and “shadow” cells. Microscopic picture of Pilomatricoma shown in Figure 4 [7].

In Table 3 comparative analysis of different differentiation of skin adnexal tumors in present study with various other study given. As shown in table 3 In present study most common differentiation in skin adnexal tumors is sweat gland differentiation. This finding is consistent with other studies like Radhika *et al*., Pujani *et al*., and Sharma *et al*., While in Bartos V *et al*., study has most common differentiation is hair follicle differentiation followed by sweat gland differentiation.

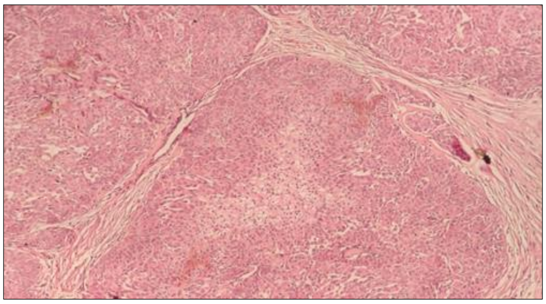

Fig 1: *Nodular hidradenoma* showing nodule with cells with clear and abundant cytoplasm

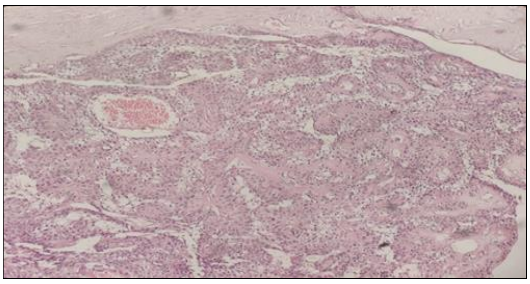

Fig 2: *Chondroid syringoma* showing clusters of small ducts lined by epithelium two cells thick. Cells have abundant hyaline cytoplasm

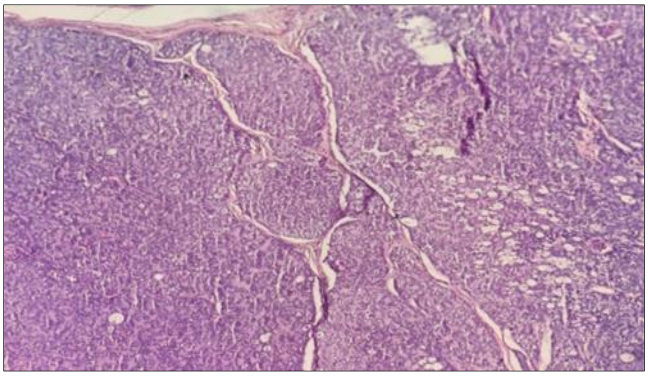

Fig 3: *Eccrine spiradenoma* showing highly cellular with basaloid appearance with some cells showing clearing of cytoplasm

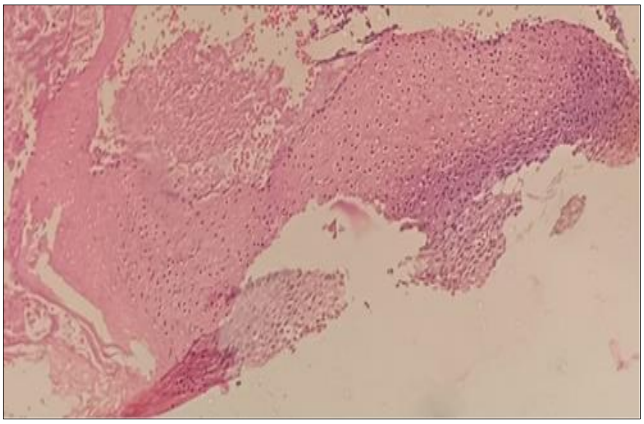

Fig 4: Pilomatricoma showing solid nests of small basaloid cells which undergo abrupt keratinization, leading to formation of "ghost" and "shadow" cells

Table 1: Clinicopathological characteristics of cases

Characteristics	Total 72
Age(years)	
0-20	13 (18.1%)
20-40	27 (37.5%)
40-60	25 (34.7%)
>60	7 (9.7%)
Sex	
Male	39 (54.2%)
Female	33 (45.8%)
Location:	
Head & Neck	31 (43.1%)
Trunk	22 (30.5%)
Extremities	19 (26.4%)
Differentiation	
Sweat gland	47 (65.3%)
Hair follicle	22 (30.6%)
Sebaceous gland	3 (4.1%)
Nature	
Benign	71 (98.6%)
Malignant	1 (1.4%)

Table 2: Morphological types of Skin adnexal tumors

Differentiation	Tumor	Total 72
Sweat gland	Nodular Hidradenoma	12 (16.7%)
	Chondroid Syringoma	8 (11.1%)
	Eccrine Spiroadenoma	7 (9.7%)
	Eccrine Poroma	6 (8.3%)
	Hidradenoma papilliferum	4 (5.6%)
	Syringocystadenoma Papilliferum	3 (4.2%)
	Apocrine Cystadenoma	2 (2.8%)
	Eccrine Dermal Cylindroma	2 (2.8%)
	Papillary Eccrine adenoma	1 (1.4%)
	Eccrine Hydrocystoma	1 (1.4%)
	Malignant Eccrine Poroma	1 (1.4%)
Hair follicle	Pilometricoma	10 (13.9%)
	Trichoepithelioma / Trichoblastoma	6 (8.3%)
	Fibrofolliculoma	4 (5.6%)
	Trichofolliculoma	2 (2.8%)
Sebaceous gland	Sebaceous adenoma	3 (4.2%)

Table 3: Comparative analysis of differentiation in skin adnexal tumors in various studies

Study	Year	Total Cases	Sweat gland differentiation	Hair follicle differentiation	Sebaceous gland differentiation
Radhika et al [1]	2013	35	17 (48.6%)	11 (31.4%)	7 (20%)
Pujani et al [2]	2016	25	14 (56%)	7 (28%)	4 (16%)
Sharma et al [3]	2014	56	24 (42.9%)	20 (35.7%)	12 (21.4%)
Bartos V et al [6]	2021	38	15 (39.5%)	22 (57.9%)	1 (2.6%)
Present study	2024	72	47 (65.3%)	22 (30.6%)	3 (4.1%)

Conclusion

Skin adnexal tumors are have very low incidence in Indian population. They are rare neoplasms with benign being far more common than malignant. Skin adnexal tumors occurs more commonly in Head & neck region with sweat gland differentiation being most common. Skin adnexal tumors often misdiagnosed clinically, so histopathological examination is the gold standard for establishing accurate diagnosis and better patient management.

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Conflicts of Interests: The authors declare that they have no conflict of interest.

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