# HISTOMORPHOLOGICAL PATTERNS OF SKIN ADNEXAL TUMORS

By

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In partial fulfillment of the requirements for the award of the degree of

**DOCTOR OF MEDICINE**

**IN**

**PATHOLOGY**

Under the Guidance of

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A line from Sanskrit Shlokha Says “Gurur Brahma Gurur Vishnu Gurudevo Maheshwaraha, Guru Ssakshaat Parabrahma Tasmay Shri Gurave Namaha” - meaning a teacher is next to god and without him knowledge is always incomplete

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# ABSTRACT

**BACKGROUND:**

Skin adnexal tumours are classified according to their state of appendegeal differentiation; Eccrine, apocrine, follicular and sebaceous. Most are benign. A malignant counterpart are not frequently encountered in practice. The diagnosis of these mixed Skin adnexial tumors relies on histological evaluation and they are usually classified according to the predominant morphological component.

**OBJECTIVES:**

To study the histomorphological patterns of skin adnexal tumors with clinicopathological correlation

**METHODS :**

This is a 10 year descriptive study of all patients who were diagnosed to have skin appendageal tumors in our department, and the diagnoses were confirmed by histopathology. The tumors were classified as eccrine, hair, sebaceous, and apocrine after a detailed examination of routine hematoxylin and eosin sections. Immunohistochemistry was been used in doubtfull cases.

**RESULTS :**

The total number of cases in the study was 53 out of which 51% males and 49% females. Tumors with eccrine differentiation constituted the maximum 49.05% followed by tumors with hair follicle differentiation 28.20%, tumors with sebaceous differentiation 13.16% & apocrine 7.52%. Among eccrine, syringoma constituted the maximum with 30.76%, eccrine clear cell hidradenoma11.53%,eccrine sipradenoma

11.53%,nodular hidradenoma 7.69%, eccrine poroma7.69%, eccrine acrospiroma 7.69%, Benign eccrine gland tumor3.84%, eccrine adenocarcinoma3.84%, mucinous eccrine carcinoma 3.84%, syringoid eccrine carcinoma 3.84%, microcystic adnexal carcinoma 3.84%;among hair follicle tumors pilomatricoma was the commonest cases 47%, trichoepithelioma tumors were 40%, Malignant trichilemmal tumors 13%. Among sebaceous tumors 28.57% were sebaceous adenoma, 28.57% were sebaceoma, 28.57% sebaceous carcinoma and 14.29% of steatocystoma multiplex. Among apocrine tumors 50% syringocystadenoma papilliferum, 25% hidradenoma papilliferum, and 25% cylindroma. Others were mixed adnexal tumor constituting 2.20%.

**CONCLUSION:**

These predominant histomorphological pattern may help in the diagnosis of SAT whenever there is overlapping of cellular morphology.

**KEY WORDS:** Skin adnexal tumor, eccrine, apocrine, pilar, sebaceous.

## LIST OF ABBREVATIONS USED

| | | |
|---|---|---|
| SAT | - | Skin adnexal tumors |
| BCC | - | Basal cell carcinoma |
| TE | - | Trichoepithelioma |
| SCAP | - | Syringocystadenoma papilliferum |
| IHC | - | Immunohistochemistry |
| CEA | - | Carcinoembryogenic antigen |
| EMA | - | Epithelial membrane antigen |
| LMWK | - | Low molecular weight cytokeratin |
| HMWK | - | High molecular weight cytokeratin |
| SMA | - | Smooth muscle actin |
| PAS | - | Periodic acid Schiff |
| WHO | - | World health organization |
| H & E | - | Haematoxylin and eosin |
| Fig | - | Figure |

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# INTRODUCTION

Neoplasms of skin appendages are rare lesions and since they are so infrequently encountered in practice, they may cause difficulty in diagnosis. Skin adnexal tumors (SAT) tumors can differentiate in the direction of any of the four types of skin appendages i.e. eccrine sweat glands, apocrine sweat glands, sebaceous glands and hair follicles.[1] Although most of these tumors are benign, it is important to diagnose them accurately since;

- Many of such tumors are genetically predetermined and may arise in the form of multiple potentially disfiguring lesions, or
- May represent sites of predilection for later development of more aggressive tumors or
- May themselves be locally aggressive or capable of metastases and may be misdiagnosed as metastatic tumors to the skin.[1]

Apart from their rarity, difficulties in diagnosis also result due to their large variety, their frequent differentiation along two[2] or more adnexal lines simultaneously[3] and their complicated nomenclature.

The diagnosis of these mixed SAT relies on histological evaluation, and they are usually classified according to the predominant morphological component. They may be clinically confused with other cutaneous tumors. Histopathological study is one of the most valuable means of diagnosis in dermatology. Adnexal tumors cannot be diagnosed only on clinical basis and histopathological study is required for the definitive diagnosis[4]. Thus, the present study is an attempt to evaluate various tumors

of skin in our region and to correlate it with clincal findings. This study is being carried out keeping in view of scarcity of data of these SAT in this part of region

# OBJECTIVES

To study the Histomorphological patterns of skin adnexal tumors with clinicopathological correlation

# REVIEW OF LITERATURE

## NORMAL HISTOLOGY OF SKIN APPENGAGES

Skin appendages are derived from the ectoderm & start to develop early during embryological life. During the fourth week of development, a single-cell-thick ectoderm and underlying mesoderm begin to proliferate, and differentiate towards various structures, including skin appendages. These specialised skin structures are located within the dermis, including the deep dermis, and focally within the subcutaneous fatty tissue.[2,3]

They are represented by three histologically distinct structures[4]

1) The pilosebaceous unit
2) The eccrine sweat glands and
3) The apocrine glands

The distribution and arrangement of these appendages vary from one part of the skin to another, but the overall general basic morphogenesis is maintained.

**THE PILOSEBACEOUS UNITS** (hair follicle and sebaceous glands) originate from the primary epithelial germs in the epidermis, a collection of deeply basophilic cells in the basal cell layer of the epidermis, protruding into the dermis and surrounded by an aggregate of mesenchymal cells.[3,4]

The hair follicle is a tubular invagination from the epidermis, responsible for the formation of hair, a highly modified keratinised structure.[2] Highly vascular connective tissue papillae, enclosed by bulbous expansion (the hair bulb), are located in the reticular dermis or in the superficial subcutaneous fatty tissue, and form the

lower portion ofthe hair follicle. The inner, mitotically active cells lining the dermal papillae undergo keratinisation to form the hair shaft and internal root sheath. Each hair shaft consists of an innermost medulla, surrounded by a broad, highly keratinised cortical layer, and an outermost thin layer of overlapping keratin, the cuticle.[3] The outer two epidermal cell layers of hair bulb form the external root sheath, which consists of large, glycogen-rich (clear) cells and is separated from the surrounding dermal connective tissue by a thick glassy membrane composed of homogenised fibrous tissue (Fig.1)[4]

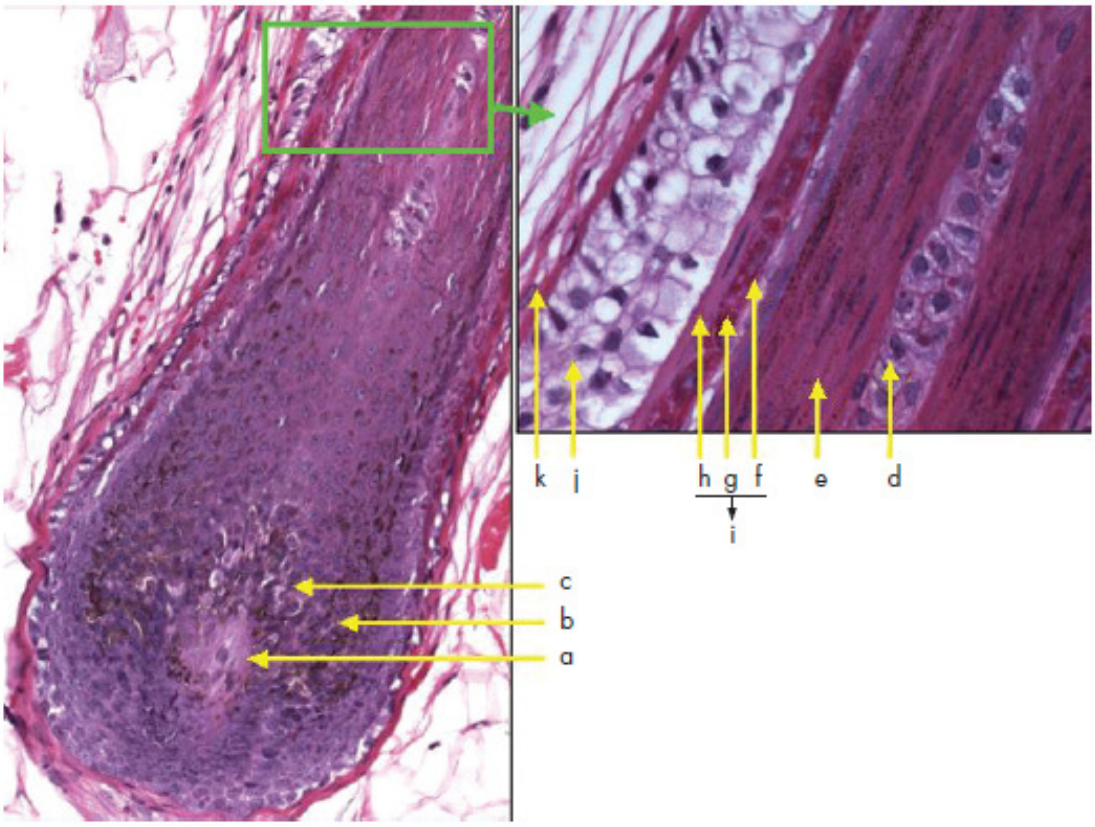



Figure 1 Structure of hair bulb: (a) dermalpapilla, (b) matrix, (c) melanocytes, (d) medulla, (e) cortex of hair, (f) area of haircuticle, (g) Huxley's layer (prominent keratohyalin granules), (h) Henle's layer (onecell layer), (i) inner root sheath composed ofcuticle, Huxley's and Henle's layers, (j) outerroot sheath and (k) glassy basementmembrane.

Developmentally, all sebaceous glands are hair follicle dependent (except those of the labia minora and glans penis), and originate as a budding of sebaceous glands primordium. The sebaceous glands consist of multiple lobules of rounded cells (sebocytes), filled with lipid-containing vacuoles, and rimmed by a single layer of small, dark germinative cells (fig 2).[3] The lobules converge on a short duct, which empties the lipid content of degenerated sebocytes into the hair follicle. Sebaceous glands are immunoreactive to low-molecular weight cytokeratin (LMWK), epithelial membrane antigen (EMA)[5] and, to a lesser extent, to the lymphatic marker D2-40. They arenegative for S100 protein and carcinoembryonic antigen (CEA).[4]

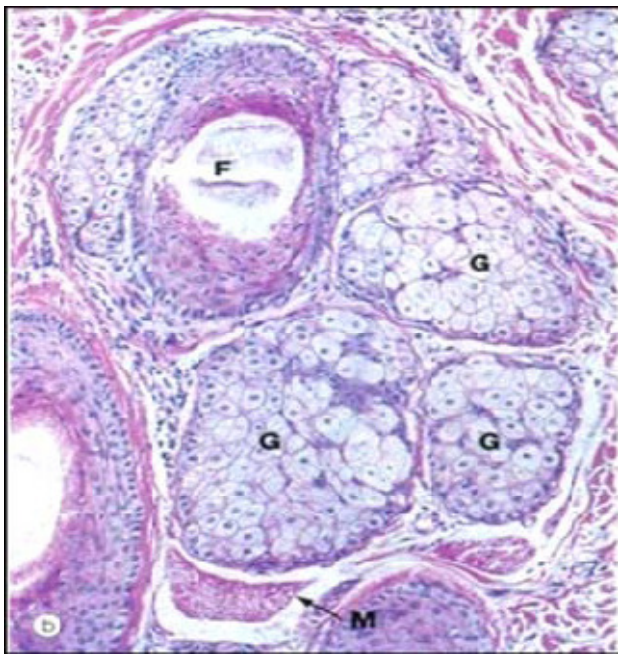



**Fig 2:Sebaceous gland**

**ECCRINE SWEAT GLANDS** originate from epidermal epithelial germs protruding into the dermis similar to those of pilosebaceous units, but contain less mesenchymal condensation. They are distributed almost everywhere in the skin. The sweat secreting coil glands are tubular and consist of two anatomical portions(Fig 3).[2]

1. The secretory coil, located in the deep dermis at the junction with the subcutaneous tissue and composed of clear pyramidal cells, and darkly stained cells (fig 4)[2] that are often difficult to identify on light microscopy. These cells express the immunohistochemical stains LMWK, EMA, CEA and S100 protein (basal layer only)[2,5]. A single outer, discontinuous layer of myoepithelial cells resting on a well-defined basement membrane is present, and can be highlighted by immunohistochemical (IHC) analysis for smooth muscle actin (SMA), p63 and calponin.[4,5]

2. The excretory part is composed of a straight intradermal portion and an intraepidermal spiral portion (acrosyringium), and consists of a double layer of small cuboidal cells with no underlying myoepithelial layer. The cells in this part may stain with high molecular weight keratin (HMWK) and cytokeratin (CK) 14.[2]

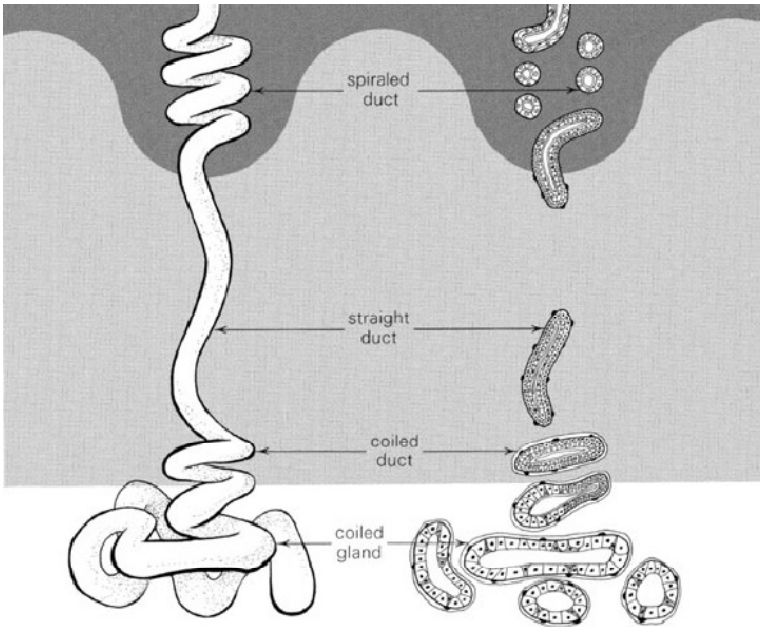



**Fig .3: Eccrine unit**

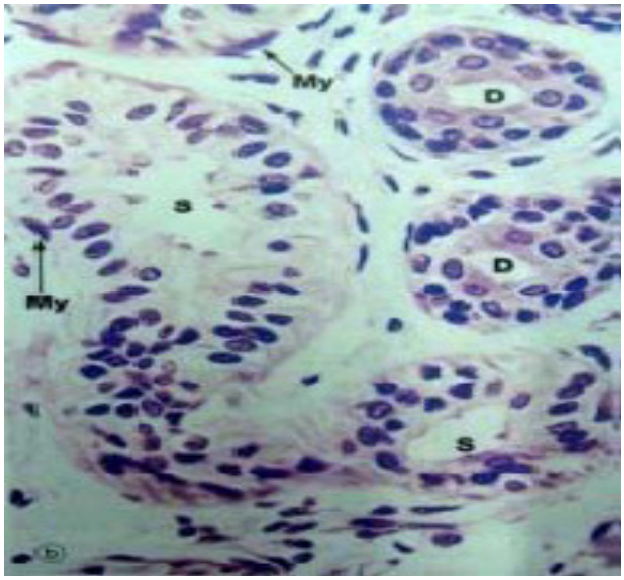



**Fig. 4: Eccrine gland**

**APOCRINE GLANDS** are seen mainly in the axillae, groin, pubicand perineal regions. In contrast with eccrine glands, apocrine glands develop from an upper bulge in hair follicles that are in the early bulbous peg stage. They have a coiled, tubular excretory portion with widely dilated lumen, lined by cuboidal epithelial cells with eosinophilic cytoplasm and apical snouts (representing decapitation secretion), and an outer discontinuous layer of myoepithelial cells, resting on a prominent basement membrane (fig 5).[2] The cytoplasm of apocrine glandular cells might contain iron, which can be illustrated using Prussianblue stain. The luminal cells are characteristically immunoreactant to gross cystic disease fluid protein 15 (GCDFP-15).[5]These glands also express androgen receptors, which may be useful in the assessment of lesions suspected to be apocrine carcinoma. The excretory duct of apocrine glands is histologically similar to that of eccrine glands, and drains into the hair shaft. A third type of sweat gland is ‘‘apoeccrine’’ glands. These glands are mostly found in the axillary region, and within lesions of the nevus sebaceous of Jadassohn (NSJ),[2] they are considered to be the origin of some adnexal lesions, such as syringocystadenoma papilliferum (SCAP),[5] and Fox–Fordyce disease.

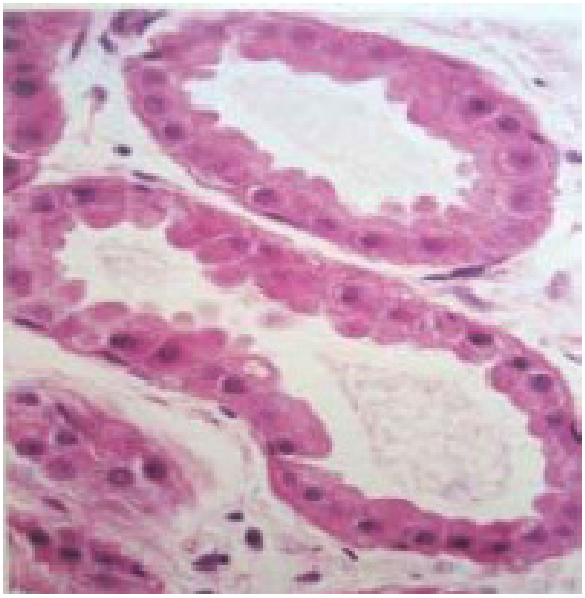


**Fig 5: Apocrine gland**

## CLASSIFICATION OF THE SKIN APPENDAGE TUMOURS

The tumours differentiating in the direction of epidermal appendages can be divided into four groups: Those differentiating toward hair follicles, toward sebaceous glands, toward apocrine glands, and eccrine gland (Table1).[6] The four groups of benign appendage tumours are divided into 3 major subgroups: A group of benign non neoplastic conditions including hyperplasias, hamartomas, and cysts; a secondgroup of benign neoplasms; and a third group of malignant neoplasms (Table 2)[6] and Morphological patterns and useful observations in evaluating skin adnexal tumours (Table 3).[3]

## CLASSIFICATION OF THE BENIGN SKIN ADNEXALLESIONS[6]

| Lesions | Follicular differentiation | Sebaceous differentiation | Apocrine differentiation | Eccrine differentiation |
|---|---|---|---|---|
| Benign neoplasms | Trichofolliculoma<br><br>Pilar sheath Acanthoma<br><br>Fibrofolliculoma<br><br>Tricodiscoma<br><br>Trichoepithelioma<br><br>Trichoadenoma<br><br>Pilomatricoma<br><br>Proliferating trichilemmal cyst<br><br>Trichilemmoma<br><br>Tumor of the follicular infundibulum | Sebaceous Adenoma<br><br>Sebaceoma | Apocrine Hidrocystoma<br><br>Hidradenoma Papilliferum<br><br>Apocrine Syringocystadenoma<br><br>Tubular apocrine Adenoma<br><br>Erosive adenomatosis of nipple<br><br>Apocrine cylindroma | Eccrine Hidrocystoma Syringoma<br><br>Eccrine Cylindroma<br><br>Eccrine poroma<br><br>Mucinous Syringe metaplasia<br><br>Eccrine Spiradenoma<br><br>Nodular Hidradenoma<br><br>Chondroid syringoma |

**Table 1: Classification of the benign skin adnexal tumors**

The four groups of benign appendage tumors with differentiation towards hair, sebaceous glands, apocrine glands and eccrine glands can be divided according to the degree of differentiation observed in them in to three major: a group of benign nonneoplastic conditions including hyperplasias, hamartomas, and cysts; a second group of benign neoplasm; and third group of malignant neoplasms

**Tumors with eccrine and apocrine differentiation**

| Malignant tumours | Benign tumours |
|---|---|
| Tubular carcinoma | Hidrocystoma |
| Microcystic adnexial carcinoma | Syringoma |
| Porocarcinoma | Poroma |
| Spiradenocarcinoma | Syringofibroadenoma |
| Malignant mixed tumour | Hidradenoma |
| Hidradenocarcinoma | Spiradenoma |
| Mucinous carcinoma | Cylindroma |
| Digital papillary carcinoma | Tubular adenoma |
| Adenoid cystic carcinoma | Tubular papillary adenoma |
| Apocrine carcinoma | Syringocystadenoma papilliferum |
| Paget disease of breast | Hydradenoma papilliferum |
| Extramammary paget disease | Mixed tumour( Chondroid syringoma) |

**Tumurs with follicular differentiation**

| Malignant tumours | Benign tumours |
|---|---|
| Pilomatrical carcinoma | Trichoblastoma |
| Proliferating trichilemmal tumour | Pilomatricoma |
| | Tricholemmoma |
| | Multiple tricholemmomas |
| | Trichofolliculoma |
| | Fibrofolliculoma/Trichodiscoma |

**Tumours with sebaceous differentiation**

| | |
|---|---|
| Sebaceous carcinoma<br>Sebaceous adenoma<br>Sebaceoma<br>Cystic sebaceous tumour | |

**Table 2: WHO classification of skin appendage tumours**[6]

In genetically determined appendage tumors, such as multiple cylindromas, multiple trichoepitheliomas, and the nevoid basal cell carcinoma syndrome, it may be assumed that the genes regulating the development of pluripotential cells into cutaneous appendages are abnormal and sooner or later modify the growth of pluripotentialcells into appendage tumors rather than into mature appendages. In some instances, primary epithelial germ cells and pluripotential cells differentiate in more than one direction, as is seen most commonly on the scalp, where a syringocystadenoma may differentiate into all three appendage structures. In many instances, particularly in solitary tumors arising after birth, adnexal tumors of the skin arise from the cells (likely the germ cells) of their corresponding structures. This is likely to be true also of the adnexal tumors that, in addition to occurring as multiple lesions with an autosomal dominant inheritance pattern, also occur as solitary, not inherited, lesions, such as trichoepithelioma and cylindroma.

Table 3; Morphological patterns and useful observations in evaluating skin adnexal tumours.[2,3]

| **Patterns** | **Tumors** |
|---|---|
| Tumours with ductal/glandular elements | Syringoma, poroma and porocarcinoma, Hidradenoma, Microcystic adnexal carcinoma |
| Tumours with small keratin cysts | Desmoplastic trichoepithelioma, Trichoblastoma,Microcystic adnexal carcinoma |
| Solid tumours with prominent basaloid component | Poroma, hidroacanthoma simplex and derma ductal tumor,Nodular hidradenoma, Cylindroma |
| Solid-cystic tumours | Nodular hidradenoma,Mixed tumour of the skin |
| Cystic lesions | Spiradenoma,Hidrocystoma |
| Tumors with predominant clear cellchange | Trichilemmoma, Poroma, Porocarcinoma, Hidradenoma,Syringoma |
| Tumours with predominant small/basaloid elements | Trichoblastoma/trichoepithelioma, Pilomatricoma<br>Sebaceous tumours<br>Poroma<br>Spiradenoma<br>Acrospiroma<br>Cylindroma |

## HISTOGENESIS OF THE BENIGN APPENDAGE TUMORS[7]

Three possibilities exist for the development of benign appendage tumors: they may develop from primary epithelial germs, from pluripotential cells, or from cells of preexisting structures. In 1948, the thesis was advanced that cutaneous tumors differentiating toward hair, sebaceous glands, or apocrine glands developed fromprimary epithelial germ cells and were primary epithelial germ tumors; further, that the hyperplasias, adenomas, and benign epitheliomas arose from primary epithelial germ cells that had attained a certain degree of differentiation before the onset of neoplasia. In the case of benign appendage tumors that are present birth, such as the nevus sebaceus and syringocystadenoma papilliferum, it may be assumed that such tumours are actually derived from embryonic primary epithelial germ cells. In other Structure of hair bulb: (a) dermal papilla, (b) matrix, (c) melanocytes, (d) medulla, (e) cortex of hair, (f) area of haircuticle, (g) Huxley's layer (prominent keratohyalin granules), (h) Henle's layer (one cell layer), (i) inner root sheath composed of cuticle, Huxley's andHenle's layers, (j) outer root sheathand (k) glassy basement membrane instances, it is likely that the benign appendage tumours tumors arise from pluripotential cells that have formed during life and possess the potential of differentiating into tumours with hair, sebaceous gland, or apocrine structures.[7,8]

## TUMOURS OF HAIR FOLLICLE (PILAR) ORIGIN

### Trichofolliculoma :

Trichofolliculomas are benign hamartomatous lesions that develop at any age, and typically involve the face. It is believed that trichofolliculomas represent abortive differentiation of cutaneous pluripotent stem cells towards hair follicles.[9]

**Clinically:**They usually present as skin-coloured, single or multiple small nodules with central epidermal ostium, in which hair emerge.

**Histologically:** trichofolliculomas consist of centrally located, keratin-filled, unilocular or multilocular cystic cavities, usually connected to the epidermis, and lined by infundibular squamous epithelium with prominent granular layer. Numerous secondary and tertiary hair follicles surrounded by variable numbers of sebaceous glands bud out and branch radially from the central cavity into a fibrotic stroma, giving it a‘‘caput medusa’’ appearance.[9,10]

**Trichoepithelioma and desmoplastic trichoepithelioma**

This tumour has also been descriptively called epithelioma adenoides cysticum or multiple benign cystic epithelioma, because it indicate that differentiation in this tumor is directed towards hair structures. Trichoepithelioma are characteristically either solitary or multiple lesions. Solitary trichoepithelioma occur more commonly than multiple and have no genetic basis.[8] The simultaneous presence of lesions of Trichoepithelioma and cylindroma has been observed repeatedly.[2,9]Multiple Trichoepithelioma is transmitted as an autosomal dominant trait.[9]In most instances, the first lesions appear in childhood and gradually increase in number.

**Clinically :** Can occuras: (1) a sporadic, solitary lesion that can be found on any portion of hair-bearing skin, with a predilection for the head and neck region in adults, or (2) an autosomal dominant familial disorder characterised by multiple, small lesions, with a predilection for the head and neck, and upper trunk regions in adolescence. The gene associated with multiple familial trichoepithelioma (MFT) links to the short arm of chromosome 9, in which several tumour suppressor genes are located.[2,8]

**Histologically** :Trichoepithelioma is a well-circumscribed and symmetric lesion with or without connection to the epidermis. It consists predominantly of uniform basaloid cells with peripheral palisading, arranged in variably sized nests, trabeculae or cribriform patterns, and surrounded by dense stroma that contains fibroblasts resembling follicular germs and bulbs, and follicular papillae. Small horn cysts filled with keratin are usually present within the epithelial nests.[8,9]

**Differential diagnosis**: Differentiation of the purely epithelial nonkeratinising trichoepithelioma from an indolent basal cell carcinoma can be troublesome in routine preparations. Table 4 highlights the salient histological and immunohistochemical features which help to differentiate the two.[9]

**Useful histological and immunohistochemical features for distinguishing between basal cell carcinoma and desmoplastic trichoepithelioma (TE)[3,9]**

| Feature | **Morphea like BCC** | **Desmoplastic TE** |
|---|---|---|
| Histology | Increased mitosis<br>Retraction spaces<br>Usually no horn cysts | Mitosis not increased<br>Retraction spaces<br>Usually horn cysts |
| Stromelysin3 | Positive in stroma | Negative |
| CD10 | Positive in basaloid cells | Positive in stroma |
| CD34 | Negative | Positive in stroma |

**Table 4: Features comparing morphea like BCC and DesmoplasticTE**

## TRICHOADENOMA

Trichoadenoma of Nikolowski is a rare benign tumor of the skin with hair follicle-like direction of differentiation. This tumor is less mature than trichofolliculoma and more differentiated than trichoepithelioma[9]. Probably because of its rarity it has not been awell recognized tumor. Trichoadenoma of Nikolowski is a symmetrical lesion consisting of epithelial islands with cystic spaces containing kerationous material, in a fibrotic stroma.[8,9](Resembles cross-sections of infundibular portion of hair follicle).

### Trichilemmoma

Trichilemmomas are benign tumours that arise from the outer root sheath of the hair follicle, mainly of the bulb region.

**Clinically:** They usually present as a solitary small skin-coloured papule, or verrucous lesion, and have a predilection for faces of older adults[10], particularly over the nose. Multiple facial trichilemmomas characteristically occur in association with Cowden syndrome (multiple hamartoma syndrome).[2]

**Histologically:** it is a well-circumscribed and symmetric lesion, with broad connection with the epidermis, which is hyperplastic and may show verruca vulgaris-like changes.In fully developed lesions, consists of lobules or plates of uniform cells with glycogenated, periodic acid Schiff (PAS)-positive/diastase sensitive clear cytoplasm.[10] The cells at the periphery of tumour lobules are more basophilic, arranged in a palisading pattern and surrounded by thick, hyaline, basement membrane material. Foci of keratin microcysts and squamous eddies may be seen.[8,11]

## FIBROFOLLICULOMA

Fibrofolliculoma present as multiple 2 to 4 mm large yellow white smooth dome shaped lesions commonly on face and neck. Multiple lesions have been described in association with trichodiscoma and acrochordons.[9]

**Histologic Findings:** Fibrofolliculomas show in their centre a hair follicle that often appears distorted. It is surrounded by a thick mantle of basophilic mucoid stroma. Numerous thin anastomosing bands of follicular epithelium extend into this stroma.[2]

## TRICHODISCOMA

The trichodiscoma first described by Pinkus (1966) is a small cutaneous tumor of the human retro pilar hair disk[6,9,] Trichodiscoma mainly consists of a hyperplasia of the dermal components of the hair disk. Merkel's cells though belonging to the normal hair disk are not involved in the histogenesis of the tumour. These lesions are generally multiple and probably more common than previously appreciated. They occur in adult patients most often associated with perifollicular fibromas and acrochordons.[11]

**Histologic Findings :** Individual lesions occur as expansile sessile nodules in the papillary dermis composed of loosely aggregated collagenous and elastic fibers in a hyaluronidase sensitive mucinous matrix.[8] Small blood vessels may be prominent and stellate stromal cells containing argyrophilic granules consistent with melanin havebeen noted. Prominent myelinated nerves and hair follicles may be found in proximity.[11]

**Differential Diagnosis**: Papular mucinosis, Perifollicular fibroma. The former can be differentiated on clinical grounds. Perifollicular fibroma shows concentric hyperplasia of the peritrichium of vellous hairs.[3,8]

## PILAR SHEATH ACANTHOMA/ CALCIFYING EPITHELIOMA OF MALHERBE

**Clinically** it is usually seen on the skin of the upper lip in adults as a solitary skin colored nodules with a central pore like opening.[9]

**Histologically** a large irregularly branching cystic cavity is seen with numerous lobulated masses of tumor cells radiating from the wall in to the dermis and subcutaneous tissue.[8,9]

## PILOMATRICOMA / PILOMATRIXOMA

Calcifying epithelioma was first described by Malherbe and Chenantais in 1880[11,12,14]. Until the 1930`s very few reports of this lesion occurred.[11,13]By 1961 Forbis and Helwig noted that there were about 300 cases in the literature.[13,14]A. B. Ackermanand coworkers elaborate on Pilomatricoma extensively. They describe pilomatricoma as a sac of epithelium that is infundibular above, and matricial and supramatricial cells along the sides and below.[15]The authors also mention that matrical cells of pilamatricoma not only cornify as shadow cells, that representing an aberrant attempt to hair formation, but they also differentiate according to other counter parts of a normal hair follicle,[15]eg.,towards inner sheath, as evidenced by thepresence of trichohyaline granules and sometimes blue-gray corneocytes, toward infundibulum, as evidenced by the presence of keratohyalin granules and basketweave orthokeratosis.[13]

**Clinically** most commonly affects children and adolescents, slightly more common in females, usually occurs as a solitary firm lesion with predilection for head and neck, and upper extremities.

**Histologically**: shows a well-circumscribed nodular lesion in the dermis and/or subcutis, surrounded by fibrous stroma. Early lesions are usually cystic, and consist of mitotically active, uniform, basaloid cells lining the cystic cavity, and contiguously transformed into pale eosinophilic anucleated shadow/ghost cells admixed with keratin. The shadow cells represent faulty attempts to produce a hair shaft. Older pilomatricomas become solid, and are characterised by prominent shadow cell component, keratin debris, secondary multinucleated giant cells and dystrophic calcification

**PILOMATRIX CARCINOMA**

Pilomatrix carcinoma is a rare malignant variant of pilomatricoma.[16]

**Clinically** Pilomatrix carcinomas occur more often in middle-aged to older individuals, more commonly in men, and show a predilection for the posterior neck, upper back and pre-auricular areas. The average size of these tumours is slightly larger than the size of benign pilomatrixomas. Reported cases of pilomatrix carcinoma range in size from 0.5 cm to 20 cm, with a mean of 3.95 cm, whereas that of pilomatricoma are usually 0.5 cm to 3.0 cm in diameter.[15]

**Histologically** it differs from pilomatricomain asymmetrical growth pattern, poor circumscription, significant cytonuclear atypia, markedly increased mitotic activity and infiltration to the adjacent tissue. Tumour necrosis, calcification and ossification may also be seen. The presence of lymphovascular and perineural invasion, extension into the bone, and distant metastasis are definitive features of malignancy.[16,17]

## TUMOUR OF FOLLICULAR INFUNDIBULUM

The tumour of follicular infundibulum is a fenestrated sheet like subepidermal proliferation of benign squamous epithelium in continuity with both epidermis and the upper outer hair sheath.[18]

## TRICHOBLASTOMA

A recent definition of trichoblastomas by Headington states.[9,11]"Trichoblastomas are rare tumors of hair germ that are purely epithelial and therefore lack a potentially inductive stroma. They tend to present as discrete, circumscribed subcutaneous nodules in non-sun exposed areas. Though the prototypic trichoblastoma is subcutaneous, this definition does not exclude the possibility of such a discrete, circumscribed tumor of hair germ epithelium occurring in the dermis.

**Microscopically**, it consists of nodules of cords and nests formed of solid basaloid germinative epithelial cells that exhibit peripheral palisading and brisk mitotic activity. Follicular papillae are characteristically present, and small keratin cysts may be found.[3,8] Numerous melanocytes and melanin pigment are also frequently seen within the epithelial component (pigmented TB).[8] The minimal intervening stromal component separates the epithelial nodules, with absent or inconspicuous cleft artefact. Trichoblastoma is the most common neoplasm that develops in association with Nevus sebaceous. Merkel cells, identified by CK 20, are frequently seen in trichoblastoma. An important differential diagnosis of trichoblastoma is BCC, as the two tumours share many histological features.[8,9](table 5)

| Feature | Basal cell carcinoma | Trichoblastoma |
|---|---|---|
| Age | Older | Younger |
| Site | Sun exposed areas | Not limited to sun exposed areas |
| location | Usually limited to dermis | Usually within the deeper dermis and subcutaneous fat |
| Peripheral palisading | Present | Present |
| Artifactual clefting | Present | Absent /inconspicuous |
| Keratin cysts | Uaually absent | Uaually present(small) |
| Mitotic activity | Present | Brisk |
| Stroma | Sclerotic and normal in amount | Sclerotic and minimum in amount |
| calcification | Present | Present |
| Follicular papillae | Uncommonly seen | Usually present |

**Table 5: Difference between Trichoblastoma and BCC**

## PROLIFERATING TRICHILEMMAL TUMOUR

A proliferating pilar tumor is a rare neoplasm arising from the isthmic region of the outer root sheath of the hair follicle.[19, 20]

**Clinically** it occurs most commonly on the scalp in women older than 50 years. Most tumors arise within a preexisting pilar cyst. Even though they usually are benign in

nature, malignant transformation with local invasion and metastasis has been described. Recently, a tentative stratification of proliferating pilar tumours into groups as benign, low-grade malignancy, and high-grade malignancy has beenintroduced.[20,21,22]

**Histologic Findings:** The neoplasm is well circumscribed, with islands of squamous epithelium undergoing trichilemmal keratinization.[21] Horn pearls or squamous eddies may be present, as also foci of calcification and glycogen-rich clear cells. Some areas may show nuclear atypia. Large areas of nuclear atypia and lack of circumscription with extension to surrounding tissue is a hallmark of a malignant proliferating trichilemmal tumor.[20]

## TRICHILEMMAL CARCINOMA

Trichilemmal carcinoma was originally described by Headington[16]as a "histologically invasive, cytologically atypical clear cell neoplasm of adnexal keratinocytes which is in continuity with the epidermis and /or follicular epithelium. The outer root sheath consists of cells with clear vacuolated cytoplasm due to presence of abundant glycogen. The trichilemmal carcinoma is a malignant tumour of the outer hair sheath.

**Clinically** the tumour may present as a pale tan or reddish papule, indurated plaque or nodule. The tumour size is usually between 0.4 and 2.0 cms.This is a slow growing tumour which shows predilection for sun exposed hair bearing skin. The usual sites include scalp, face, and trunk.

**Histologically** the tumour shows a wide range of growth patterns (solid, lobular,trabecular). The tumour lobules are sharply circumscribed by a hyaline, PAS

positive membrane, and infiltrates with a pushing border. These lobules consist of large tumor cells with PAS reactive and diastase sensitive clear or pale eosinophilic cytoplasm. Stain for mucin is negative.[23]There are foci of pilar type keratinization and peripheral palisading of cells with subnuclear vacuolation. Some dyskeratotic cells may be identified. Numerous mitotic figures are present. There is usually evidence of actinic damage. Superficial ulceration is also noted. Some of these tumours show pagetoid spread, others show infiltration into the deep dermis. On immunocytochemistry the tumour is positive for cytokeratin and negative for CEA and EMA.[23, 24]despite an aggressive growth it has an indolent clinical course. No cases with recurrence or metastasis have been reported in the literature.

**TUMOURS OF SEBACEOUS GLANDS**

**SEBACEOUS ADENOMA** is common benign skin adnexal lesions that principally affect middle-aged and elderly individuals.[3,8]

**Clinically:** They are usually solitary, and present as a small, yellow, lobulated papule with a predilection to the forehead and cheeks. Multiple sebaceous lesions (hyperplasia, adenoma, sebaceoma and carcinoma) can occur in association with Muir–Torre syndrome[25,26], is a well-circumscribed dermal nodule,

**Histologically** formed of lobules of predominate mature, bland sebaceous cells, and peripherally located in one or two layers of germinal basaloid epithelial cells. There is no central draining duct. Sebaceoma is a histological variant of SA, in which the basaloid epithelial cells constitute >50% of the SA. It is characterised by variably sized lobules, which are composed predominantly of basaloid cells, admixed with single or clustered mature sebaceous cells, and exhibit sebaceous ductal differentiation. Foci of squamous metaplasia may rarely be seen.[25]

## SEBACEOMA

The terminology regarding indolent tumors having sebaceous differentiation can be confusing in that the term sebaceous epithelioma has been used not only for the indolent tumors but also for more aggressive ones that would be better designated as basal cell carcinoma with sebaceous differentiation [27,28].

**Histopathology** Sebaceoma (formerly known as sebaceous epithelioma) is a histological variant of SA,[29]in which the basaloid epithelial cells constitute >50% of the SA. It is characterised by variably sized lobules, which are composed predominantly of basaloid cells, admixed with single or clustered mature sebaceous cells, and exhibit sebaceous ductal differentiation . Foci of squamous metaplasia may rarely be seen.

## SEBACEOUS CARCINOMA

**Clinically:** most frequently affects the eyelid and has potential for local recurrence and distant metastases[27,30]. Sebaceous carcinoma of the eyelid is derived from the modified sebaceous glands (Meibomian glands or glands of Zeis). When associated with Muir–Torre syndrome, sebaceous carcinoma appears to have a better prognosis.

**Histologically:** sebaceous carcinoma differs from sebaceous adenoma and sebaceoma in its asymmetry, poor circumscription, infiltrative growth pattern, and preponderance of pleomorphic, basaloid cells that are arranged in solid sheets, and shows marked cytonuclear atypia and high mitotic activity. Scattered sebocytes are often present within the basaloid tumour mass. Peripheral palisading and artefactual clefting are absent. The presence of tumour necrosis denotes bad prognosis.[3,8]IHC shows sebaceous carcinoma to be immunopositive for AE1/AE3 cytokeratin, LMWCK, EMA, anti-breast carcinoma associated antigen-225 antibody(CU18), anti-CA 15.3

antibody, and androgen receptor protein, and immunonegative for CEA, S100 protein and GCDFP-15. Immature and mature neoplastic sebocytes can also express CK 14. Different histological variants of sebaceous carcinoma are recognised, the most important being the basaloid, spindle cell, squamoid and dedifferentiated (pleomorphic) variants.[3,8]

**STEATOCYSTOMA MULTIPLEX**

Steatocystoma presents as a solitary lesion (steatocystoma simplex) or multiple lesions (steatocystoma multiplex) in adolescence or young adults. Steatocystoma multiplex is a rare benign autosomal dominant disorder of the pilosebaceous unit. Mutations in keratin 17 have been found in some cases.8Site: These lesions can appear virtually anywhere on the body but are more common in areas where the pilo-sebaceous apparatus is well developed, such as the trunk (especially the presternal area), neck, axilla, inguinal region, scalp, and proximal extremities.[40]

**Gross:**Macroscopically these are small, smooth, fleshy, cystic nodule.

**Microscopic features:**Microscopically the lesion is located in the mid dermis.The cyst has a wavy wall, lined by squamous epithelium with a corrugated eosinophilic cuticle surface.No granular layer is usually seen.Characteristic feature: Presence of sebaceous glands within or adjacent to the cyst wall. These are flattened lobules of sebaceous glands of varying size.[40,43]

## SKIN APPENDAGE LESIONS WITH ECCRINE DIFERENTIATION

The eccrine sweat gland consists of several morphological and functional regions and there is at least one recognisable tumour for each of these.The outer cells of the coiled intraepidermal duct give rise to the eccrine poroma.[2,8] The intradermal straight duct gives rise to eccrine spiradenomas. The coiled duct seems to be the origin of eccrine cylindromas. Poroma, spiradenoma, and cylindroma are all derived from the outer cells of the duct. The cells lining the inner aspect of the eccrine duct gives rise to hidradenomas.[8]

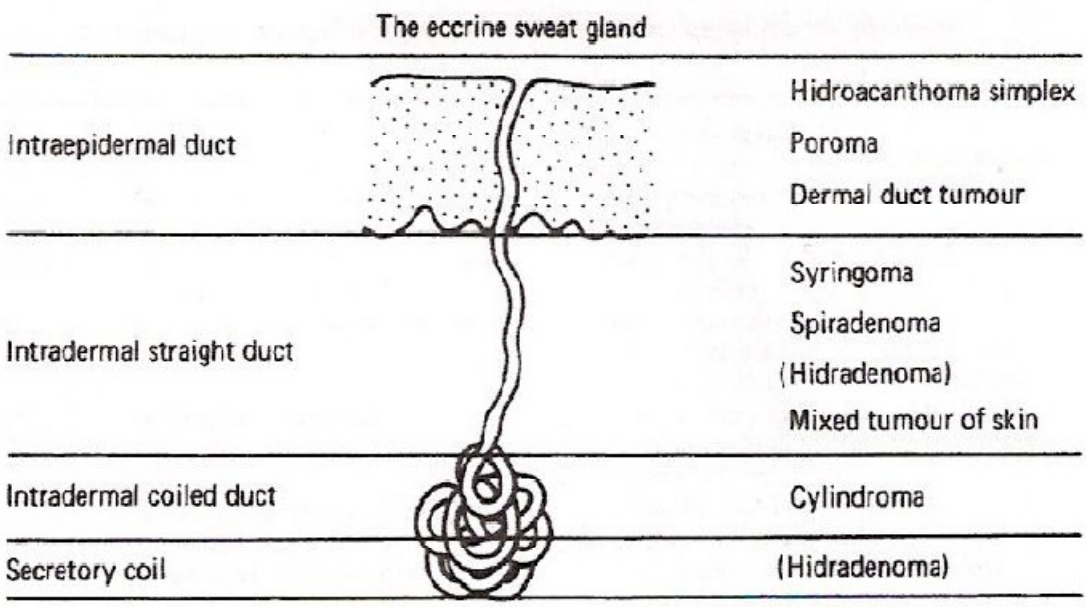



**Fig. 6[2] :Various Functional Regions of the eccrine sweat gland and the tumors derived from them**

## ECCRINE HIDROCYSTOMA

Eccrine hidrocystomas are rare,[33]benign, cystic lesions with a lining that resembles that of the eccrine sweat gland and may be solitary or multiple. **Clinically:** Multiple eccrine hidrocystomas occur predominantly on the face as asymptomatic, skin-colored to bluish lesions associated with a chronic course and seasonal variability. [33]

**Histologically:** The cysts are lined by single layer of cuboidal cells.[2,8]

## ECCRINE POROMA

Eccrine poroma is a type of benign eccrine sweat gland tumour,[34,35] thought to be derived from the intra-epidermal sweat duct epithelium. It occurs most commonly on the palms and soles.

**Histologic Findings:** These lesions arise within the lower portion of epidermis, from where it extends downwards into the dermis as tumour masses consisting of broad anastomosing bands. Numerous epidermal connections by a uniform population of small keratinocytes having visible cytoplasmic borders are seen in eccrine poromas. The stroma is frequently quite vascular, and this is not location dependent. The small keratinocytes comprising these tumors may be indistinguishable from those found in some seborrheic keratoses. The marked acanthosis and lack of pseudohorn cysts are more characteristic of poromas. The same acrosyringeal cell population is seen in dermal duct tumors, and these differ from poromas by the lack of epidermal connections.[35,36] There are cases where just a few epidermal connections are demonstrated, and the diagnostic choice is then arbitrary.[37]

## SPIRADENOMA

Spiradenoma is a benign dermal tumour occuring in adults, [38]as tender nodules usually occurs on the trunk and sometimes on the scalp. This lesion often coexists with cylindromas.

**Histologically** The tumour consists of sharply demarcated lobules located in the dermis without connection to the epidermis. Two cell types are present. The small cells with dark nuclei are present at the periphery and the large paler cells are at the centre. These cells may be arranged around small lumina, which contain small amounts of granular eosinophilic material that is PAS positive and diastase resistant.[3,8] The tumour may show prominent degenerative changes, fibrosis and cyst formation. The larger tumours are partially or totally necrotic. Eosinophilic PAS positive basement membrane like material may be present around the lobules.[38]

## MALIGNANT SPIRADENOMA

There have been 33 reported cases of malignant transformation in benign eccrine spiradenoma since it was first described by Dabska in 1972.[38]These are aggressive tumours and usually originate on a long standing solitary lesion of spiradenoma.

**Clinically** there is usually a history of increase in size of the mass, change in colour or ulceration of the overlying skin. The tumour commonly arises on the lower extremities and rarely on the trunk.[8,2]

**Histologically** there are two distinct components, typical spiradenoma and carcinoma with areas of transition. The tumour displays monotonous basaloid cells, with occasional ductular differentiation. The luminal aspect of the tumour cells stains positively with PAS. The tumour infiltrates into the deep dermis and extends into the

subcutaneous fat. There are focal areas of necrosis and mononuclear reactive inflammatory cell infiltration.[3]

**POROCARCINOMAS / MALIGNANT ECCRINE POROMAS**

Are usually found on the lower extremities. They usually arise in pre-existing benign poroid tumours.[8]

**Histologically :** Characterised by asymmetrical, solid, nodular growth pattern, with infiltrative or pushing borders. The neoplastic cells in porocarcinoma may have basaloid features, resembling those of poroma, but show varying degrees of cytonuclear atypia, hyperchromatic nuclei, and prominent nucleoli. Large polyhedral cells with abundant clear cytoplasm can be present.[2] Foci of squamous and spindle cell differentiation are common. Evidence of eccrine differentiation in the form of CEA-positive ductal formation is present in most of the cases. Brisk mitotic activity, necrosis and desmoplastic stromal reaction can be prominent.[2,8]

**SYRINGOMA**

Syringoma is a benign adnexal neoplasm formed by well-differentiated ductal elements. Its name is derived from the Greek word *syrinx,*[39] which means pipe or tube. Females are affected more often than males. While these tumors usually first appear at puberty, additional lesions can develop later. Syringomas are skin-colored or yellowish, small, dermal papule. Sometimes, the lesions may appear translucent or cystic. The lesions are usually multiple, arranged in clusters, and symmetrically distributed. Most commonly, lesions are limited to the upper parts of the cheeks and lower eyelids.[39,40]

**Histologic Findings:** Syringoma is a tumor that is located mostly in the superficial dermis. It is composed of numerous small ducts embedded in a sclerotic stroma. The walls of the ducts are usually lined by 2 rows of cuboidal to flattened epithelial cells and contain a lumen filled with periodic acid-Schiff–positive, eosinophilic, amorphous debris. Some of the ducts have elongated tails of epithelial cells that produce the characteristic tadpole appearance. Keratinous cysts can be found on the surface. Rarely, tumor cells may appear clear as a result of glycogen accumulation.[2,8,40]

**CHONDROID SYRINGOMA**

Chondroid syringoma represents the cutaneous counterpart of mixed tumor ("pleomorphic adenoma") of salivary glands, therefore it is also termed 'mixed tumour of the skin'[40]. The cutaneous lesion has different behaviour in that it rarely recurs even if inadequately excised. It is generally accepted that there are both eccrine andapocrine variants of mixed tumour of skin.

**Clinical presentation**: Chondroid Syringoma usually occurs in middle aged and elderly patients in the head and neck region and rarely in the distal extremities. The tumour presents as a solitary, slow growing nodule (0.5 - 3cm in diameter).[40]

**Microscopic features:** Well circumscribed tumour located in the dermis and subcutaneous tissue with no epidermal connection to the overlying epidermis. The tumour consists of an epithelial component set in a chondroid, myxoid and fibrous stroma. There are epithelial nests, islands, ducts and tubular structures. Tubules or lumina may be large, multilayered, and complex structures or small relatively round simple tubules. Focal areas of apocrine secretion may be present or rarely intracytoplasmic lumina of the eccrine type. Some cases show follicular and

sebaceous differentiation (shadow cells, other elements of hair follicles and sebocytes).Other features include keratinous cyst formation, presence of eosinophilic globules (collagenous spherulosis), islands of squamous epithelium and areas of ossification.[2,40]

**MALIGNANT CHONDROID SYRINGOMA:**

A few cases of malignant chondroid syringoma have been reported more commonly in women and most often on the trunk and extremities. The tumour may metastasize to both the regional and distant lymph nodes, causing the death of the patient. In these cases, radiation therapy follows the surgical excision.[40]

**Microscopic features:** Malignant chondroid syringoma has a lobulated appearance, composed of epithelial and mesenchyme-like component (myxomatous and cartilaginous areas). The epithelial component predominates at the periphery of the tumour while the mesenchymal component is seen at the center. Scattered mitoses and variable pleomorphism may be seen. Immunohistochemistry[40]shows a positive staining for Cytokeratin, S-100 protein, Neuron- specific enolase and Glial fibrillary acidic protein.

**CLEAR CELL HIDRADENOMA / NODULAR HIDRADENOMA / ECCRINE ACROSPIROMA**

Hidradenoma is a benign tumour, which usually presents as a solitary, skin-coloured lesion and occurs more commonly in females. It shows variably sized nests and nodules of neoplastic epithelial cells, with small ductular lumens, confined within the upper dermis. The tumour cells are small, monomorphous and polyhedral, resembling those of poroma cells. In fact, some tumours have an epidermal attachment, and

occasionally may also have features overlapping with those of typical poromas. Clear cell change and/or squamous metaplasia may be prominent, the latter however does not seem to denote a worse prognosis.[41]Apocrine differentiation when present is focal. The margin characteristically pushy, but well-circumscribed. Nodular hidradenoma should be fully excised, as malignant transformation may be present in other areas of the lesion. Further a recurrence rate of 12% is reported in incompletely resected tumours, which increasesto 24% in lesions with irregular peripheral border.[42]

**MUCINOUS ECCRINE CARCINOMA:**

First decribed in 1971,[8] it is rather uncommon tumor that metastasizes to regional lymphnodes occasionally.

**Histopathologically:**The tumor is divided into numerous compartments by strands of fibrous tissue. In each compartment, abundant amounts of pale staining mucin surround nests or cords of moderately anaplastic cells, some of which show tubular lumen. The mucin shows strongly positive reactions with both PAS and colloidal iron.[8]

**MICROCYSTIC ADNEXAL CARCINOMA:**

It may be considered as a sclerosing variant of ductal eccrine carcinoma.[2,8]

**Clinical findings:** This tumor is most commonly seen on the skin of the upper lip, but occasionally also on the chin, nasolabial fold or cheek. Rare cases of multiple primary microcystic adnexal carcinomas have been reported**.**[2,8]

**Histopathologically:** The tumor is poorly circumscribed dermal tumor that may extend into the subcutis and skeletal muscle. Continuity with epidermis or follicular epithelium may be seen. Two components within a desmoplastic stroma may be

evident. In some areas, basaloid keratinocytes are seen, some of which contain horn cysts and abortive hair follicles, in other areas ducts and gland like structures lined by two cell layer predominate. Cells with clear cytoplasm may be present. IHC have shown that CD23 can help to distinguish microcystic adnexal carcinoma from trichoepithelioma.[8,40]

**SYRINGOID ECCRINECARCINOMA**

This tumor was originally referred to in 1969 as basal cell tumor with eccrine differentiation,[8] and subsequently as eccrine epithelioma; the term syringoid eccrine carcinoma is preferable because the tumor differs from basal cell carcinoma in its cytological and enzymatic patterns. It represents a relatively well differentiated form of eccrine carcinoma**.** [2,40]

**Histopathology:** It resembles syringoma by showing ductal, cystic, comma like epithelial components and by containing eccrine enzymes.It differs from syringoma by its cellularity, anaplasia and deep infiltrative growth. This uncommonly diagnosed tumor is probably related to the microcystic adnexal carcinoma. A clear cell variant of syringoid eccrine carcinoma has been described.[8]

**SKIN APPENDAGE LESIONS WITH APOCRINEDIFFERENTIATION**

**APOCRINE HIDROCYSTOMAS**

Apocrine hidrocystomas are benign cystic proliferations of the apocrine secretory glands.

**Clinically** cysts occur in adulthood, although in no particular age group is exempt. No sex predilection is described. The tumors usually occur as solitary translucent papules or nodules and occasionally as multiple lesions. These tumors have a predilection for

the eyelid, particularly the inner canthus, but may also arise in other areas of the head, neck, and trunk. A few cases have been reported occurring on the penis, axillae, and the anal region.[6]

**Histologic Findings:** The cyst wall is lined by apocrine-type secretory epithelium. The innermost layer of the wall is composed of a single (occasionally double) layer of cuboidal-to columnar-shaped cells. The nuclei of these cells are positioned basally. The outer layer of cells composing the cyst wall is formed by myoepithelial cells in which the long axis run parallel to the cyst wall. Well-organized fibrous tissue surrounds the cyst. Papillary projections extend from the secretory layer into the cyst cavity, depicting decapitation secretion. The secretory cells contain periodic acid-Schiff–positive, diastase-resistant granules and occasionally contain pigment granules.[6]

**SYRINGOCYSTADENOMA PAPILLIFERUM**

The origin of this tumour is still being debated. Most authors agree that this hamartoma develops from undifferentiated pluripotential appendageal cells.[6]

**Clinically** most of the cases are first noted at birth. The others develop in infancy, childhood and adolescence. The tumour presents either as one papule or several papules in a linear arrangement, or as a solitary plaque. Some papular lesion may be umbilicated and resemble molluscum contagiosum. During evolution of lesion, verrucous changes can develop at puberty.[43]

**Histologically** the epidermis is acanthotic and shows papillomatosis. A cystic invagination extends downward from the epidermis. Numerous villous projections are seen within these invaginations. These papillary projections are lined by two layers of

epithelial cells, a columnar luminal cell layer and an outer layer of small cuboidal cells. Occasionally, the luminal row of cells shows decapitation secretion. In the deep dermis, groups of apocrine glands may be present. Close step sections should be carried out, to demonstrate connection of the apocrine glandswith cystic invagination in the upper dermis. The stroma is usually infiltrated by adense mononuclear infiltrate composed entirely of plasma cells. Malformed sebaceous glands and hair structures may be present. Syringocystadenoma papilliferum may be associated with nevus sebaceous, and basal cell carcinoma and rarely with sebaceous epithelioma, trichoepithelioma, eccrine spiradenoma and apocrine hydrocystoma.[8,40]

**CYLINDROMA**

**Clinically** the tumour may present as a solitary, slow growing rubbery lesion usually on the scalp, head and neck or trunk. An autosomal dominant inheritance attributed to the cyld1 gene on chromosome 16 has been described in multiple tumours occur. This form is also known as 'turban tumour' and may be associated with spiradenoma. Some of these lesions may be are painful.[40]

**Histologically** Cylindroma is a circumscribed, nonencapsulated, dermal tumour without attachment to the epidermis. The lesion is composed of numerous oval and polygonal nests arranged in an interlocking jigsaw like pattern. There are two cell types, the peripheral cells are small and basophilic and central cells are larger and pale stained. Small ductal lumina may be present. Thick PAS positive hyaline bands surround tumour islands. Cylindromas occasionally undergo malignant transformation.[43]Malignant cylindromas are characterised by islands of cells displaying marked nuclear pleomorphism. There is an increase in mitosis inclusive of

abnormal forms. The tumour shows invasion into the surrounding tissue and loss of the delicate hyaline sheath.

## HIDRADENOMA PAPILLIFERUM

**Clinically** this benign tumour is a variant of apocrine adenoma and usually occurs in the vulval or perianal regions. The tumour usually occurs in middle aged women as small nodules (1cm or less in size). Human papilloma virus may have a potential rolein the pathogenesis.[43]

**Histologically** these are circumscribed solid or partly cystic tumours containing papillary and glandular areas. There are two types of epithelium -tall columnar cells with pale eosinophilic cytoplasm and underlying myoepithelial cell layer. Prominent apocrine changes are noted in areas. Hidradenoma papilliferum lacks cytonuclear atypia, mitotic activity or tumour necrosis. Morphological features analogous to benign breast diseases can be frequently encountered, and include oxyphilic (apocrine) metaplasia, sclerosing adenosis-like changes, atypical apocrine adenosis like changes, ductal epithelial hyperplasia, clear cell change of themyoepithelium, foamy histiocyte reaction and stromal fibrosis. Rare malignant transformation in hidradenoma papiulliferum (apocrine adenocarcinoma) ischaracterised by cytological pleomorphism, mitoses and necrosis with or without epidermal pagetoid spread of the malignant cells. Immunohistochemically, the tumour cells often express CEA, GCDFP-15, lysosome and CD-15 (Leu M1)[43]

## TUBULAR APOCRINE ADENOMA

**Clinically** this is a slow growing circumscribed nodule found in the axilla, cheek and breast. This tumour may be present along with nevus sebaceous.

**Histologically** the tumour is composed of well-differentiated dilated tubular structures situated in the dermis and sometimes in the subcutis. These tubules are lined by one or more layers of cells. The apical cells are of apocrine type. Myoepithelial cells are present a feature which helps to differentiate it from adenocarcinoma. The overlying epidermis may be hyperplastic. The tubules areseparated by fibrous tissue with scanty inflammatory cells.[43]

**COMPOSIT / MIXED ADNEXAL TUMORS**

Cutaneous adnexal tumours may display a varied composition with a mixture of eccrine, apocrine, sebaceous and pilar differentiation. The diagnosis of these mixed lesions relies on histological evaluation, and they are usually classified according to the predominant morphological component.[2,40] If no component is predominant, a different terminology is used to describe these lesions, including ‘‘combined adnexal tumours of the skin’’, ‘‘benign adnexal tumour with multidirectional differentiation’’, ‘‘benign adnexal tumour of mixed lineage’’ and ‘‘composite adnexal tumours of theskin’’.[2,40]

**Clinically:** these tumours are located in the head and neck and the extremities, and rarely elsewhere in the body, as in a case we diagnosed recently from the ventral aspect of the penis. They present as slowly enlarging solitary dermal /subcutaneous nodules.[8,40]

**Histologically**: they are characterised by well-circumscribed, non-encapsulated nodules composed of a lobular proliferation of epithelial cells displaying a spectrum of eccrine, apocrine, sebaceous and follicular differentiation.[2,40]

# MATERIALS AND METHODS

## Source of data

Skin adnexal tumors diagnosed in the department of histopathology during 10 years duration between Oct 2004 to Sept 2014 were included in this study which forms 8years retrospective and 2years prospective study

## Method of collection

1. Biopsy specimens and paraffin blocks of all identified adnexal tumors of skin received in histopathology department, Shri B. M. Patil Medical college and research centre were collected. All clinical data were noted as per proforma.
2. The biopsy material in 10% formalin is subjected to routine processing and paraffin embedding. Serial sections were taken for each biopsy and were stained by standard haematoxylin and eosin stain (H & E) and special stains. For all the retrospective case blocks were retrieved and serial sections were taken for each biopsy and were stained by standard haematoxylin and eosin stain (H & E).The H&E stained sections were then studied under light microscope.

## Inclusion criteria

All adnexal tumors of skin diagnosed histopathologically are included in the study

## Exclusion criteria:

1. All the skin tumours diagnosed other than the SAT.
2. All the cysts and tumour like lesions of skin.

**Statistical methods applied:**

Following statistical methods were applied in the present study.

1. Number and percentage
2. Chi square test
3. Descriptive statistical analysis were made according to the the following patterns described in table 6 [2,3]

| **Patterns** | **Tumors** |
|---|---|
| Tumours with ductal/glandular elements | Syringoma, poroma and porocarcinoma, Hidradenoma, Microcystic adnexal carcinoma |
| Tumours with small keratin cysts | Desmoplastic trichoepithelioma, Trichoblastoma,Microcystic adnexal carcinoma |
| Solid tumours with prominent basaloid component | Poroma, hidroacanthoma simplex and derma ductal tumor,Nodular hidradenoma, Cylindroma |
| Solid-cystic tumours | Nodular hidradenoma, Mixed tumour of the skin |
| Cystic lesions | Spiradenoma, Hidrocystoma |
| Tumors with predominant clear cellchange | Trichilemmoma, Poroma, Porocarcinoma, Hidradenoma, Syringoma |
| Tumours with predominant small/basaloid elements | Trichoblastoma/trichoepithelioma, Pilomatricoma<br>Sebaceous tumours, Poroma, Spiradenoma, Acrospiroma, Cylindroma |

**Table 6: Morphological patterns of skin adnexal tumors**

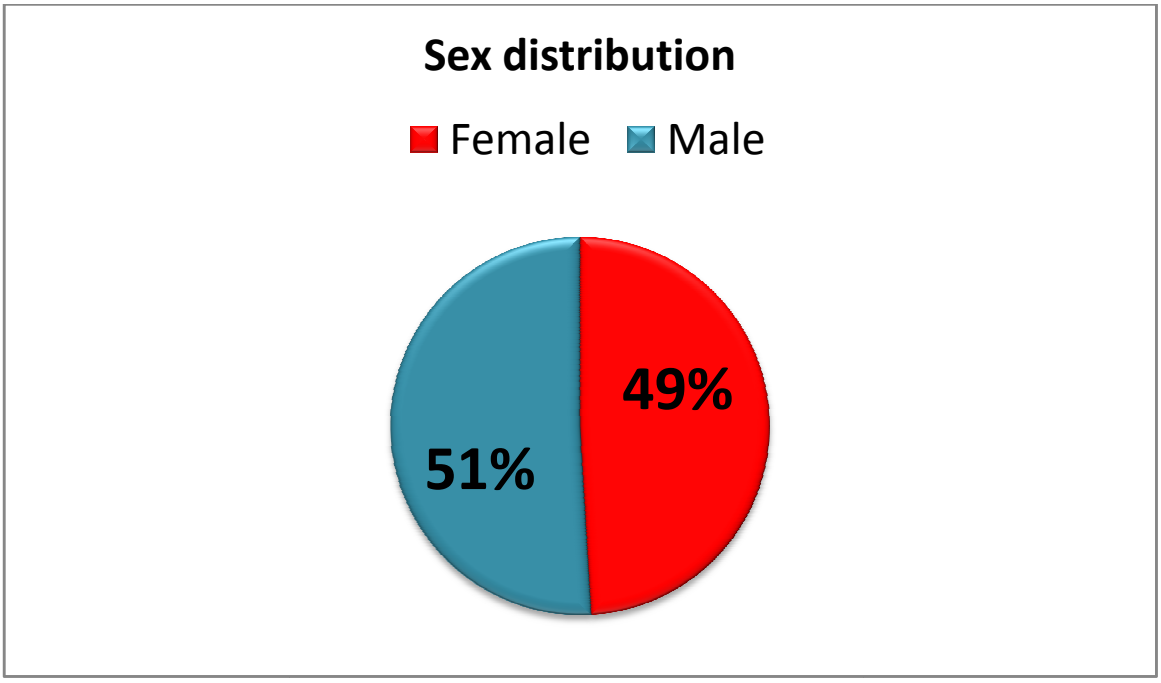
# RESULTS AND OBSERVATIONS

## GENERAL CONSIDERATION

A total of 53 skin adnexal tumors were received, which included both prospective and retrospective cases. These skin adnexal tumors were diagnosed in our department of histopathology Shri B. M. Patil Medical college and Research centre, Bijapur during 10 years duration between Oct 2004 to Sept 2014 which forms 8years retrospective and 2years prospective study

**Sex distribution**

**Fig.7: Pie chart showing sex distribution**

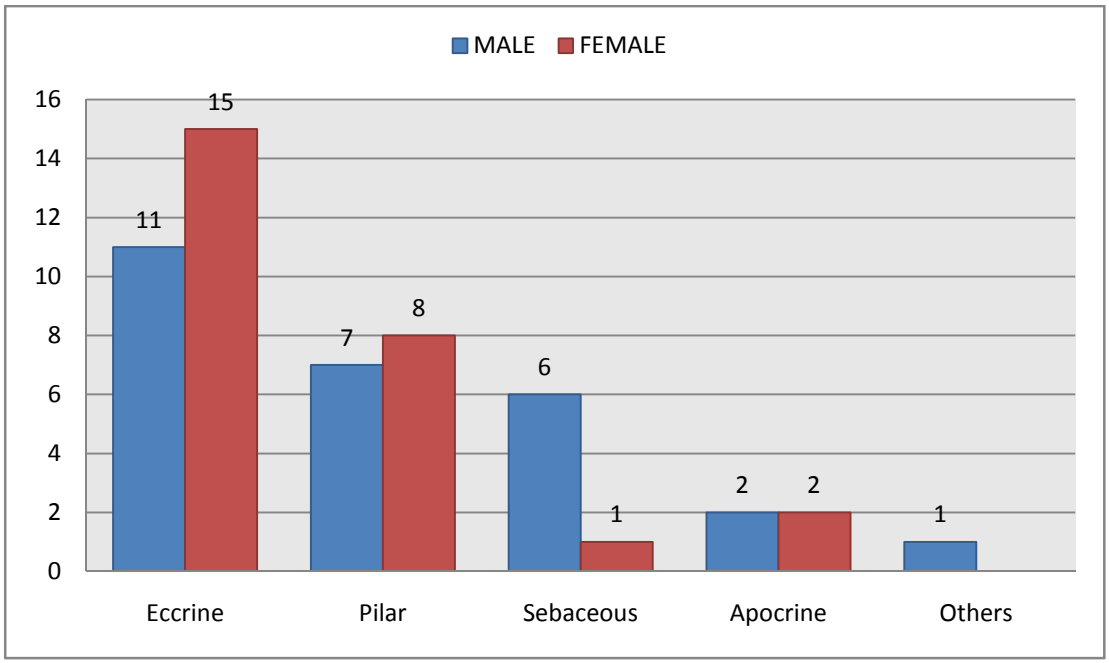



In the present study out of 53cases, 26were females accounting for 49.05% and 27 were males accounting for 50.95% (Fig.7 )

**Table 7: Distribution of SAT according to sex**

| SEX (n=53) | Eccrine (n=26) | Pilar (n=15) | Sebaceous (n=7) | Apocrine (n=4) | Others (n=1) |
|---|---|---|---|---|---|
| Male | 11(42.30%) | 7(46.66%) | 6(85.71%) | 2(50%) | 1(100%) |
| Female | 15(57.7%) | 8(53.34%) | 1(14.29%) | 2(50%) | |

**Fig 8: Bar diagram showing distribution of SAT according to sex**

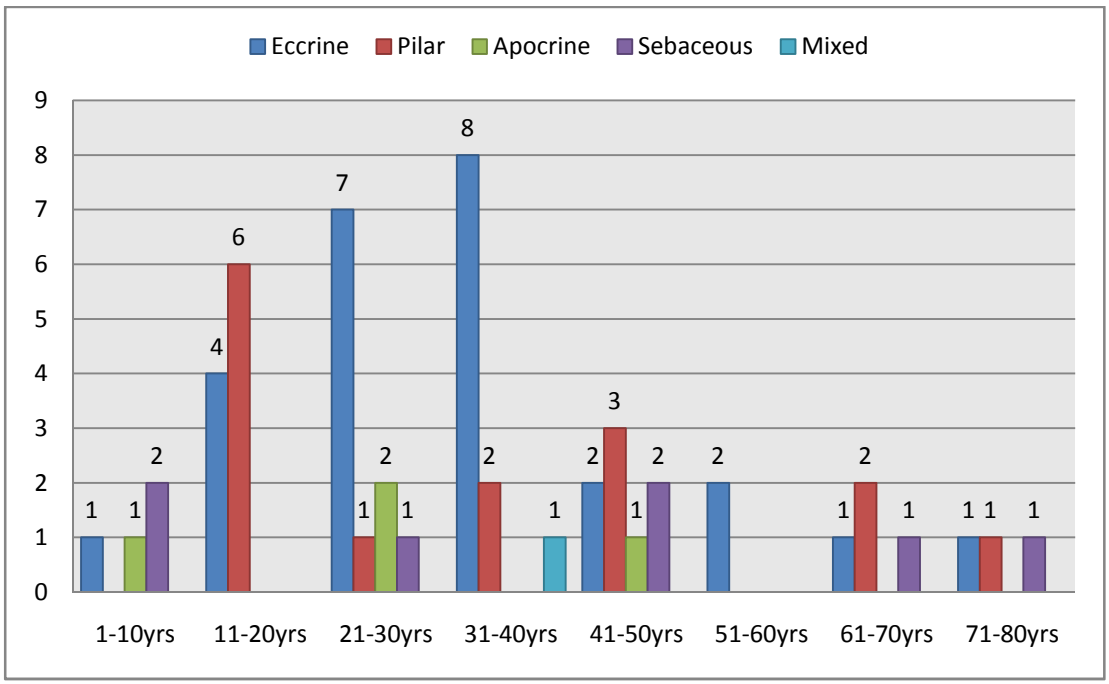



In this study tumors with eccrine and pilar differentiation was noticed predominantly in females accounting for 57.7% (15cases) and 53.34% (8cases) respectively, were as tumors with sebaceous differentiation was noted in males and there was no sex predilection observed in tumors with apocrine differentiation.

**Table.8: Distribution of SAT according to age**

| Age | 1-10 yrs | 11-20 yrs | 21-30 yrs | 31-40 yrs | 41-50 yrs | 51-60 yrs | 61-70 yrs | 71-80 yrs |
|---|---|---|---|---|---|---|---|---|
| **Eccrine differentiation** | 1 (3.84%) | 4 (15.38%) | 7 (30.38%) | 8 (30.76%) | 2 (7.69%) | 2 (7.69%) | 1 (3.84%) | 1 (3.84%) |
| **Pilar differentiation** | 0 | 6 (40%) | 1 (6.66%) | 2 (13.32%) | 3 (19.98%) | 0 | 2 (13.32%) | 1 (6.66%) |
| **Apocrine differentiation** | 1 (25%%) | 0 | 2 (50%) | 0 | 1 (25%) | 0 | 0 | 0 |
| **Sebaceous differentiation** | 2 (28.57%) | 0 | 1 (14.28) | 0 | 2 (28.57%) | 0 | 1 (14.28%) | 1 (14.28%) |
| **Mixed** | 0 | 0 | 0 | 1 (100%) | 0 | 0 | 0 | 0 |
| **Total no. of cases** | 4 (7.54%) | 10 (18.86%) | 11 (20.75%) | 11 (20.75%) | 8 (15.09%) | 2 (3.77%) | 4 (11.32%) | 3 (5.66%) |

**Fig 9: Bar diagram showing distribution of SAT according to age**

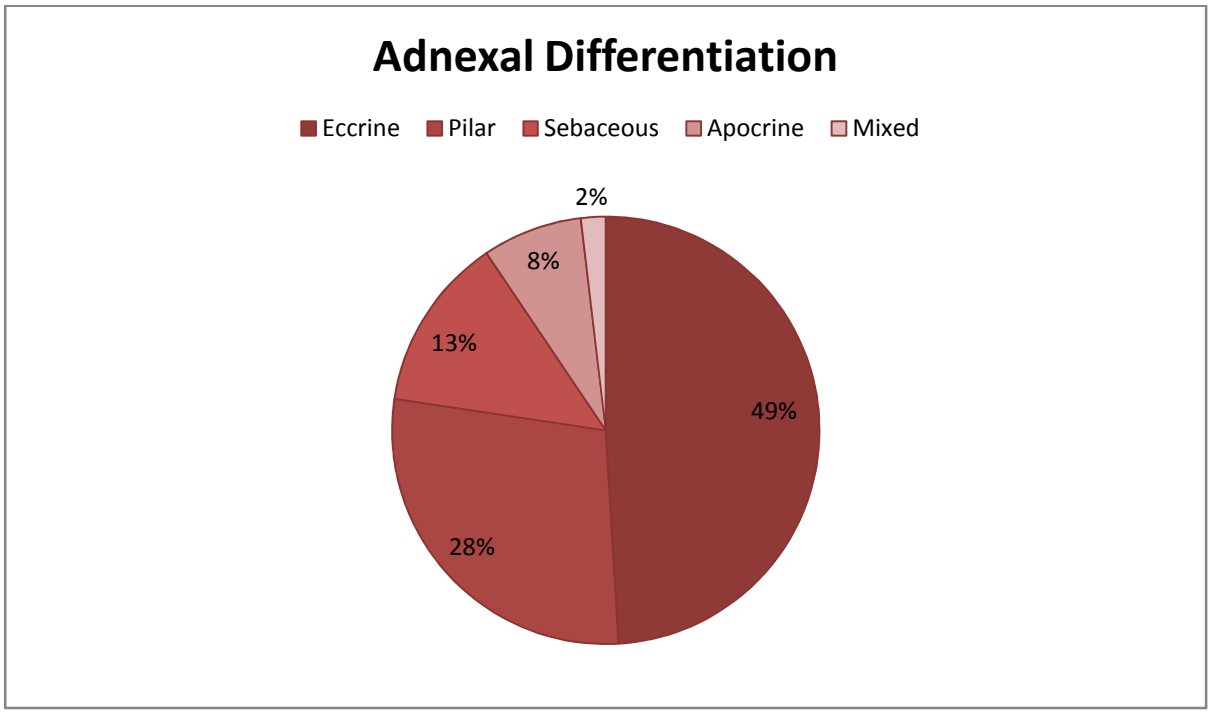



In the present study peak incidence was 10 – 30years age group with mean age being 33yrs (table 8)

**Distribution of skin adnexal tumors**

The tumors were categorised as per the adnexal differentiation noted and the distribution is illustrated in fig 10

**Fig 10: Pie chart showing Skin adnexal tumor differentiation**

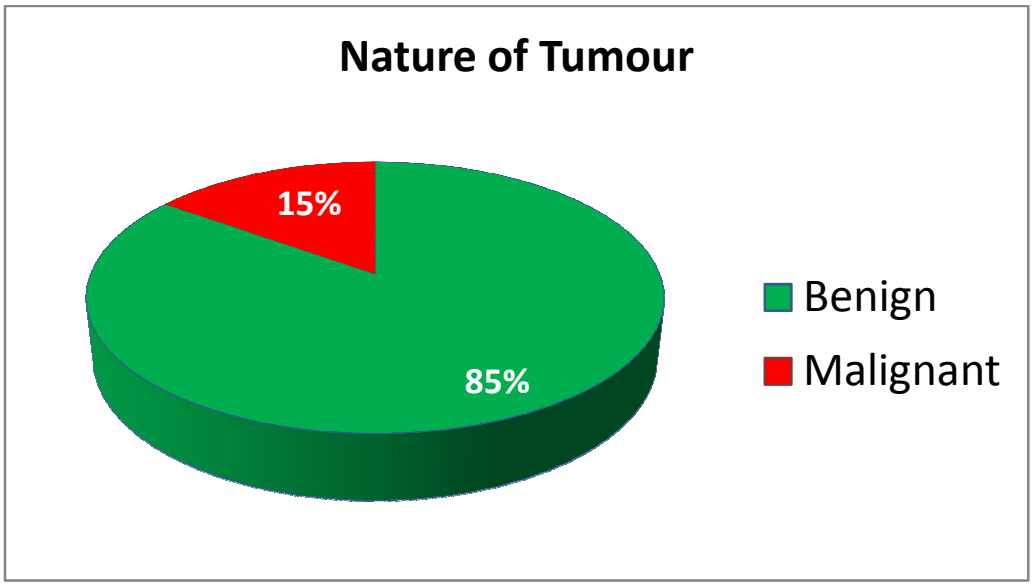



In this study, tumors of the eccrine differentiation consitituted maximum accounting for 26 cases(49.05%), Followed by tumors with pilar differentiation 15cases (28.2%), sebaceous differentiation 7cases (13.16%), apocrine differentiation 4cases(7.52%) and mixed adnexal tumor accounting for 1case(2.06%).

**Distribution of benign and malignant adnexal tumour**

Out of 53 cases 45(84.6%) were benign and 8(15.4%) were malignant.

**Fig 11: Pie chart showingincidence of benign and malignant tumors**

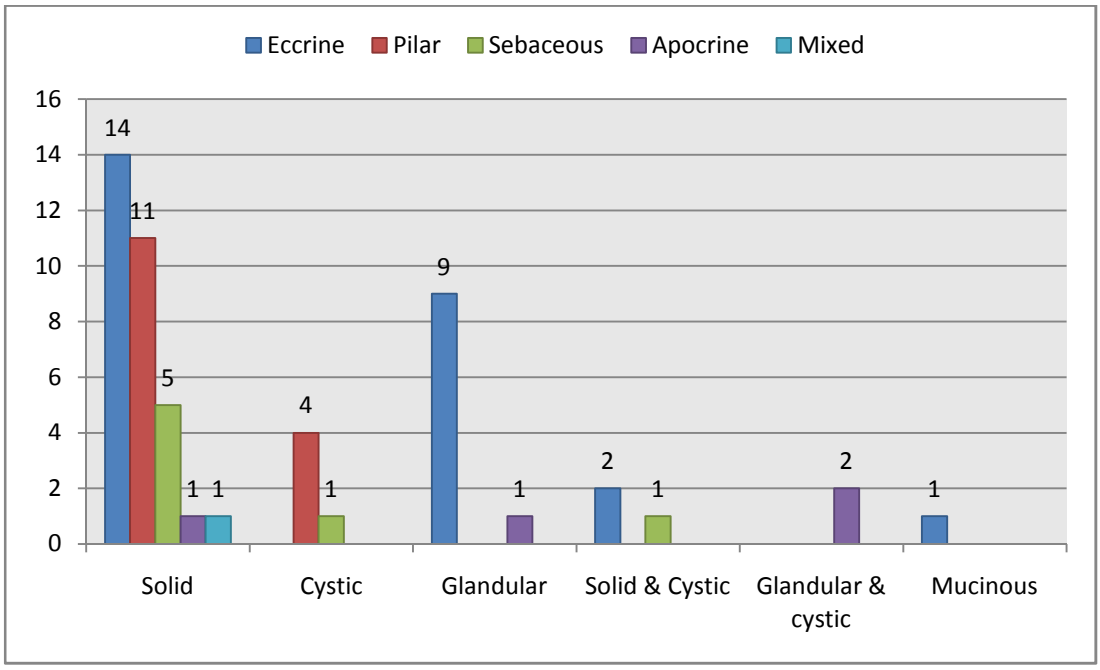



**HISTOMORPHOLOGICAL DISTRIBUTION OF SKIN ADNEXAL TUMORS**

**Table 9: Distribution of all SAT according to the histomorphological arrangement.**

| Tumor differentiation | Solid | Cystic | Glandular | Solid& cystic | Glandular cystic | Mucinous |
|---|---|---|---|---|---|---|
| **Eccrine** | 14 (53.84%) | - | 09 (34.56%) | 2 (7.68%) | - | 01 (3.92%) |
| **Pilar** | 11 (73.33%) | 04 (26.64%) | - | - | - | - |
| **sebaceous** | 05 (71.42%) | 01 (14.28%) | - | 1 (14.28%) | - | - |
| **Apocrine** | 01 (25%) | - | 01 (25%) | - | 02 (50%) | - |
| **Mixed** | 01 (100%) | - | - | - | - | - |
| **Total** | 32 (60.37%) | 05 (9.4%) | 9 (18.92%) | 3 (5.64%) | 2 (3.79%) | 01 (2.02%) |

**Fig 12 :Bar diagram showing distribution of all SAT according to the histomorphological arrangement**

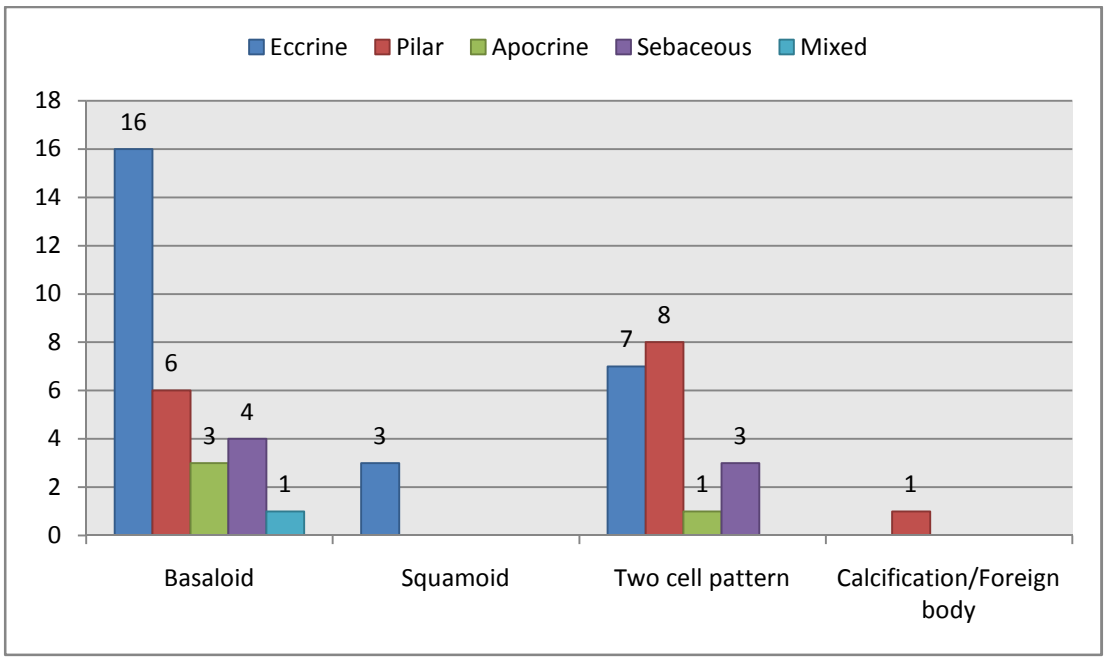



In the present study, among all the adnexal tumors, solid pattern were maximum accounting for 60.37% (32cases).This was followed by glandular pattern accounting for 18.86% (10cases) followed by cystic, solid /cystic, glandular cystic patterns with 9.4%(5cases), 5.64% (3cases) and 3.79% (2cases) respectively. Mucinous 1case accounting for 2.02% Among eccrine, maximum of the tumors showed solid pattern accounting for 53.84% (14cases) followed by glandular pattern accounting for 34.56% (9cases). Among pilar tumors solid pattern formed maximum accounting for 73.33%(11 cases) followed by cystic pattern accounting for 26.64% (04cases).71.42% (5cases) of sebaceous tumors showed solid pattern remaining two cases showed cystic and solid/cystic pattern each accounting for 14.28%(1case). Among apocrine tumors 25%(1cases)showed solid pattern ,25%(1case) showed glandular pattern and remaining 50%(2cases) of the tumors are showed glandular cystic pattern.

**Table 10:Distribution of all SAT according to the cellular morphology**

| Tumors | Basaloid | Squamoid | Two cell pattern | Calcification/foreign body reaction |
|---|---|---|---|---|
| **Eccrine derived** | 16(61.53%) | 03(11.59%) | 07(26.88%) | - |
| **Pilar** | 06(40%) | - | 08(53.32%) | 01(6.68%) |
| **Apocrine** | 03(75%) | - | 01(25%) | - |
| **Sebaceous** | 04(57.14%) | - | 03(42.86%) | - |
| **Mixed** | 01(100%) | | - | - |
| **Total** | 30(56.60%) | 3(5.64%) | 19(35.76%) | 01(02%) |

**Fig 13 :Bar diagram showing distribution of all SAT according to the cellular morphology**




In the present study, among all the adnexal tumors, basaloid type of cell pattern were maximum accounting for 56.60%(30cases),followed by two cell pattern accounting for 35.76%(19cases). This was followed by squamoid cell pattern accounting for 5.64%(3 cases) and calcification in one case (6.68%). Among eccrine tumors 61.53% (16cases) of the tumors showed basaloid type of cells, 26.88% (7cases) of them showed two cell type and remaining 11.59% (3cases) showed

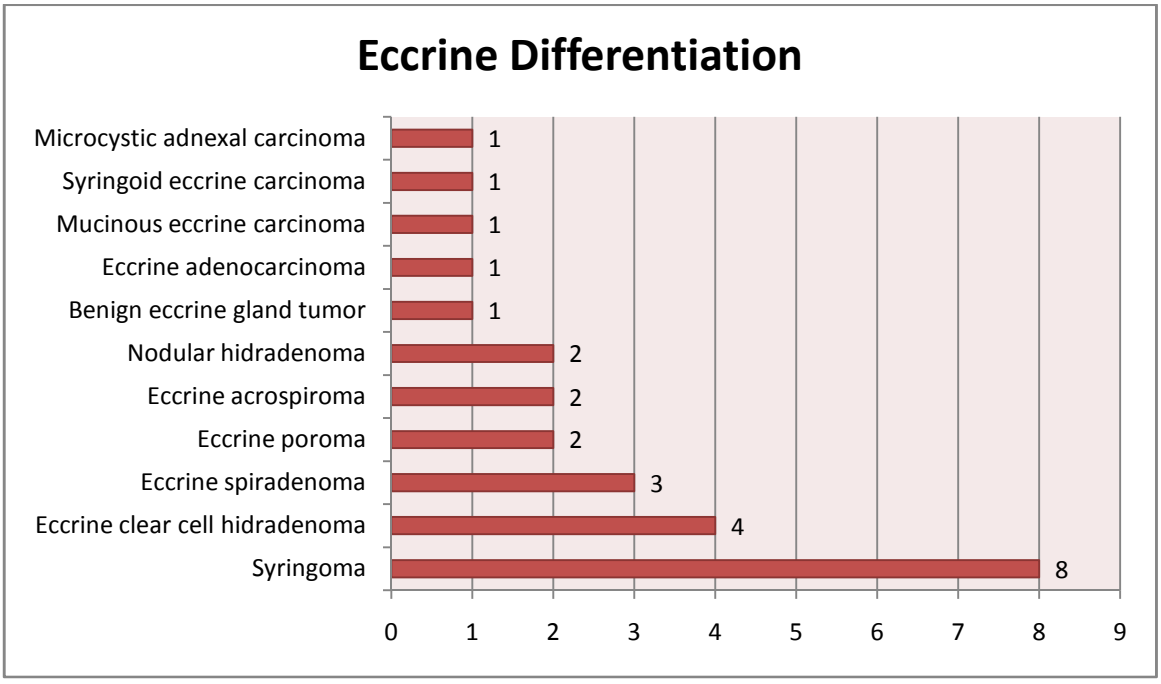
squamoid type of cells. Maximum pilar tumors showed two cell type accounting for 53.32%(8cases), followed by basaloid type and calcification accounting for 40% (6cases) and 6.68% (1case) respectively.75%(3ases) of the tumors showed basaloid type of cell remaining 25% (1case) two cell type. Among sebaceous 57.14% (4cases) showed basaloid and remaining 42.86% (3cases) two cell type.

**SKIN ADNEXAL LESIONS WITHECCRINEDIFFERENTIATION**

There were 26 cases of skin adnexal tumors with eccrine differentiation which accounted for 49.05% of the cases.

The different tumors with eccrine differentiation seen in this study are illustrated in fig14.

**Fig 14:Bar diagram showing eccrine derived tumors**



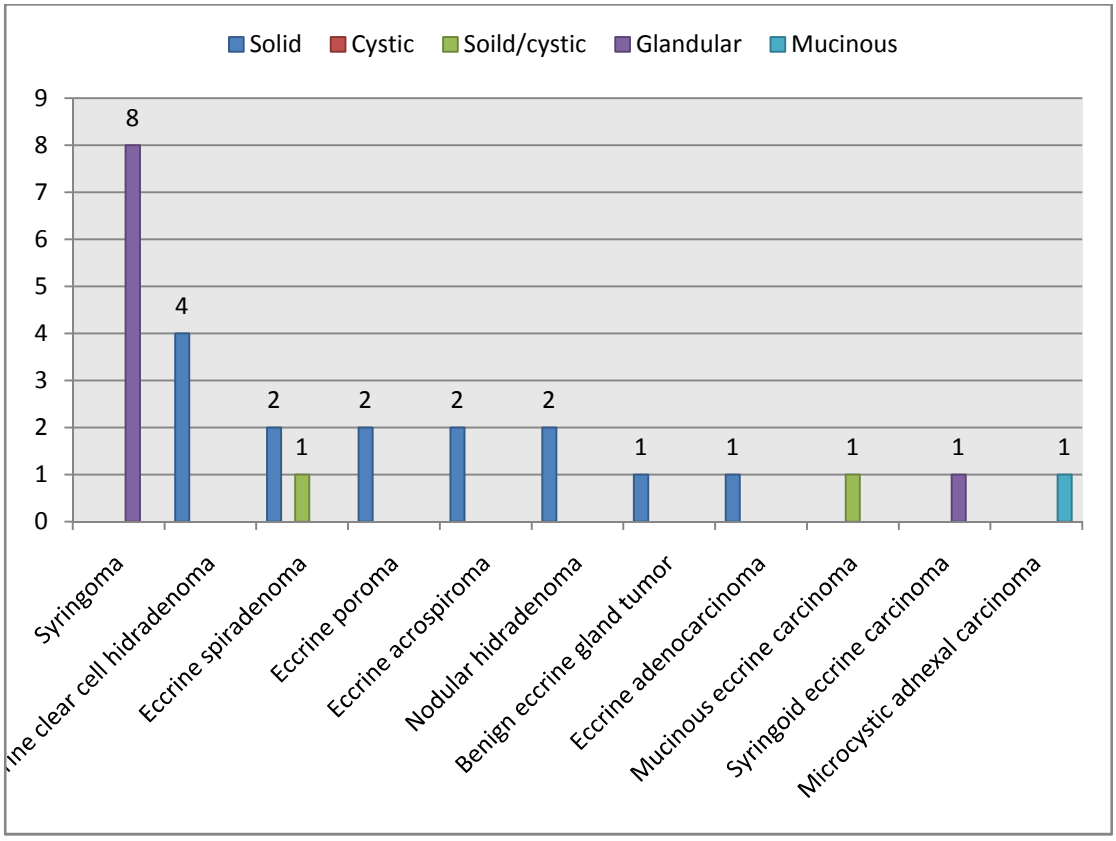

In this study majority is formed by syringoma accounting for 08 cases (30.76%) followed by eccrine cell hidradenoma 04 cases (15.38%), eccrine spiradenoma 03 cases (11.53%), nodular hidradenoma 2cases (7.69%), eccrine

acrospiroma 2cases (7.69%), eccrine poroma 2cases(7.69%), single case of benign eccrine gland tumor(3.84%), eccrine adenocarcinoma (3.84%), mucinous eccrine carcinoma (3.84%), syringoid eccrine carcinoma (3.84%)and microcystic adnexal carcinoma(3.84%)

**Table 11: Distribution of eccrine tumors according to the histomorphological pattern**

| Tumors | Total no | solid | Cystic | Solid/cystic | Glandular | Mucinous |
|---|---|---|---|---|---|---|
| **Syringoma** | 08 | - | - | - | 08(100%) | - |
| **Eccrine clear cell hidradenoma** | 04 | 04(100%) | - | - | - | - |
| **Eccrine spiradenoma** | 03 | 02(66.6%) | - | 01(33.4%) | - | - |
| **Eccrine acrospiroma** | 02 | 02(100%) | - | - | - | - |
| **Nodular hidradenoma** | 02 | 02(100%) | - | - | - | - |
| **Eccrine poroma** | 02 | 02(100%) | - | - | - | - |
| **Benign eccrine gland** | 01 | 01(100%) | - | - | - | - |
| **Eccrine adenocarcinoma** | 01 | 01(100%) | - | - | - | - |
| **Microcystic adnexial carcinoma** | 01 | - | - | 01(100%) | - | - |
| **Syringoid eccrine carcinoma** | 01 | - | - | - | 01(100%) | - |
| **Mucinous eccrine carcinoma** | 01 | - | - | - | - | 01(100%) |

**Fig 15: Bar diagram showing distribution of eccrine tumors according to the histomorphological pattern**



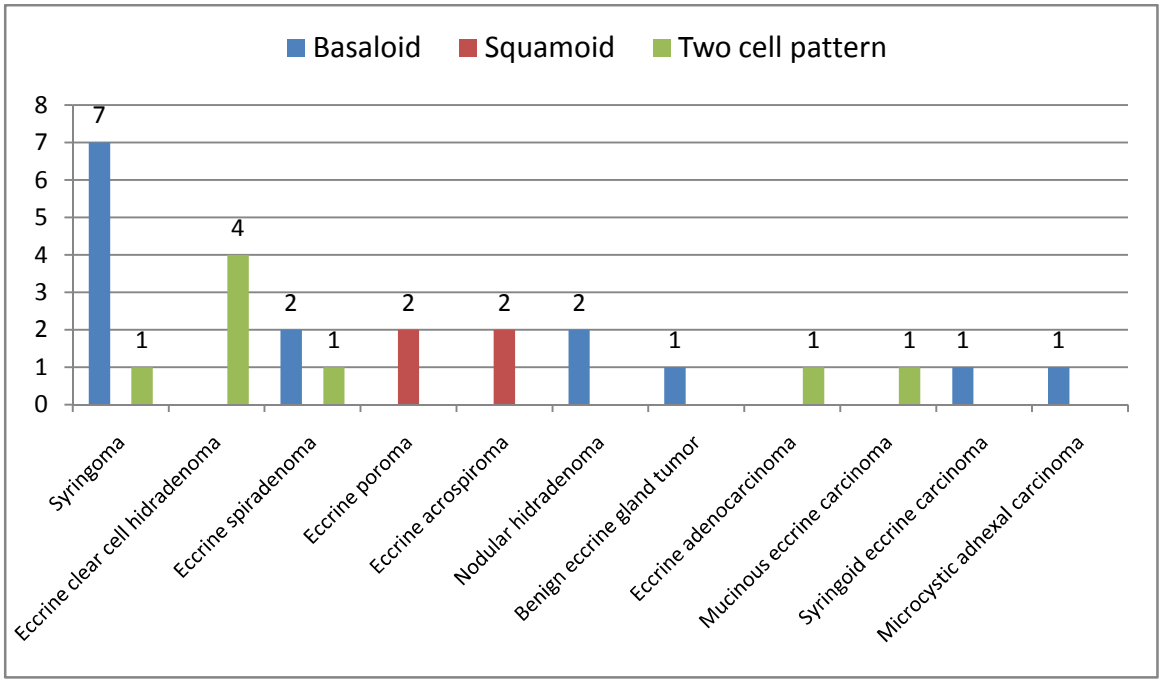

Among eccrine tumors, all the syringoma tumors showed glandular type of arrangement accounting for 100% (8cases). Eccrine spiradenoma showed maximum of solid pattern accounting for 66.6% (2cases) followed by solid/cystic pattern accounting for 33.4% (1case). Eccrine clear cell hidradenoma (4cases), eccrine acrospiroma (2cases), nodular hidradenoma (2cases), eccrine poroma (2cases), benign eccrine gland tumor (1case), eccrine adenocarcinoma (1case) all of them are showed solid pattern accounting for 100%. One case of microcystic adnexial carcinoma showed solid and cystic pattern accounting for 100%, syringoid eccrine carcinoma

showed glandular pattern accounting for 100% and one case of mucinous eccrine carcinoma showed mucinous pattern accouting for 100%

**Table 12:**Distribution of eccrine tumors according to cellular morphology

| **Tumors** | **Basaloid** | **Squamoid** | **Two cell pattern** |
|---|---|---|---|
| **Syringoma** | 07(87.5%) | - | 01(12.5%) |
| **Eccrine clear cell hidradenoma** | - | - | 04(100%) |
| **Eccrine spiradenoma** | 02(66.6%) | - | 01(33.4%) |
| **Eccrine acrospiroma** | - | 02(100%) | - |
| **Nodular hidradenoma** | - | 02(100%) | - |
| **Eccrine poroma** | 02(100%) | - | - |
| **Benign eccrine gland** | 01(100%) | - | - |
| **Eccrine adenocarcinoma** | - | - | 01(100%) |
| **Microcystic adnexial carcinoma** | - | - | 01(100%) |
| **Mucinous eccrine carcinoma** | 01(100%) | - | - |
| **Syringoid eccrine carcinoma** | 01(100%) | - | - |

**Fig 16: Bar diagram showing distribution of eccrine tumors according to cellular morphology**

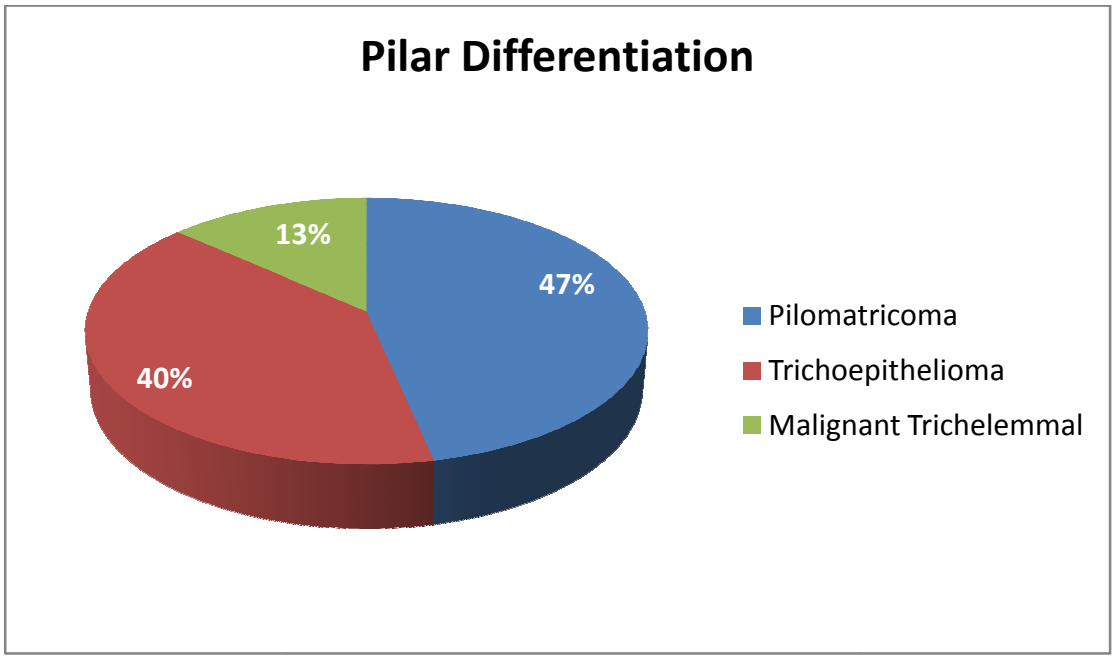



Among eccrine tumors, all syringoma tumors 87.5% (7cases) showed basaloid type of cell pattern, 12.5%(1case) showed two cell type pattern. All Eccrine clear cell hidradenoma cases showed two cell type pattern accounting for 100% (4cases). In eccrine spiradenoma 66.6% (2cases) showed basaloid type and 33.4%(1case) showed two cell type pattern. All the cases of nodular hidradenoma (2cases) and eccrine acrospiroma (2cases) showed squamoid cell pattern accounting for 100%. Eccrine adenocarcinoma (1case) and microcystic adnexial carcinoma (1case) showed two cell type pattern both accounting for 100%. Eccrine poroma (2cases), benign eccrine gland tumor (1case), syringoid eccrine carcinoma (1case), mucinous eccrine carcinoma (1case)all of them showed basaloid type of cell pattern accounting for 100%.

**SKINADNEXAL LESIONSWITH PILAR DIFFERENTIATION**

Skin adnexal tumors with pilar differentiation comprised 28.30% (15 cases). The different tumors with pilar differentiation are illustrated in fig 17

**Fig 17: Pie chart showing distribution of pilar tumors**

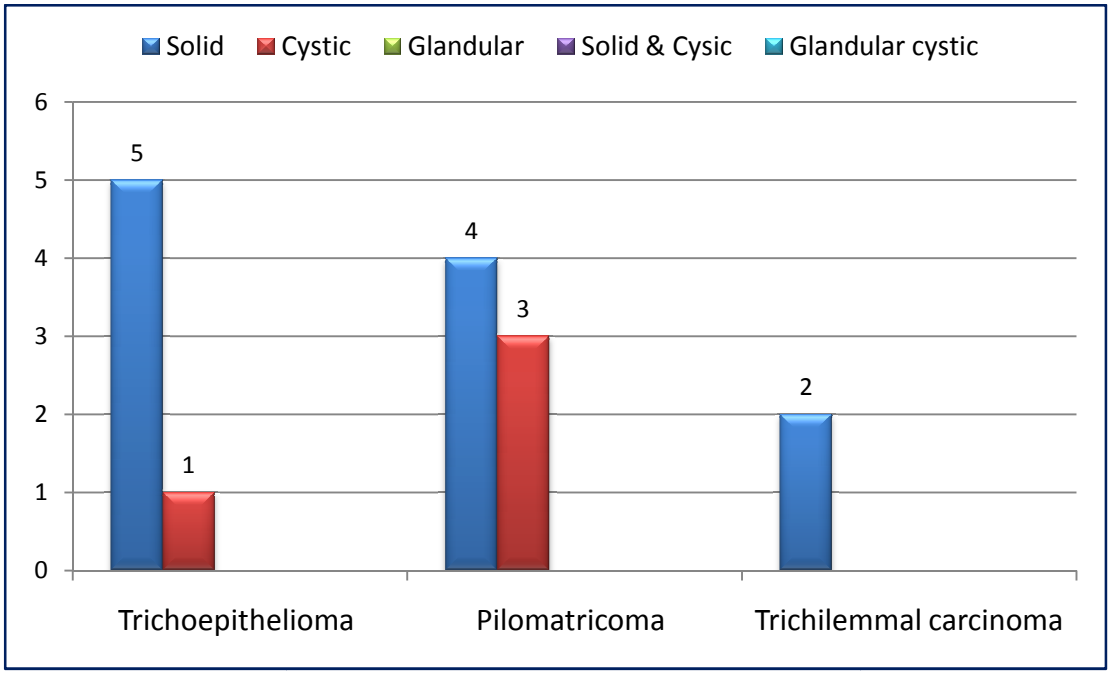



In this study pilomatricoma were maximum accounting for 47% (7cases), followed by trichoepithelioma accounting for 40% (6cases) and malignant trichilemmal tumor 13% (2cases).

**Table 13: Distribution of pilar tumors according to histomorphological pattern**

| Tumor | Solid | Cystic | Glandular | Solid& cystic | Glandular cystic |
|---|---|---|---|---|---|
| **Trichoepithelioma** | 05 (83.33%) | 01 (16.70%) | - | - | - |
| **Pilomatricoma** | 04 (57.14%) | 03 (42.86%) | - | - | - |
| **Trichilemmal carcinoma** | 02 (100%) | - | - | - | - |

**Fig.18: Bar diagram showing distribution of pilar tumors according to histomorphological pattern**

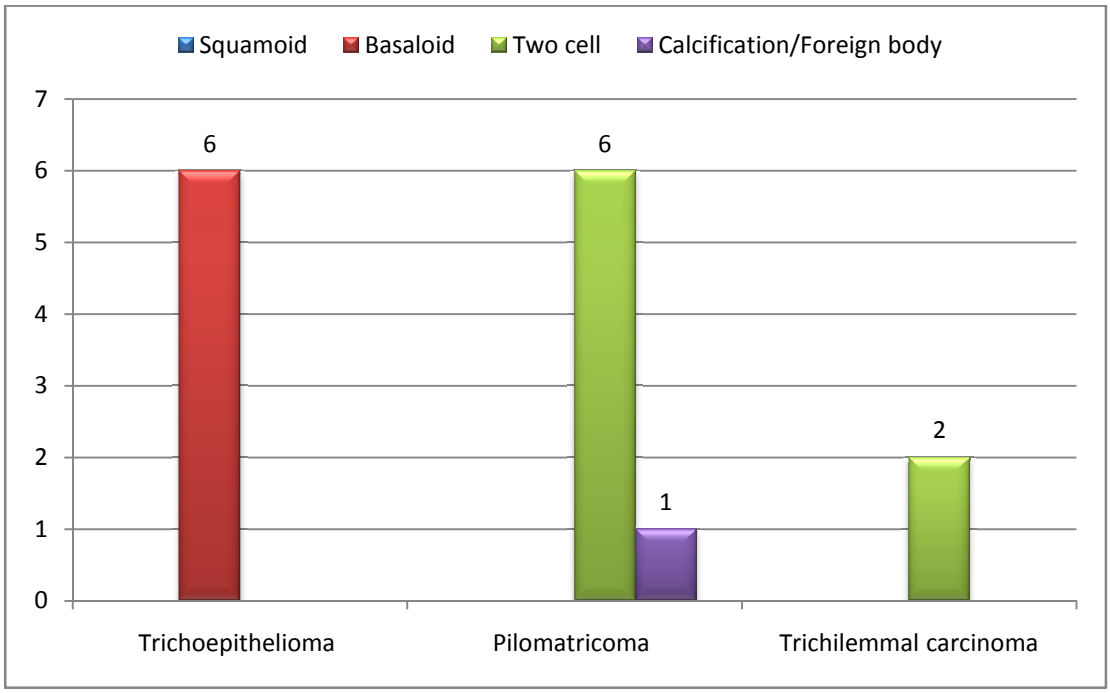



Among all pilar tumors, trichoepithelioma tumors 83.33%(5cases) showed solid pattern and 16.7%(1case) showed cystic pattern. 57.14%(4cases) of pilomatricoma tumor showed solid pattern and 42.86%(3cases) showed cystic pattern wereas all the trichilemmal carcinoma showed solid pattern accounting for 100% (2cases).

**Table.14:Distribution of pilar tumors according to the cellular morphology**

| Tumor | Squamoid | Basaloid | Two cell pattern | Calcification/foreign body reaction |
|---|---|---|---|---|
| **Trichoepithelioma** | - | 06 (100%) | - | - |
| **Pilomatricoma** | - | - | 06 (85.71%) | 01 (14.29%) |
| **Malignant trichelemmal tumor** | - | - | 02 (100%) | - |

**Fig19: Bar diagram showing distribution of pilar lesions according to the cellular morphology**

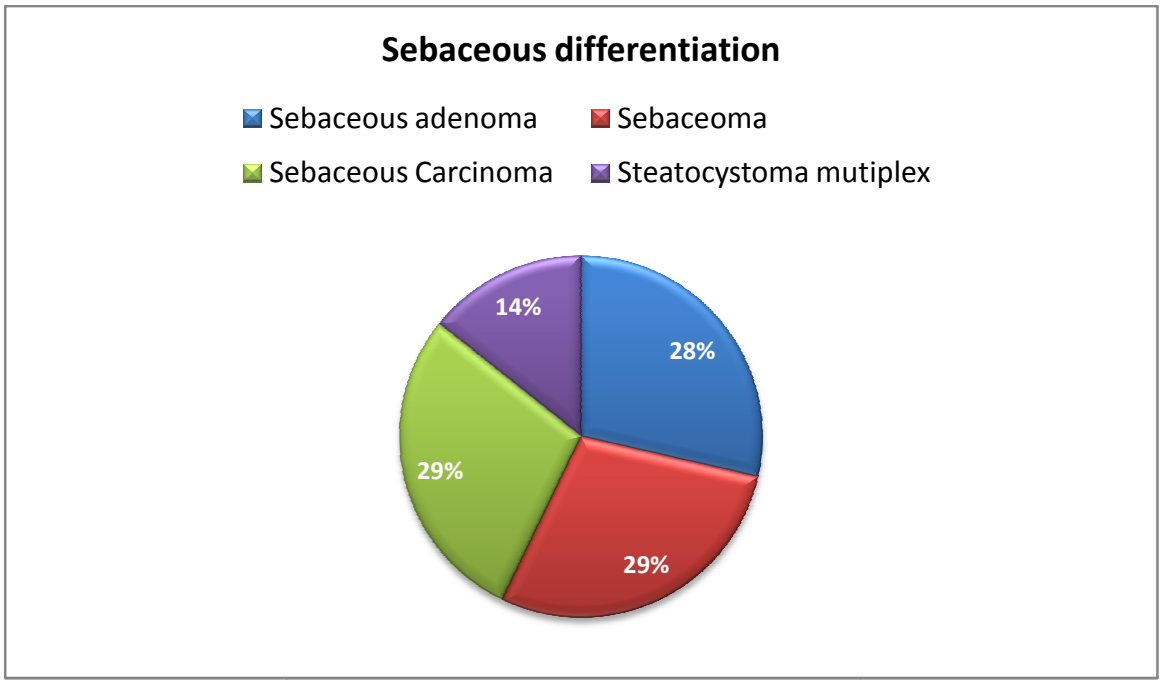



All the trichoepithelioma tumors showed basaloid type of cell pattern accounting for 100%(6cases). 85.71%(6cases) of pilomatricoma showed two cell type pattern and 14.29%(1case) showed calcification & foreign body reaction. Were as all the trichilemmal carcinoma showed two cell pattern accounting for 100%(2cases)

## SKIN ADNEXAL LESIONS WITH SEBACEOUS DIFFERENTIATION

Tumors with sebaceous differentiation constituted for 13.20% (7cases) among all the skin adnexal tumors. The spectrum of the tumors seen in this study is highlighted in fig 20.

**Fig 20: Pie chart showing distribution of sebaceous tumors**

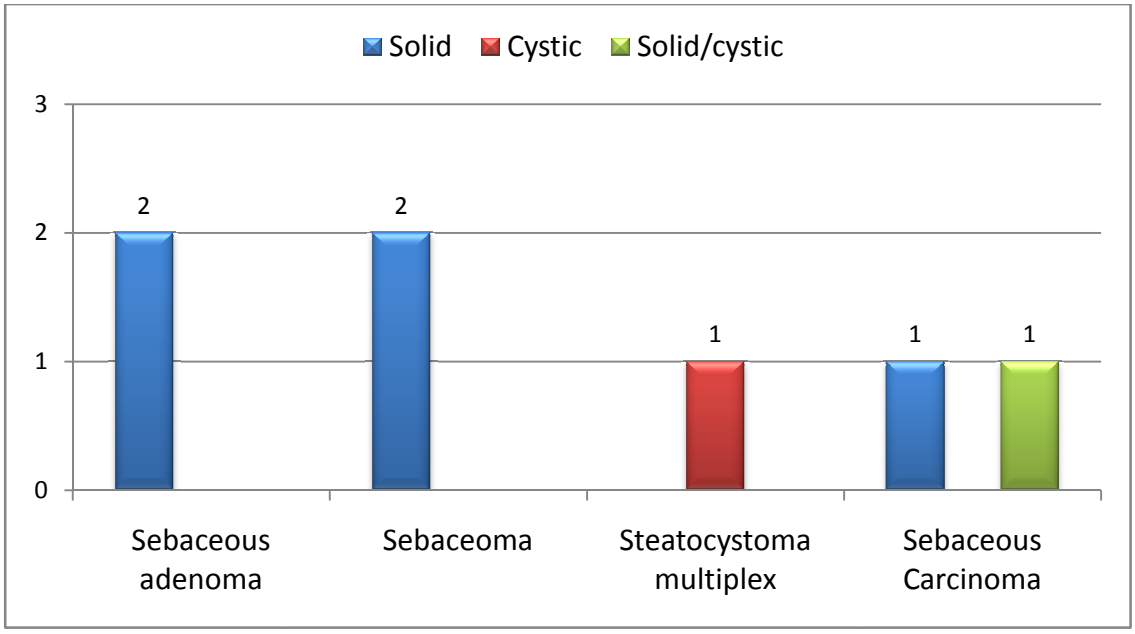



Sebaceous adenoma(2cases) and sebaceoma(2cases) were accounting for 28.57% each followed by two cases of sebaceous carcinoma accounting for 28.57% and one case of steatocystoma multiplex accounting for 14.29%.

**Table 15: Distribution of sebaceous tumors according to the histomorphological pattern**

| Tumors | Solid | Cystic | Solid/cystic |
|---|---|---|---|
| Sebaceous adenoma | 02 (100%) | - | - |
| Sebaceoma | 02 (100%) | - | - |
| Steatocystoma multiplex | - | 01 (100%) | - |
| Sebaceous carcinoma | 01 (50%) | - | 01 (50%%) |

**Fig 21: Bar diagram showing distribution of sebaceous tumors according to the histomorphological pattern**

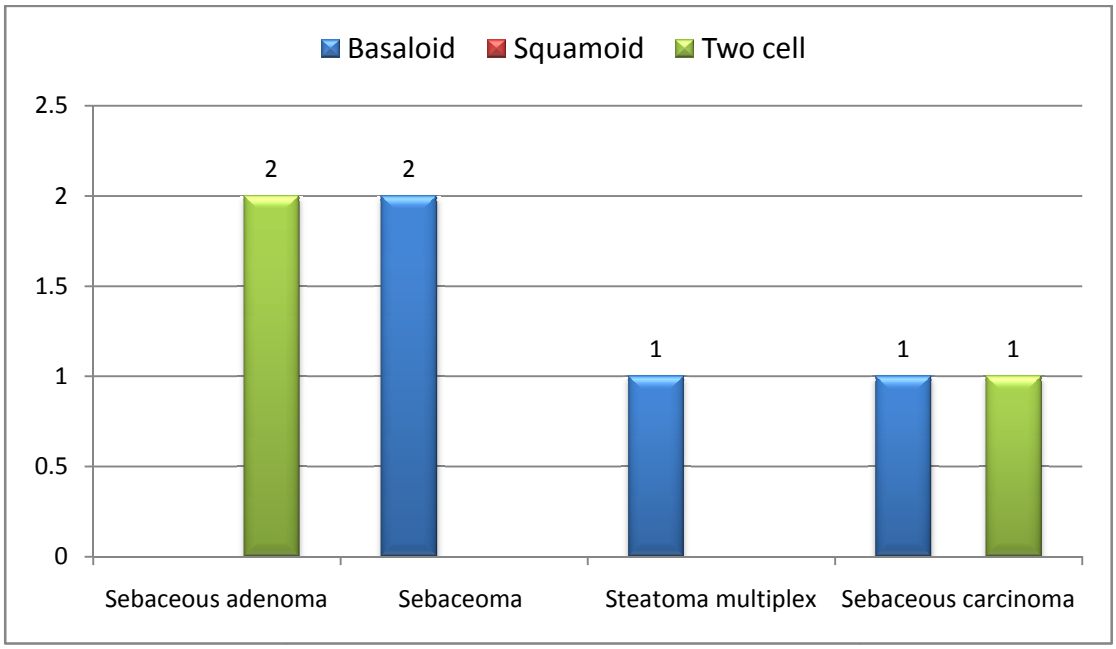



All the cases of sebaceous adenoma (2cases) and sebaceoma (2cases) showed solid pattern accounting for 100%, one case of steatocystoma multiplex showed cystic pattern accounting for 100% and 50%(1case) of sebaceous carcinoma showed solid/cystic pattern and the other 50%(1case) showed solid pattern.

**Table.16 : Distribution of sebaceous tumors according to the cellular morphology**

| Tumors | Basaloid | Squamoid | Two cell pattern |
|---|---|---|---|
| Sebaceous adenoma | - | - | 02(100%) |
| Sebaceoma | 02(100%) | - | - |
| Steatocystoma multiplex | 01(100%) | - | - |
| Sebaceous carcinoma | 01(50%) | - | 01(50%) |

**Fig.22:Bar diagram showing distribution of sebaceous tumors according to the cellular morphology**

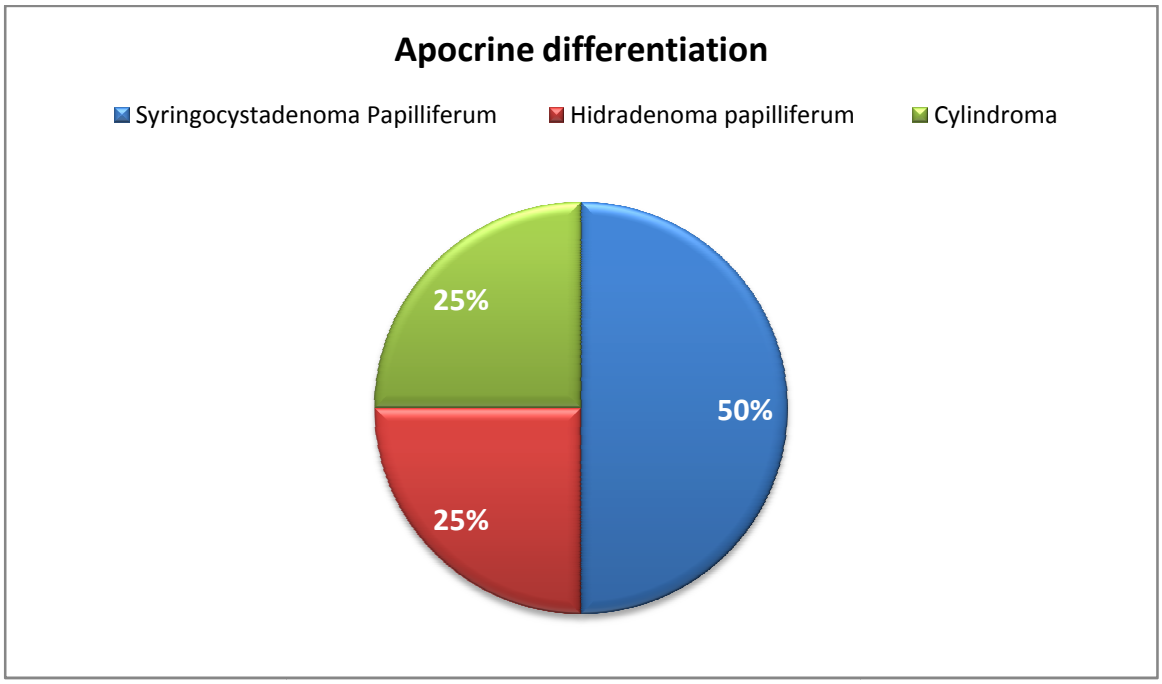



In this study all the sebaceous adenoma showed two cell type pattern accounting for 100%(2cases).All Sebaceoma (2cases) and steatocystma multiplex(1case) showed basaloid type cell pattern accounting for 100% each. One case of sebaceous carcinoma showed basaloid type of cell accounting for 50% and the other case showed two cell type accounting for 50%

**SKIN ADNEXAL TUMORS WITH APOCRINEDIFFERENTIATION**

A total of 4 cases showed apocrine differentiation, which accounted for 7.54% of skin adnexal lesions. The spectrum of the tumors seen in this study is highlighted in fig .23

Fig.23:Pie chart showing distribution of apocrine tumors

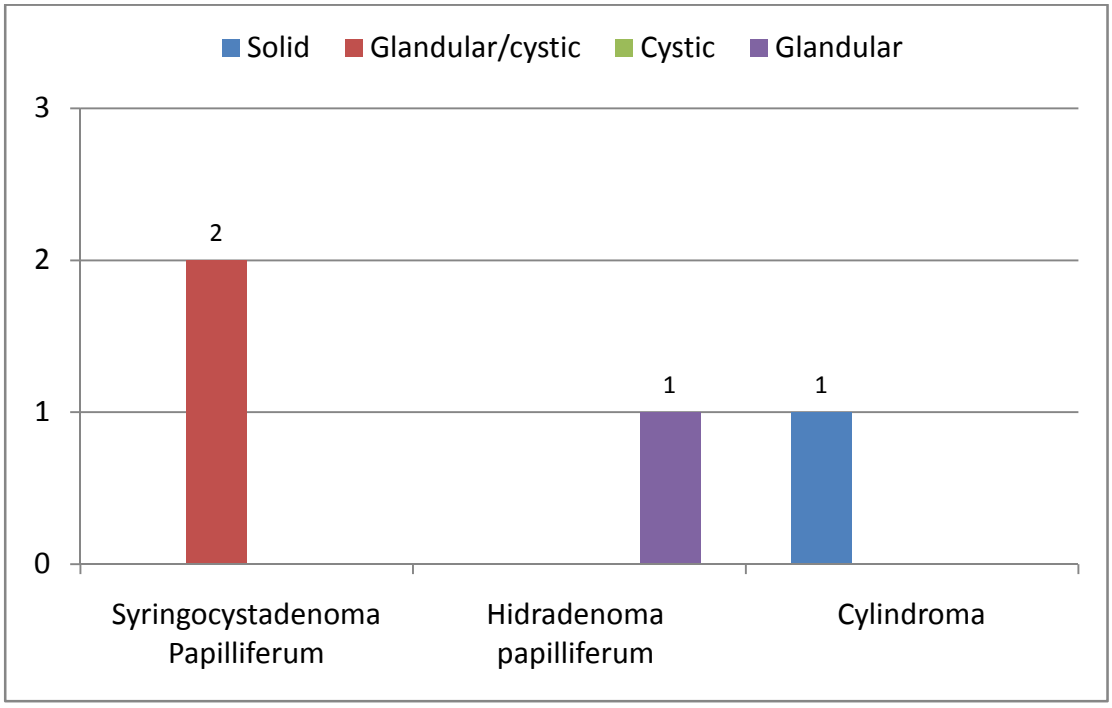



Among all apocrine tumors, 2 casesof syringocystadenoma papilliferum were seen accounting for 50% followed by singlecase of Hidradenoma papilliferum accounting for 25% and single case of cylindroma accounting for 25% .

**Table. 17: Distribution of apocrine tumors according to histomorphological pattern**

| Tumors | Solid | Glandular/ cystic | Cystic | Glandular |
|---|---|---|---|---|
| Syringocystadenoma Papilliferum | - | 02 (100%) | - | - |
| Hidradenoma papilliferum | - | - | - | 01 (100%) |
| Cylindroma | 01 (100%) | - | - | - |

**Fig 24 : Bar diagram showing distribution of apocrine tumors according to histomorphological pattern**

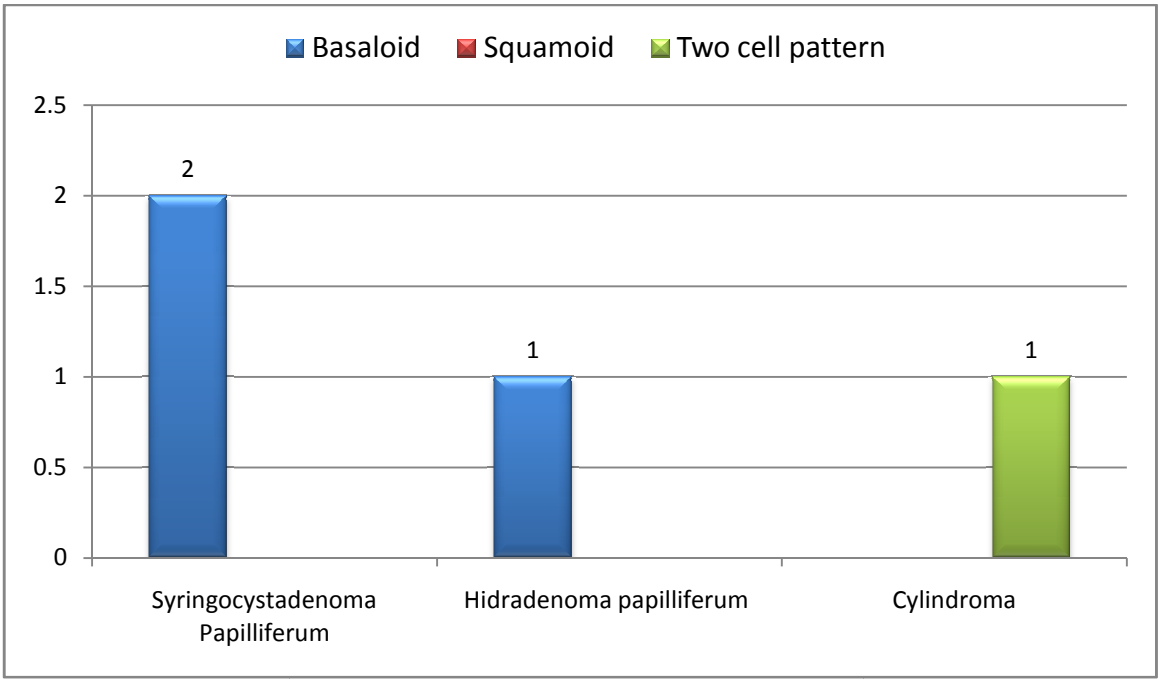



In this study all Syringocystadenoma papilliferum showed glandular cystic pattern accounting for 100% (2cases) and Hidradenoma papilliferum showed glandular pattern accounting for 100%(1case). Cylindroma showed solid pattern accounting for 100% (1case).

**Table.18 : Distribution of apocrine tumors according to the cellular morphology**

| Tumors | Basaloid | Squamoid | Two cell pattern |
|---|---|---|---|
| Syringocystadenoma Papilliferum 2(50%) | 02(100%) | - | - |
| Hidradenoma papilliferum 1(25%) | 01(100%) | - | - |
| Cylindroma 1(25%) | - | - | 01(100%) |

**Fig.25:Bar diagram showing distribution of apocrine tumors according to the cellular morphology**




In this study both syringocystadenoma papilliferum(2cases) and hidradenoma papilliferum(1case) showed basaloid type of pattern each accounting for 100%. Cylindroma showed two cell type accounting for 100%(1case).

## OTHER/ MIXED SKIN ADNEXAL TUMORS

One case of mixed tumor accounted for 2.2% of all skin adnexal lesions. This tumor showed solid type of pattern and basaloid type of cell pattern.

## SYRINGOMA

This study included 8 cases of Syringoma with eccrine differentiation accounting for 30.76% among all the eccrine tumors.

**Age at Presentation*:*** Syringoma occurred over a wide age range of 5 to 46 years with a mean age of 15 years.

**Clinical findings:** Most of the cases of syringoma showed a predilection for eyelid followed by the cheek & forehead

**Histopathology:**Syringoma tumor were ill circumscribed and composed inglandular arrangement, lined bybilayered epithelium of which showed comma like tail (fig 26) and solid strands ofepithelial cells, mainly of basaloid type. One of the case showed two cell type, consisting of both basaloid and clear cells.

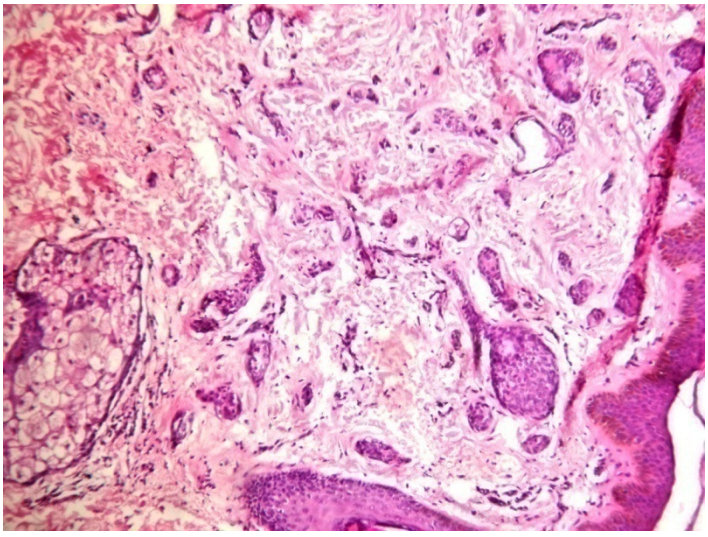


**Fig.26: Syringoma showing comma like tail and solid strands ofepithelial cells, mainly of basaloid type (H & E 10x)**

**ECCRINE SPIRADENOMA**

This study included 3 cases of eccrine spiradenoma which accounted for 11.53% among eccrine tumors.

**Clinical findings**: Patient were between the age group of 40-50yrs , of which two were male and one female with nodularlesions in the sites like scalp, preauricular and anterior aspect of left leg

**Microscopy:**The dermis showed sharply delineated nodules unattached to the overlying epidermis(fig 27 A) which are composed of aggregates of cells in sheets and cords, most of these appeared basaloid and very few cells arranged in glandular pattern with pale nuclei and containing eosinophilic material in the centre.(Fig 27 B)Thinirregular bands of fibrous tissue containing blood vessels were seen inbetween these cells.

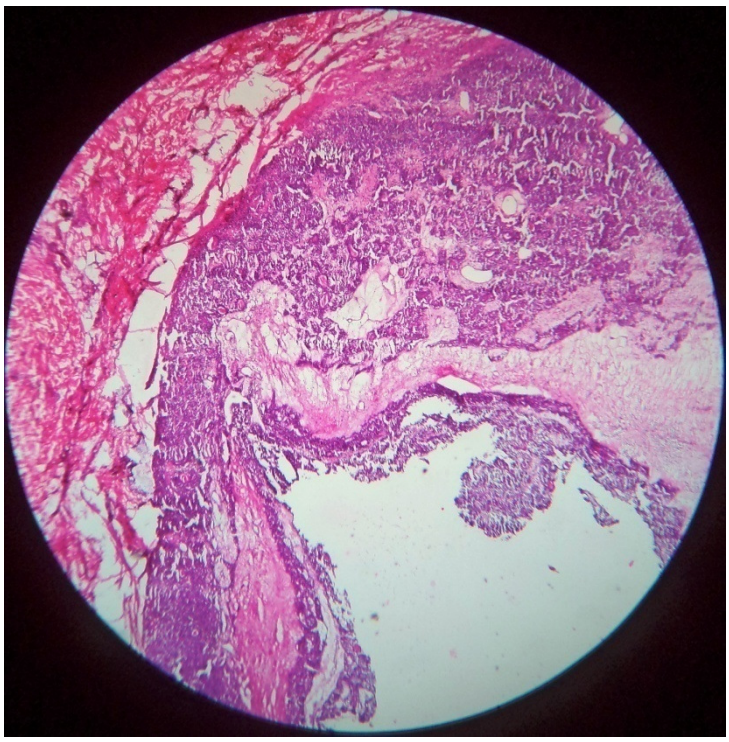


**Fig. 27 A:Eccrine spiradenoma showing basaloid cells arranged in sheets(H&E 10X)**

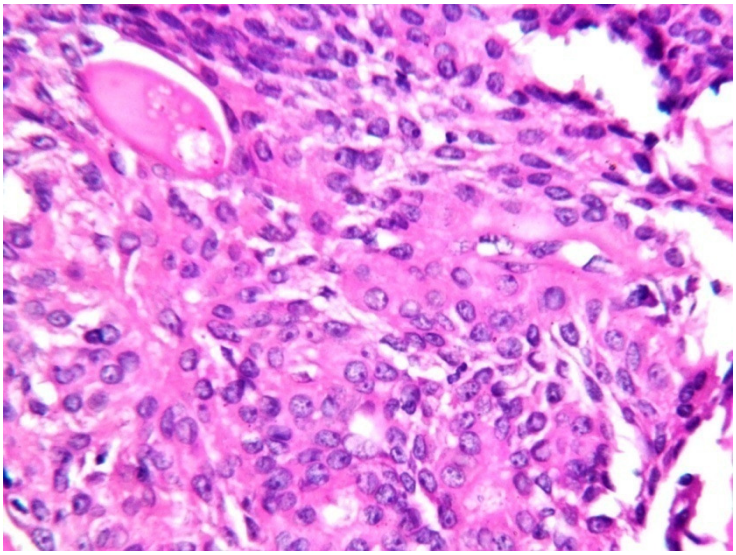


**Fig.27 B:Eccrine spiradenoma showing cells containing eosinophilic material arranged in sheets(H&E 40X)**

**ECCRINE ACROSPIROMA**

This study included two cases cases of an Eccrine acrospiroma which accounted for 7.69% among eccrine tumors.

**Clinical findings:**One patient was of 22year old female and the other patient was of 20 year old female bothpresented with a solitary lesion on the scalp.The cut surface of the excised lesion was grey white.

**Gross**: Single irregular skin covered pale brown tissue bit measuring 2x1.5x1cm, central ulcerated growthnoted measuring 1.5x1cm.On cut section pale white areas seen.

**Microscopy*:*** The dermis showed a tumor tissue arranged in solid sheets and inlobules. Individual tumor cells are polygonal with round vesicularnuclei and moderate amount of cytoplasm(fig 28 ).There wasno cellular atypia or necrosis.

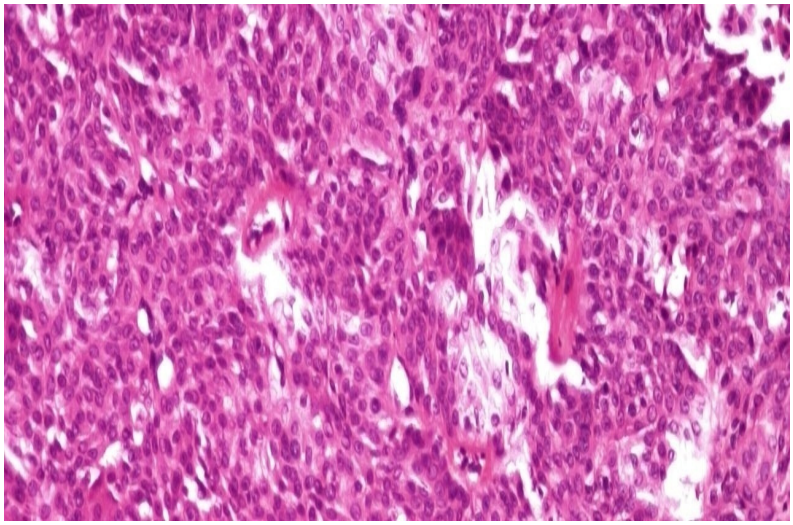


**Fig.28: Eccrine acrospiroma showing squamoid type of cells arranged in sheets.(H&E 40X)**

**ECCRINE POROMA**

This study included ywo cases of eccrine poroma accounting for 7.69% among eccrine tumors.

**Clinical findings :** One patient was of 72 year old male who presented with a solitary lesion on the palmar aspect of little ring finger and the other was 40years female who presented with lesions over left foot. The cut surface of the excised lesions were grey white.

**Microscopy :** The eccrine poroma lesion seen arising from the lower portion of the epidermis and extending into the dermis in broad fronds (Fig 29), focal connection with the epidermis was noted. The tumour cells were uniform round to oval cells with round nuclei and a moderate to scant amount of cytoplasm (basaloid type).

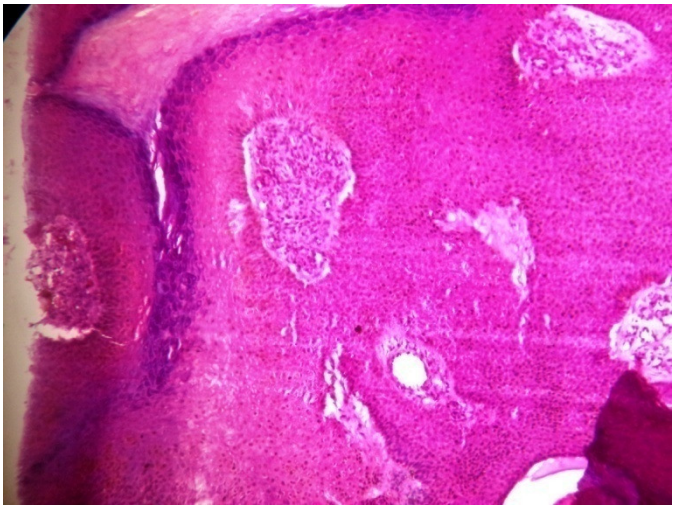


**Fig.29:Eccrine poroma showing basaloid cells arranged in solid sheets arising from the lower epidermis. (H&E 10X)**

**NODULAR HIDRADENOMA**

This study included 2 cases of nodular hidradenoma accounting for 7.69% among eccrine tumors.

**Clinical findings**: One patient was of a 52 year old female with nodular lesions over the forearm and the other was of 35 year old female with irregular lesion on parietal region of scalp presented clinically as epidermoid cyst of scalp.

**Gross:** Skin covered irregular tissue bits. Cut section- solid, grey white in color.

**Microscopy**- showed structure of skin comprised of epidermis and dermis. Epidermis lined by stratified squamous epithelium. Dermis shows tumor tissue arranged in multiple lobules, sheets and nests. Many tubular lamina lined by cuboidal to flattened epithelium noted in the tumor tissue. Tumor cells are polygonal having eosinophlic cytoplasm(Fig 30).

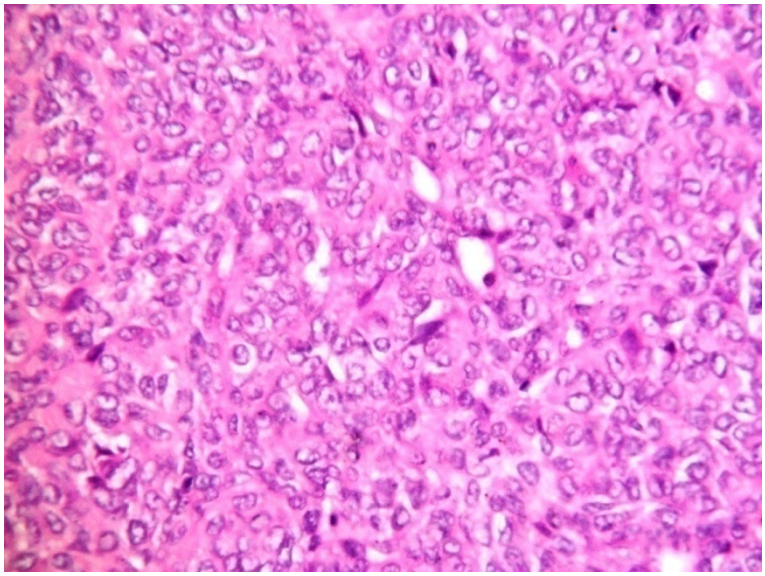


**Fig.30: Nodular hidradenoma showing squamoid type cells arranged in solid sheets (H&E 40X)**

**ECCRINE ADENOCARCINOMA**

The study included single case of eccrine adenocarcinoma accounting for 3.84% among eccrine tumors.

**Clinical findings** A 60year old male presented with nodular lesion over the scalp measuring 4x4cm.

**Gross;** Received scalp tissue with tumor tissue measuring 7x5cm. Tumor tissue measuring 3x3x1cm. Tumor was well circumscribed, external surface showed one nodule. On cut section serous fluid was drained out.

**Microscopy**-showed tissued lined by stratified squamous epithelium, beneath the lining tumor tissue is seen comprised of tumor cells arranged in large sheets, cribriform and irregular haphazardly arranged glandular pattern. Individual tumor cells are large containing pleomorphic hyperchromatic nuclei and clear cytoplasm, also basaloid type of cells are seen(Fig 31).

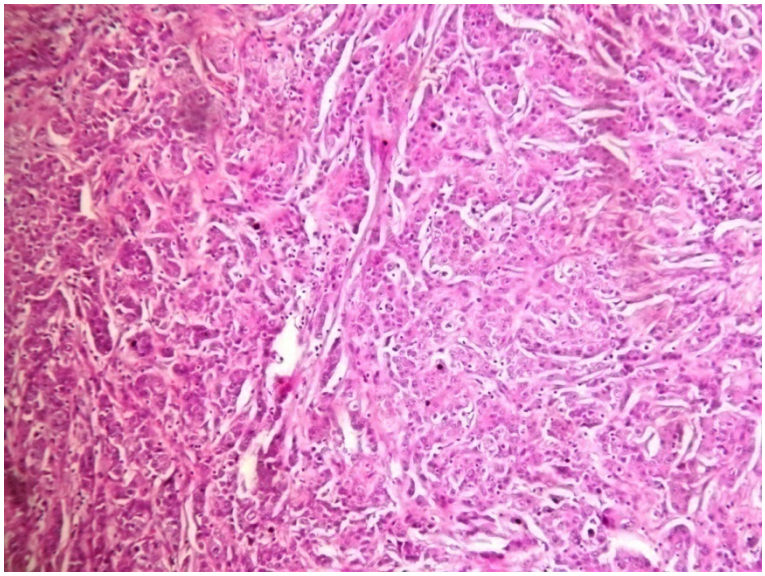


**Fig. 31: Eccrine adenocarcinoma showing both clear cytoplasm and basaloid type cells having pleomorphic nucleus arranged in sheets (H&E 10X)**

**ECCRINE CLEAR CELL HIDRADENOMA**

The study included 3 cases of eccrine clear cell hidradenoma which accounted for 15.38% among eccrine tumors.

**Clinical findings**: Patient were between the age group of 25-35yrs, of which all were female with nodular lesions in the sites like subareolar region, scalp, and anterior aspect of left leg.

**Microscopy** It showed variably sized nests and nodules of neoplastic epithelial cells, with small ductular lumens, confined within the upper dermis. The tumour cells are monomorphous and polyhedral,some showed clear cell change(fig.31A) and squamoid cells (fig .31B)

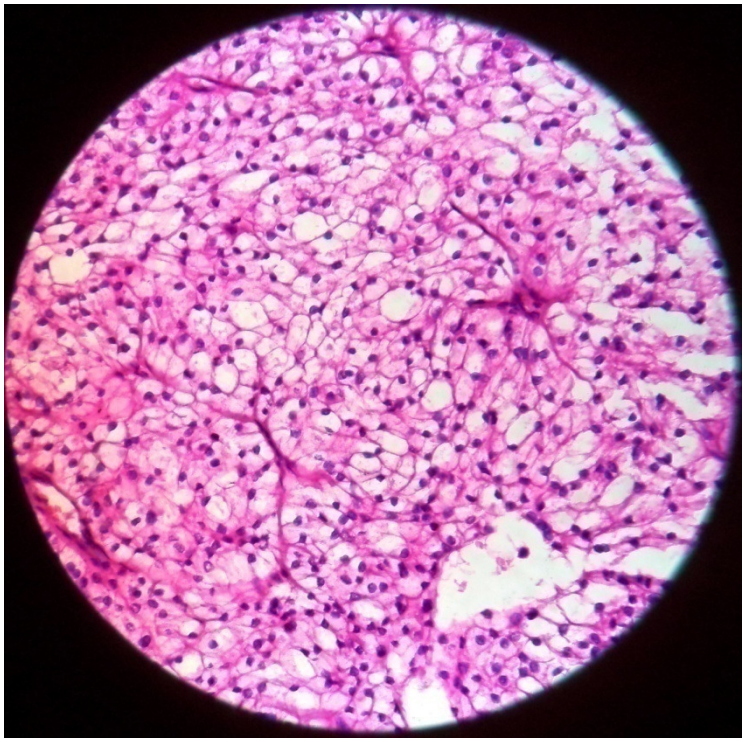


**Fig.32A: Eccrine clear sell hidradenoma showing clear cell change arranged in sheets (H&E 40X)**

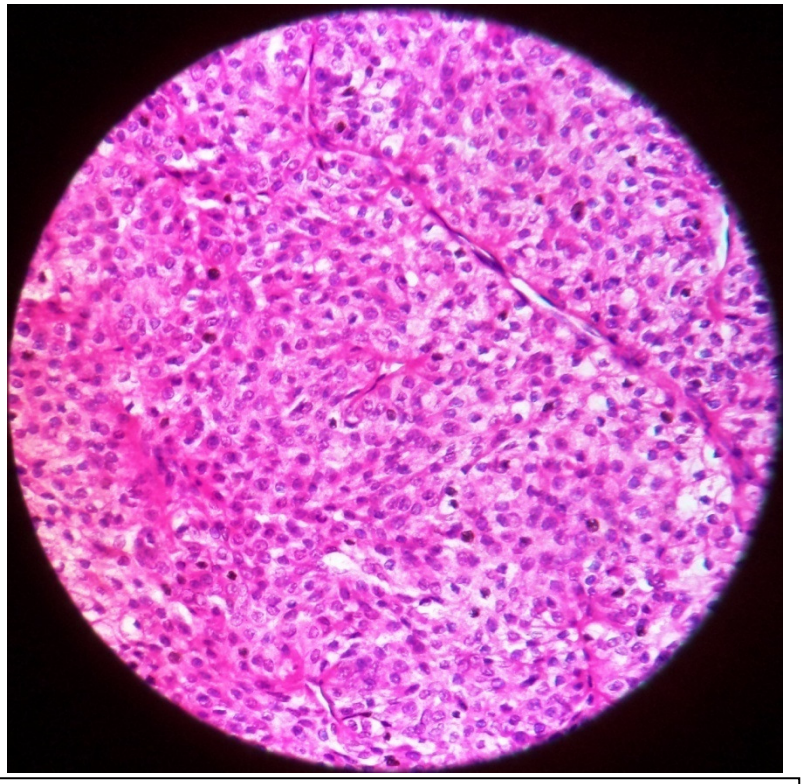


**Fig.32B: Eccrine clear cell hidradenoma showing squamoid type of cells arranged in sheets (H&E 40X)**

**MICROCYSTIC ADNEXAL CARCINOMA**

This study included single case of microcystic adnexial carcinoma accounting for 3.84% among eccrine tumors.

**Clinical findings:**

Patient was 25 year old male presented with a nodular growth over parietal region of scalp**.**

**Gross:** received three flap like tissue bits, larger measuring 2x1cm and smaller measuring 1.5x0.5cm

**Microscopy:** tumor tissue was arranged in sheets, cords, nests and cystically dilated spaces(fig 33A). Tumor cells are polygonal having pleomorphic nucleus with prominent nucleoli and moderate eosinophilic cytoplasm. Also seen cells with clear cytoplasm admixed with mucinouc areas & squamous metaplasia(fig 33B). Mitotic figures noted.

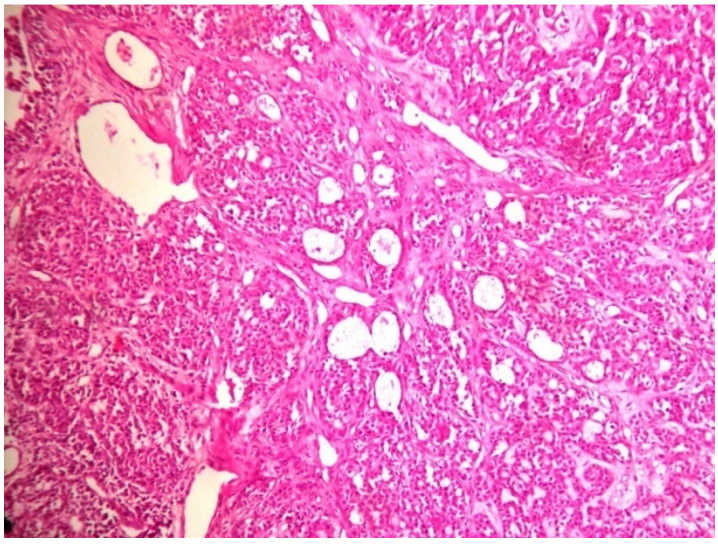


**Fig.33A:Microcystic adnexal carcinoma showing cystically dilated spaces (H&E 10X)**

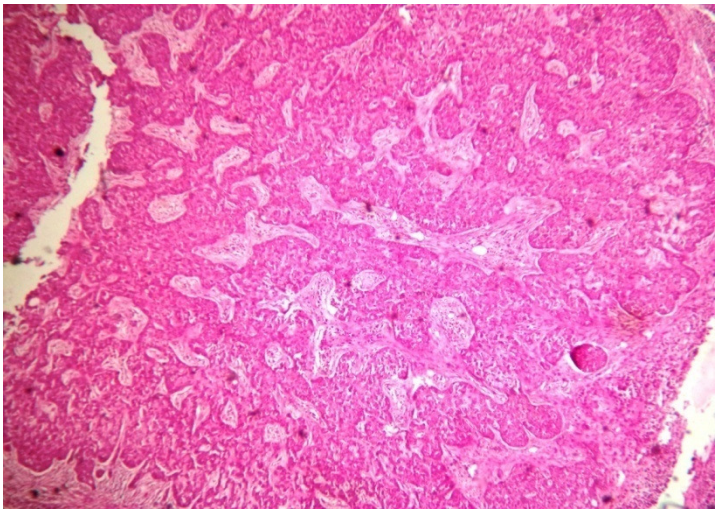


**Fig. 33B: Micrcystic adnexal carcinoma showing tumor tissue arranged in solid sheets with squamous metaplasia(H&E 10X)**

## SYRINGOID ECCRINE CARCINOMA

This study included single case of Syringoid eccrine carcinoma accounting for 3.84% among eccrine tumors.

**Clinical finding**: A 37years male presented with swelling over scalp

**Microscopy;** The tumor tissue is arranged in sheets , glandular pattern, tubules, these tubules are lined by single and double layer of round to oval cells having pleomorphic round to oval hyperchromatic nucleus with prominent nucleoli and scant cytoplasm.(Fig.34)

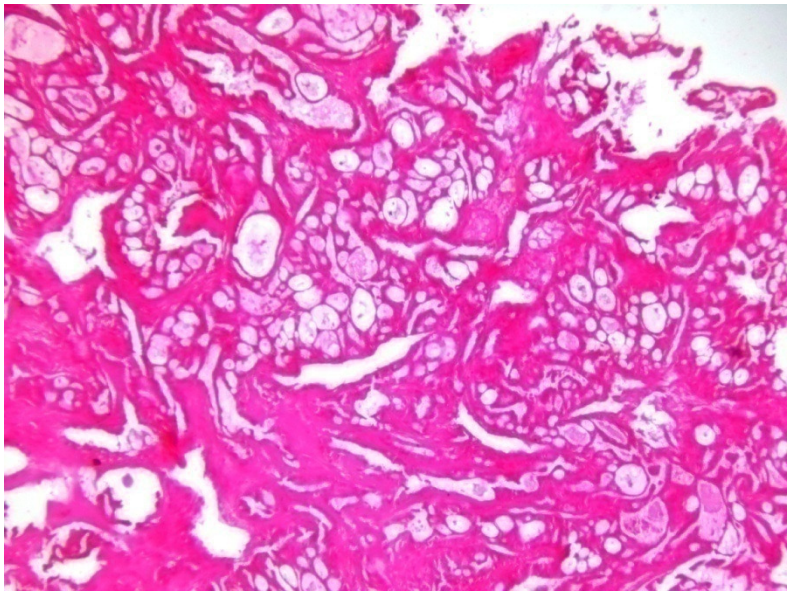


**Fig.34:Syringoid eccrine carcinoma showing tumor tissue arranged in glandular, tubular pattern and in sheets(H&E 10X)**

**MUCINOUS ECCRINE CARCINOMA**

This study included single case of mucinous eccrine carcinoma which accounted for 3.84% among eccrine tumors.

**Clinical finding**; A 40years old male patient presented with multiple nodular lesions over axilla.

**Microscopy;** The tumor tissue is arranged in lobules separated by fibrous septa, in each compartment abundant amount of pale staining mucin nests and cords of moderately anaplastic epithelial cells seen ( Fig.35A). The mucin showed strongly positive reaction with PAS(Fig. 35B)

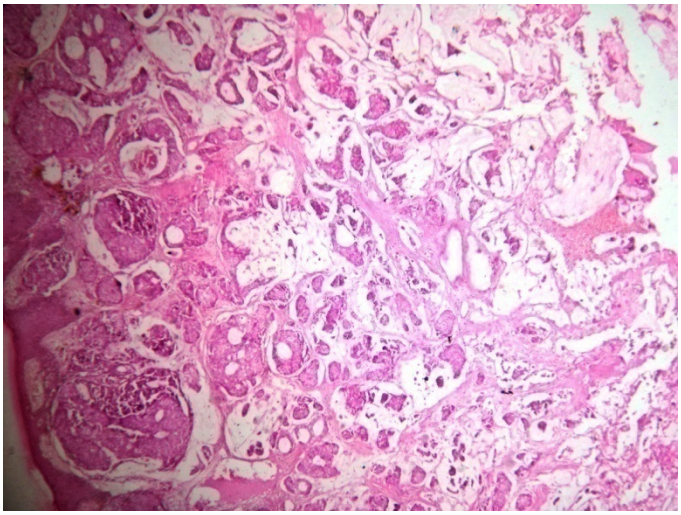


**Fig.35A Mucinous eccrine carcinoma showing tumor tissue arranged in lobules and abundant mucinous pools(H&E 10X)**

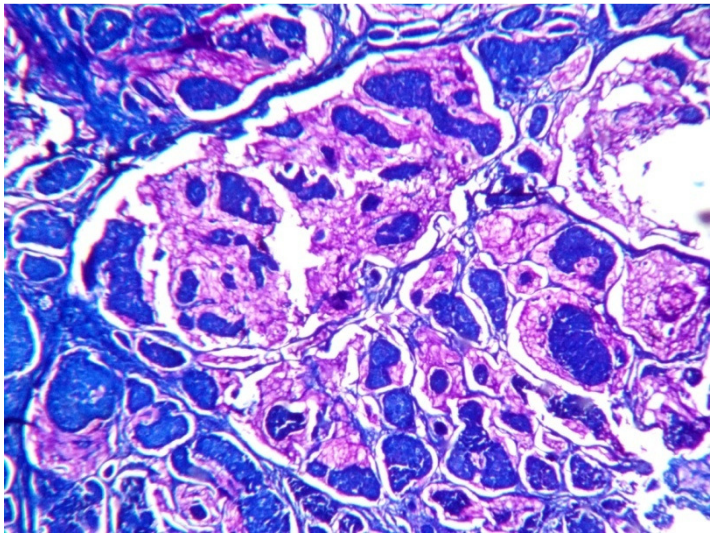


**Fig.35B, Mucinous eccrine carcinoma showing strongly mucin positive reaction with PAS (10X)**

## SKIN ADNEXAL TUMORS WITH PILAR DIFFERENTIATION

### Pilomatricoma

This study included 7 cases of Pilomatricoma which accounted for 47% among pilar tumors.

### Age at presentation

The age of the patients with Pilomatricoma ranged from 13 years to 62 years.
with mean age being of 26years. Most of the patients present with lesions over scalp, other sites included earlobe, cheek and eye lid.

**Histopathological features** All thecases of Pilomatrcoma showedsupramatricial differentiation i.e cellular areas withpale staining cells having a moderate amount cytoplasm and a not very crowded appearance as compared with the areas of matricial differentiation and a predominance of shadow cells.(fig 36A) Matricial differentiation characterised by areas showing closely packed basaloid cells having round, pale staining, finely stippled monomorphous nuclei with prominent nucleoli. Calcification was in a cases (Fig 36B).The tumoursshowed secondary changes such as inflammation and foreign body giant cell reaction(fig 36C).

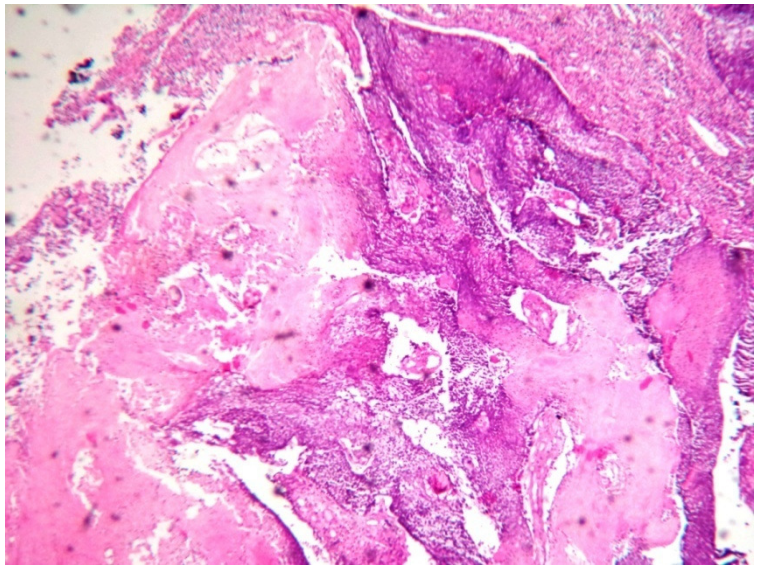


**Fig.36 A : Pilomatricoma showing areas of matricial differentiation and a predominance of shadow cells (H&E 10X)**

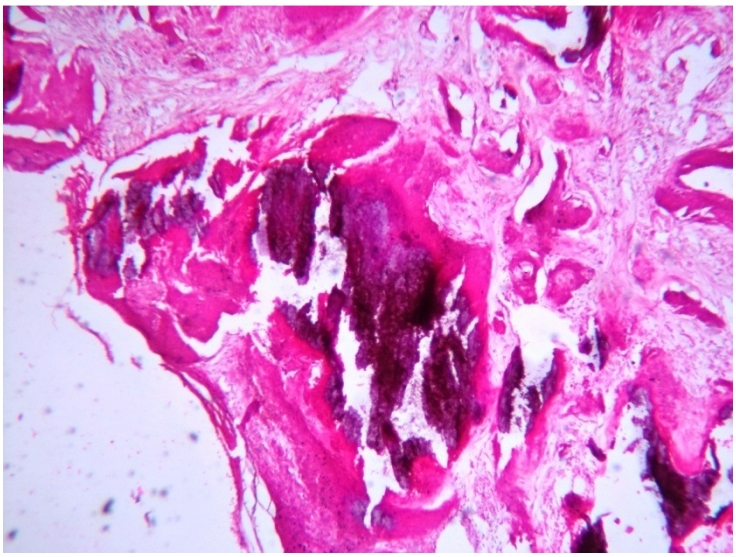


**Fig.36 B : Pilomatricoma showing areas of calcification.(H&E10X)**

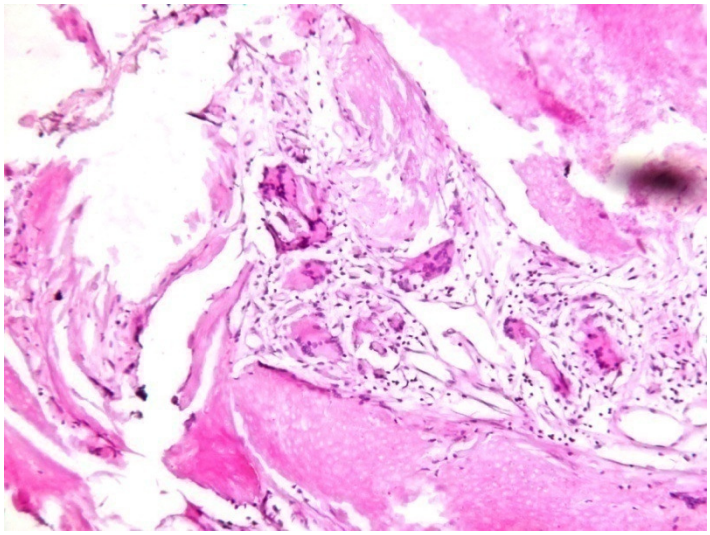


**Fig.36C: Pilomatricoma showing foreign body reaction (H&E 10X)**

**TRICHOEPITHELIOMA**.

This study included 6 cases of Trichoepithelioma which accounted for 40 % among pilar tumors.

**Clinical findings:**There was a female preponderance with 4 females and 2 male patients. All cases occurred in patients aged 15-75 yrs and presented as multiple skin coloured papules on the face with mean age being of 31years.

**Gross:**The skin biopsies ranging in size from 0.2cmsto 0.6cms in greatest dimension were obtained with skin surfaceshowing a raised lesion in all cases.

**Microscopy:** In all the 6 cases the lesions were located in the dermis with one of them showing a connection with the epidermal surface. The tumour was composed predominantly of nests of basaloid cells having ovoid vesicular nuclei and scant cytoplasm with few horn cyst scattered in between. (fig.37A) In one case the tumour cells were arranged in strands. One among the 6 cases showed calcification andabortive hair follicles. Also one of the case showed cystic spaces(fig.37B)

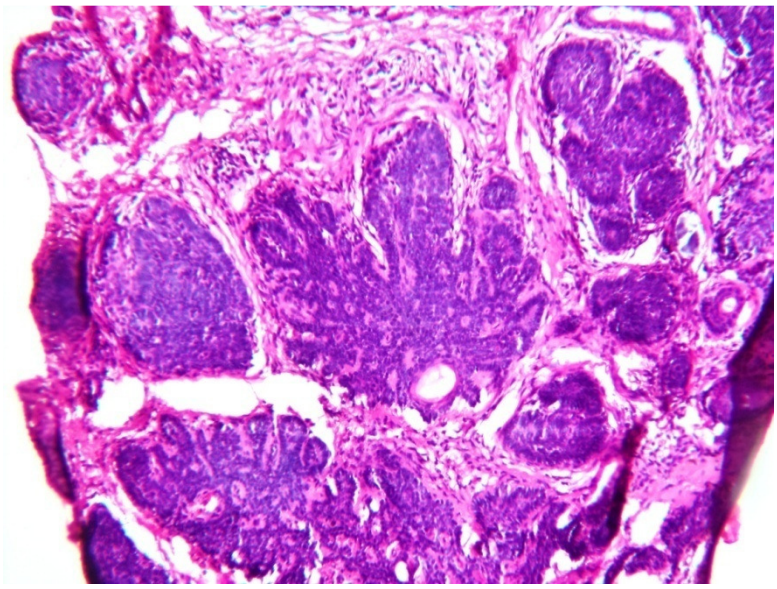


**Fig 37A :Trichoepithelioma showing tumor tissue arranged in nests predominantly comprised of basaloid cells (H&E 10X)**

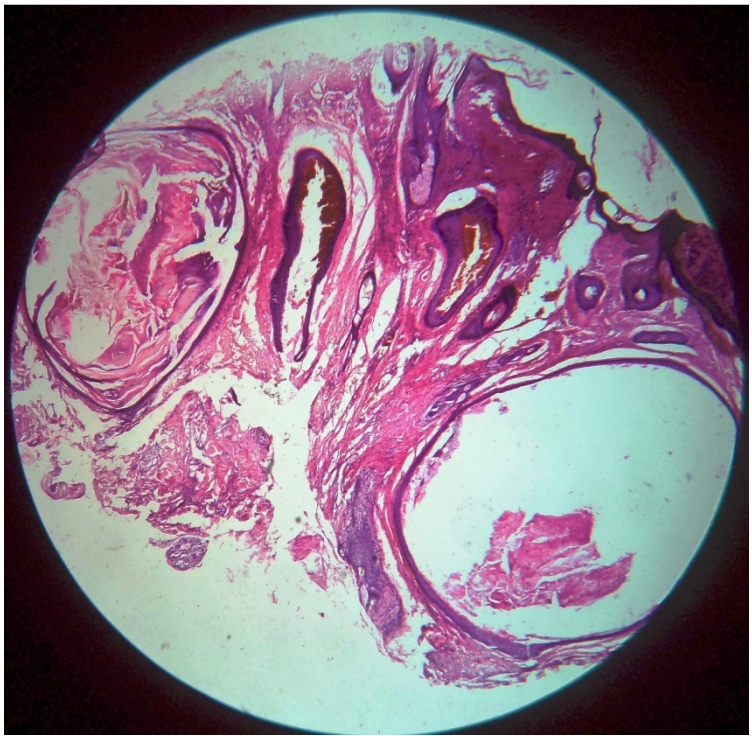


**Fig.37B : Trichoepithelioma showing cystically dilated spaces (H&E 4X)**

## MALIGNANT TRICHELEMMAL TUMOR

This study included 2 cases of malignant trichelemmal tumor which accounted for 13.34% of these lesions among pilar tumors.

**Clinical findings**: One patient was of a 65 year old female and the other was of 35 year old female with irregular lesion on parietal region of scalp. Both of them presented with pale tan or reddish papule, indurated nodule.

**Gross:** The tumour size variedbetween 0.4 and 2.0 cms.

**Microscopy :** Tumour showed a wide range of growth patterns solid, lobular, trabecular. These lobules of tumor showed two cell types having clear (Fig 38A) or pale eosinophilic cytoplasm(Fig 38B), with pleomorphic hyperchromatic nucleus and prominent nucleoli. Also seen many bizarre cells, with mitotic figs and large areas of necrosis.

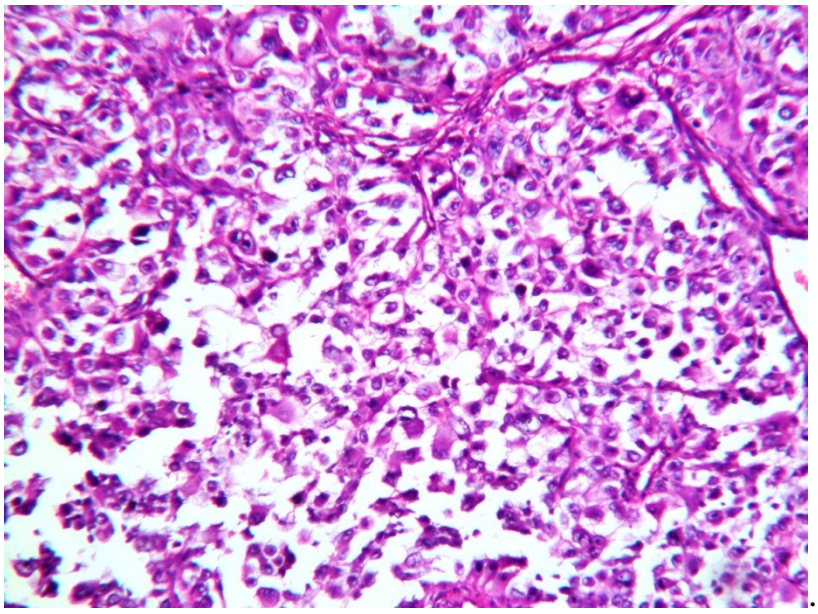


**Fig .38A :Malignant trichelemmal tumor showing tumor arranged in lobules having clear cytoplasm (H&E 40X)**

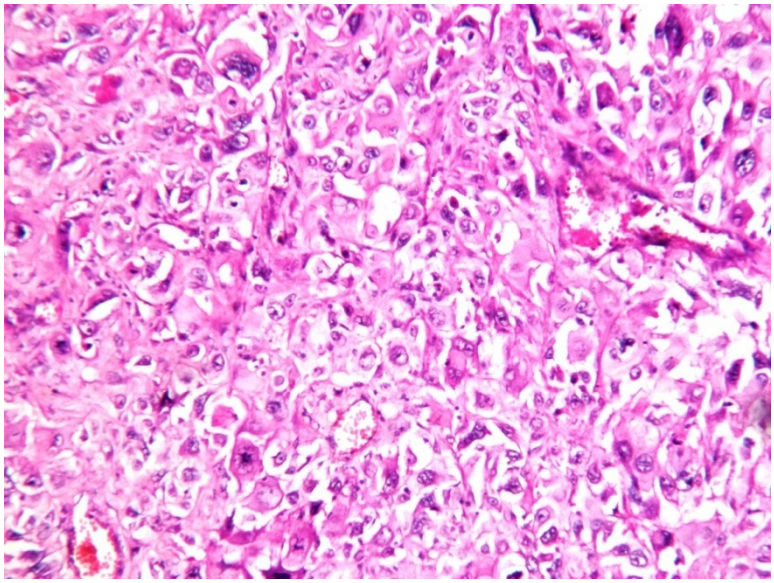


**Fig 38B: Malignant trichelemmal tumor showing tumor arranged in sheets comprised of cells having pale eosinophilic cytoplasm with bizarre cells (H&E 40X)**

**SEBACEOMA**

This study included two cases of Sebaceoma which accounted for 28.75% among sebaceous tumors.

**Clinical findings:**One patient was of 24 year old male presented with a solitary cystic lesion in the right upper limb measuring 2x1 cm and the other patient was 46 year old male presenting with cystic lesion in back measuring 1x1cm.

**Microscopy:**The dermis showed a neoplasm composed of lobules of sebaceous glands separated by compressed connective tissue septae. The sebaceous lobules showed a peripheral germinative layer of small cells and mature sebaceous cells centrally and transitional zone inbetween (Fig 39).. The stroma showed marked inflammatory cell infiltrate

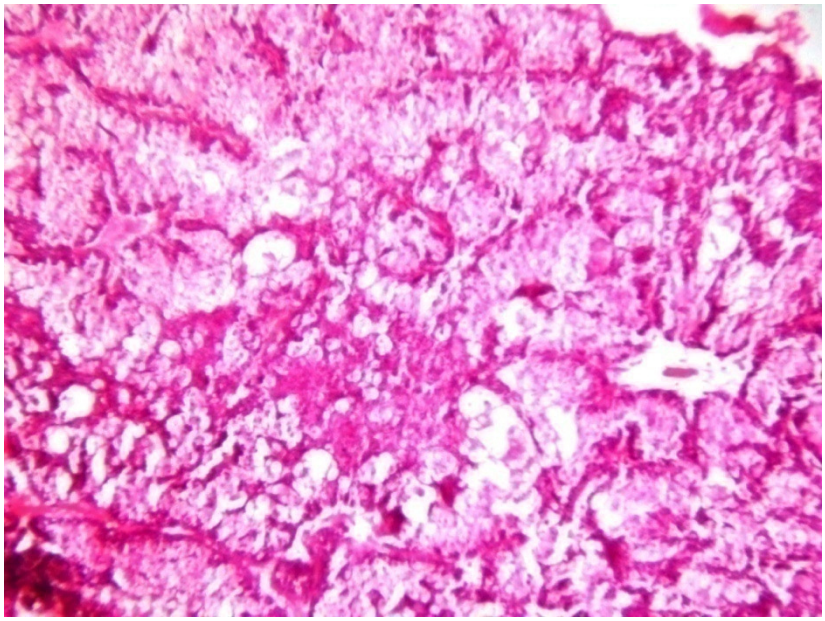


**Fig.39: Sebaceoma showingperipheral germinative layer of small cells and mature sebaceous cells centrally (H&E 40X)**

**SEBACEOUS CARCINOMA**

This study included two cases of sebaceous carcinoma which accounted for 28.75% among sebaceous tumors.

**Clinical findings :**The patient was a 75 year old female and a 70year old male both presented with a nodular lesion in the lower eye lid

**Gross:**An ellipse of skin measuring 4x2.5 cms was received with the skin surface showing multiple raised areas, the largest measuring 1.5x1cm.

**Microscopy:**An ulcerated exophytic neoplasm was seen arranged in solid sheets and many cystically dilated spaces (fig 40A) composed of mature sebaceous cells with vesicular nuclei and abundant foamy vacuolated cytoplasm in the centre, surrounded by undifferentiated sebaceous cells with pleomorphic vesicular nucleus and scant eosinophilic cytoplasm(fig40B ). Many mitotic figures were noted as also areas of necrosi and focal squamoiddifferentiation (fig 40 C)with keratin pearl formation.

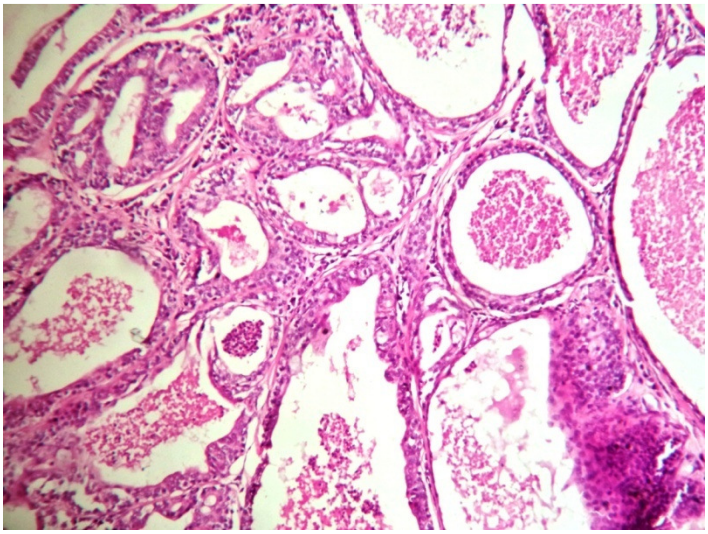


**Fig.40A: Sebaceous carcinoma showing tumor tissue arranged in solid sheets and many cystically dilated spaces(H&E 10X)**

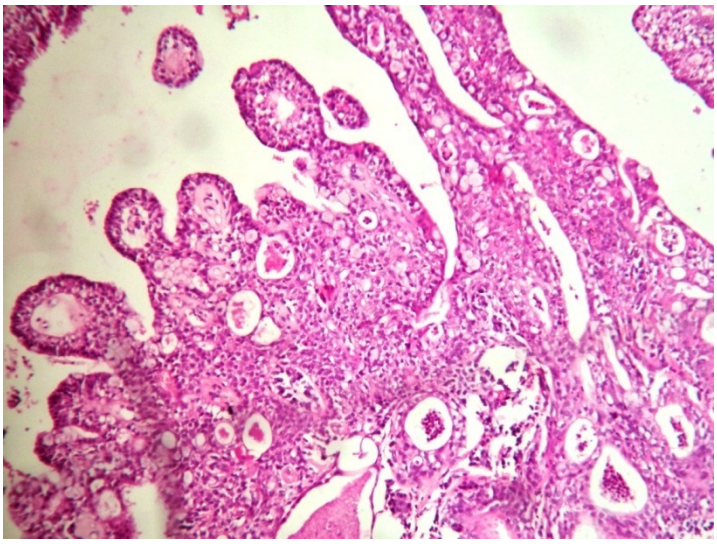


**Fig.40B: Sebaceous carcinoma showing undifferentiated sebaceous cells with pleomorphic vesicular nucleus and scant eosinophilic cytoplasm(H&E 10X)**

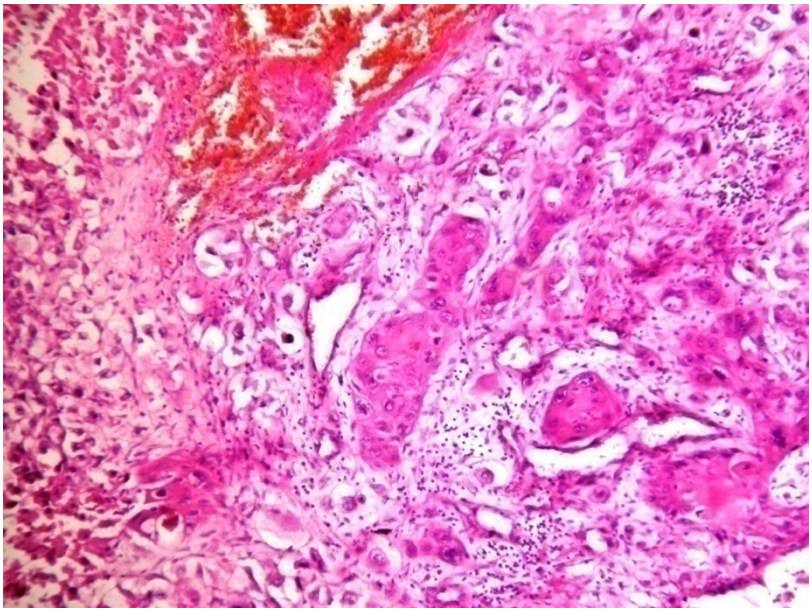


**Fig.40C: Sebaceous carcinoma showing focal squamoid differentiation with keratin pearl formation. (H&E 40X)**

**STEATOCYSTOMA MULTIPLEX**:

This study included single case of steatocystoma multiplex accounting for 14.29% among sebaceous tumors.

**Clinical findings**: A 4years boy presented with multiple lesions over chest and back.

**Microscopically**: the lesion is located in the mid dermis. The cyst has a wavy wall, lined by squamous epithelium with a corrugated eosinophilic cuticle surface with presence of sebaceous glands within or adjacent to the cyst wall (Fig.41). These are flattened lobules of sebaceous glands of varying size No granular layer was seen

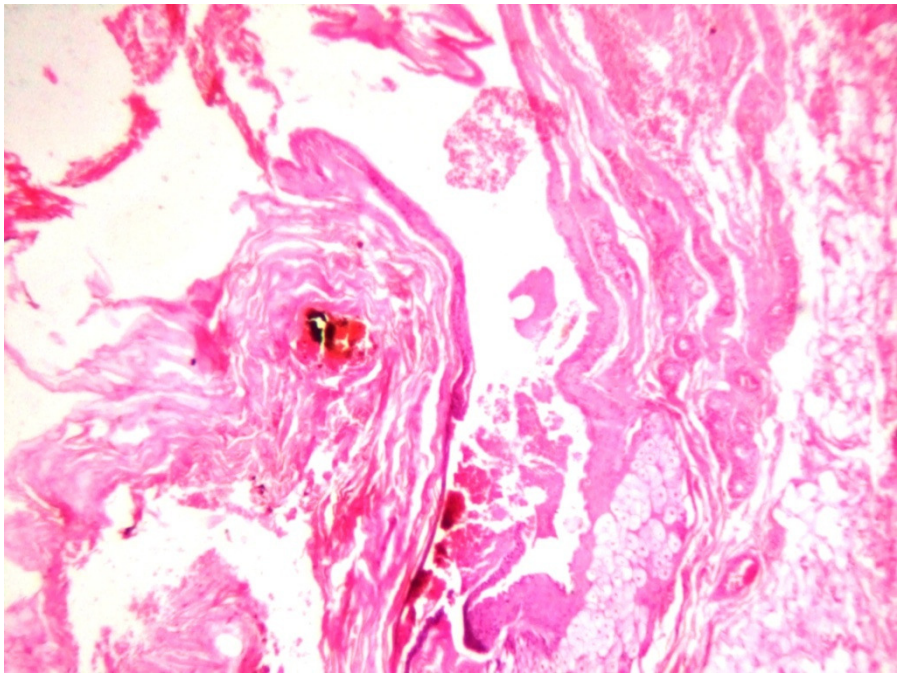


**Fig.41: Steatocystoma multiplex showing cyst wall, lined by squamous epithelium with a corrugated eosinophilic cuticle surface with presence of adjacent sebaceous glands (H&E 40X)**

**SEBACEOUS ADENOMA:**

In the present study we had two cases of sebaceous adenoma accounting for 28.75% among sebaceous tumors.

**Histopathology :** Formed of lobules of predominate mature, bland sebaceous cells, and peripherally located in one to two layers of basaloid epithelial cells pattern

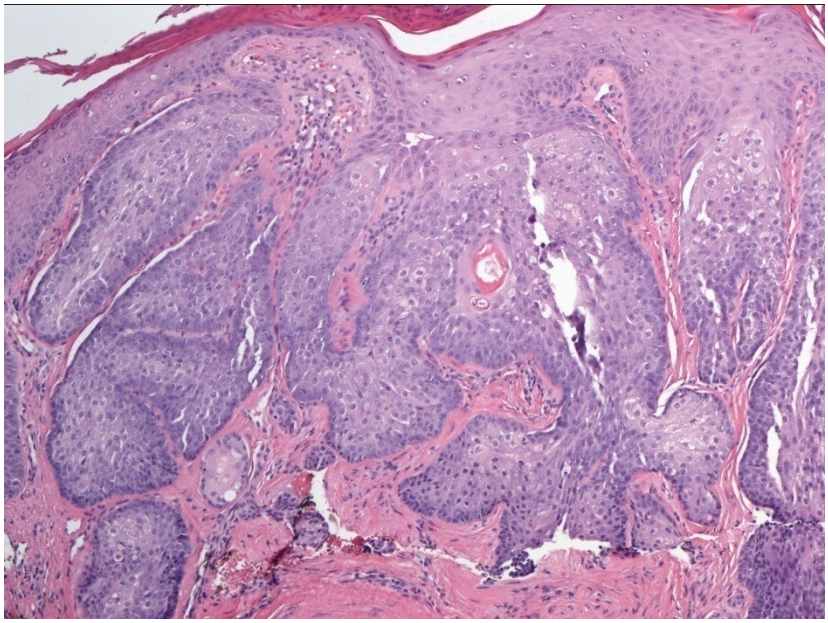


**Fig.42: Sebaceous adenoma showing solid sheets with two cell type (H&E 10X)**

**SYRINGOCYSTADENOMA PAPILLIFERUM**

Syringocystadenoma Papilliferum constituted 2 accounting for 50% among apocrine tumors.

**Clinical findings**: Both of the patients were males and one was of 7year old & the other of 21year old, presented with single lesion in scalp and lower neck respectively.**Gross:**One of the lesions showed surface ulceration and another presented as a cystic lesion measuring 1x1cm and containing clear fluid.

**Microscopy*:*** Both cases possessed the classic histological appearance of a papillary cystic(fig 43A ) and glandular lesion(Fig 43B) lined by two layers of epithelial cells. The outer or basal layer of epithelium is composed of flattened or cuboidal cells and the inner layer of columnar cells. A dense plasma cell infiltrate occupied the fibrous connective tissue of the papillary stalksand dermis beneath the tumour, but was most intense near the epithelium. Surface ulceration was present in one of the lesion.

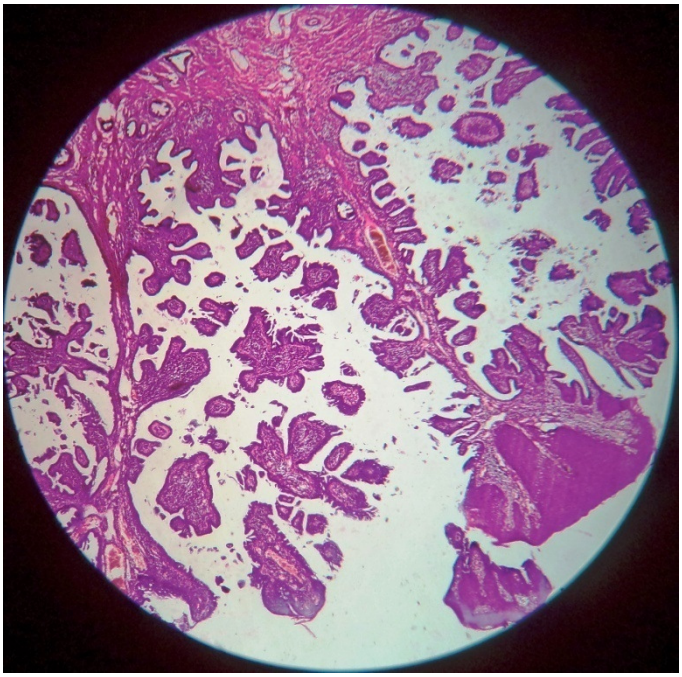


**Fig.43A : Syringocystadenoma Papilliferum showing papillary pattern (H&E 10X)**

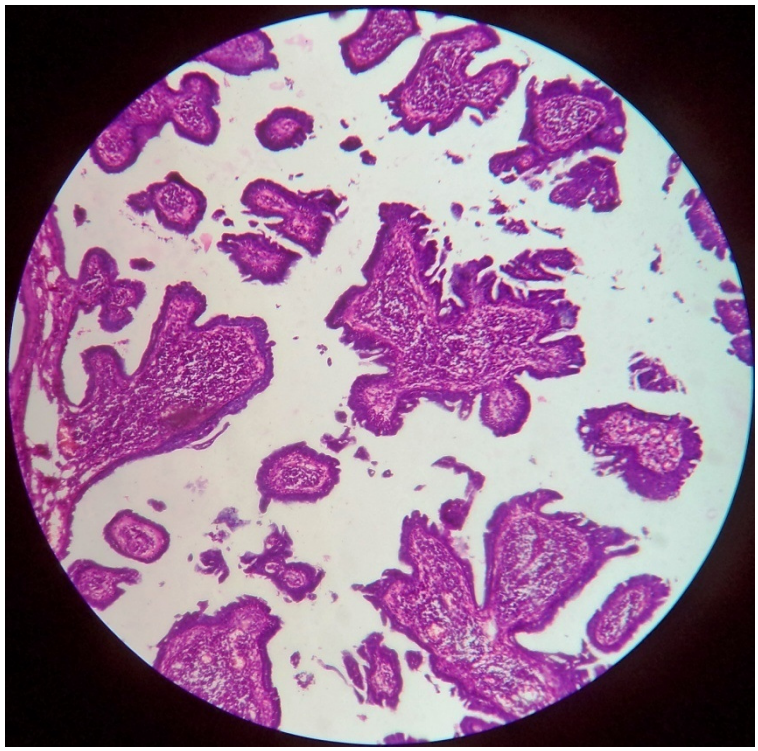


**Fig.43 B:Syringocystadenoma Papilliferum showing glandular pattern (H&E 40X)**

**HIDRADENOMA PAPILLIFERUM**

There was one case of Hidradenoma papilliferum accounting for 25% among apocrine tumors.

**Clinical findings :** The patient was a 28 year old female with a solitary painful nodule on the right labia of 6yrs duration which was diagnosed clinically as a bartholin cyst.

**Gross** : A circumscribed nodular lesion measuring 0.5x0.5cms was seen

**Microscopy :** A well circumscribed cystic lesion surrounded by a fibrous capsule was seen in the dermis with no connection to the overlying epidermis. The lesion showed both glandular and papillary patterns with papillary fronds projecting into the lumen. (fig44 ). The epithelium was bilayered with an inner layer of tall columnar cells with faintly eosinophilic cytoplasm with decapitation secretion and a basal nuclei. The outer layer consisted of small cuboidal cells with brightly eosinophilic cytoplasm

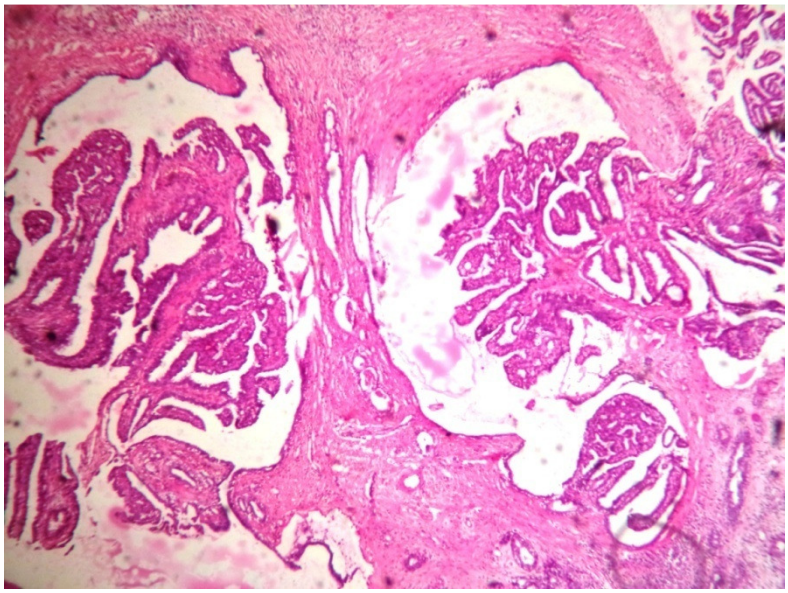


**Fig.44:Hidradenoma showing both glandular and papillary fronds projecting into the lumen(H&E 10X)**

**CYLINDROMA**

One case of cylindroma accounting for 25% among apocrine tumors was noted in a 45 year old female with recurrent scalp nodules. Thetumour characteristically showed dual population of cells with jigsaw puzzle pattern(fig.45)

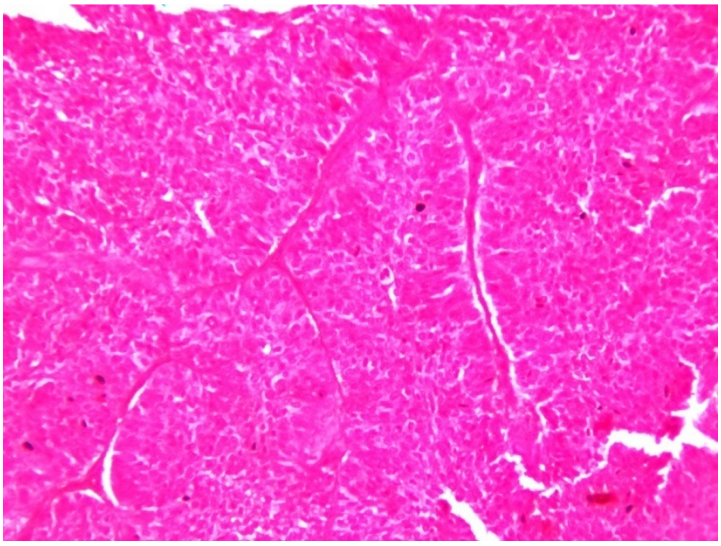


**Fig.45 : Cylindroma showing dual population of cells with jigsaw puzzle pattern(H&E40X)**

# DISCUSSION

Skin adnexal lesions are relatively rare,[4,24]and hence uncommonly encountered in routine surgical pathology practise. Adnexal tumours have been recognised from the latter half of the 19th century. The first case of mixed tumour was recognised by Nissu and subsequently there have been several studies in the Western Literature.[4,24,40]Indian studies in this area have been few and often case reports. However Nair PS et al[44] published 33 cases in year 2007 and Radhika et al[45] published a series of 35 cases in 2012 **.** The occurrence of skin adnexal tumors in the present study was 53 in 10years of duration which included both prospective and retrospective cases.Benign lesionsaccount for the majority of the adnexal lesions.[4,28,]Sweat gland tumours were the predominant subcategory of SAT in some foreign studies [46]and Indian studies. [47,48]In this study it was lesions with eccrine differentiation (49.05%) which were the most common. Apocrine tumours are the rarest SAT a finding observed in all studies including the current one .

Syringoma was the commonest individual tumour in this study whereas Reddy et al[47]**,**Radhika et al[45], and Vaishnav etal[48]found nodular hidradenomas to be the commonest. Nair PSet al[44] found a high incidence of eccrine acrospiroma in his study.

**Table.19: Comparison of sex distribution in skin adnexal tumors**

| | **Male** | **Female** | **M:F** |
|---|---|---|---|
| Yakoob et al[1] | 85(51.21%) | 81(48.79%) | 1.04:1 |
| Nair PS et al[44] | 10(30.30%) | 23(69.70%) | 1:2.5 |
| Present study | 27(50.95%) | 26(49.05%) | 1.03:1 |

In present study M:F ratio was 1.03:1, In the study by Yaqoob et al and Nair PS et al M:F ratio was 1.04:1 and 1:2.5 respectively.

**Table. 20:Comparison of incidence of benign and malignant skin adnexal tumors**

| | Benign | | Malignant | | Total(cases) |
|---|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** | |
| Reddy et al[47] | 59 | 69.40 | 26 | 30.60 | 85 |
| Radhika.k et al[45] | 27 | 77.14 | 08 | 22.86% | 35 |
| Yakoob N et al[1] | 145 | 87.30 | 21 | 12.60 | 166 |
| Samaila M. O. A.[46] | 46 | 88.50 | 06 | 11.50 | 52 |
| Present study | 45 | 84.60 | 08 | 15.40 | 53 |

In present study benign tumors formed the majority accounting for 84.6%. Similarly in the studies done by Radhika et al, Reddy et al, Yaqoob N et al and Samaila MOA benign tumors formed the majority

**Table. 21:Comparison of incidence of skin adnexaltumors with other studies**

| | **Yaqoob et al[1] No (%)** | **Samaila MOA[46] No (%)** | **Nair PS et al[44]No (%)** | **Radhika et al[45]No (%)** | **Present study No (%)** |
|---|---|---|---|---|---|
| Eccrine | 62(37.34%) | 41(78.8%) | 17(51.5%) | 17(48.5%) | 26(49.05%) |
| Apocrine | 24(14.45%) | | 2(6.06%) | | 04(7.52%) |
| Pilar | 69(14.56%) | 04(7.7%) | 12(36.36%) | 11(31.4%) | 15(28.2%) |
| sebaceous | | 07(13.5%) | 2(6.06%) | 07(20%) | 07(13.16%) |
| Mixed | ND | ND | ND | ND | 01(2.06%) |

ND- Not described

In the present study eccrine differentiated tumors formed the majority accounting for 49.05%. In the study by Nair PS et al eccrine differentiated tumors formed the majority accounting for 51. 5%. Were as Study by U.jindal R Patel and Yaqoob N et al pilosebaceous derived tumours formed the majority accounting for 48% and 41.56 % respectively.

**Table.22:Comparison of incidence of individual skin adnexal tumors with other studies**

| | Reddy et al[47] No.(%) | Vaishnav et al[48] No.(%) | Samaila MOA[46] No.(%) | Radhika et al[45] No.(%) | Present study No.(%) |
|---|---|---|---|---|---|
| **Sweat gland tumors** | | | | | |
| Nodular hidradenoma | 29(34) | 20(41.7) | - | 5(14.2) | 2(3.77%) |
| syringoma | 3(3.5) | - | 5(9.6) | 1(2.8) | 8(15.4%) |
| Eccrine clear cell hidradenoma | - | - | - | | 4(7.52%) |
| Eccrine spiradenoma | 2(3.5) | - | - | 3(8.5) | 3(5.64%) |
| Eccrine acrospiroma | - | - | 17(32.7) | | 2(3.77%) |
| Eccrine poroma | - | - | 6(11.5) | | 2(3.77%) |
| Benign eccrine gland tumor(unclassified) | | - | - | | 1(1.88%) |
| Syringocystadenoma papilliferum | 3(3.5) | 8(16.7) | 2(3.8) | | 2(3.77%) |
| Hidradenoma papilliferum | - | 1(2.1) | - | 3(8.5) | 1(1.88%) |
| Chondroid syringoma | 2(2.4) | 3(6.3) | - | | - |
| Cylindroma | 1(2.4) | 1(2.1) | 5(9.6) | | 1(1.88%) |
| Sweat gland carcinoma | 11(2.9) | 5(10.4) | 6(11.5) | 4(11.4) | 4(7.54%) |
| **Sebaceous gland tumors** | | | | | |
| Sebaceous nevus | - | 1(2.1) | 6(11.5) | 5(14.2) | - |
| Steatocystoma multiplex | | | | | 1(1.88%) |
| Sebaceoma | | | | | 2(3.77%) |
| Sebaceous gland adenoma | 3(3.5) | 2(4.2) | 1(2.0) | | 2(3.77%) |
| Sebaceous carcinoma | 15(7.7) | - | - | 2(5.7) | 2(3.77%) |
| **Hair follicle** | | | | | |
| Hair nevus | - | 1(2.1) | - | | - |
| Trichofolliculoma | - | - | 1(2.0) | 1(2.8) | - |
| Trichoepithelioma | 4(4.7) | 2(4.2) | 3(5.8) | 2(5.7) | 6(11.28%) |
| Pilomatricoma | 9(10.6) | 3(6.3) | - | 2(5.7) | 7(13.16%) |
| Piloleiomyoma | - | | - | 3(8.5) | - |
| Trichilemmal carcinoma | - | - | - | 2(5.7) | 2(3.77%) |
| Others (mixed) | 3(3.5) | - | - | 1(2.8) | 1(1.88%) |

In the present study among all the skin adnexal tumors syringoma forms the maximum accounting for 15.4%, followed by Pilomatricoma accounting for 13.16% and trichoepithelioma accounting for 11.8%. Where as studies done by Reddy et al and Vaishnav et al showed maximum number of Nodular hidradenoma cases accounting for 34% and 41.7% respectively followed by sebaceoeus carcinoma accounting for 7.7% in Reddy et al study and syringocytstadenoma papilliferum accounting for 16.7% in Vaishnav et al.

**Tumours of sweat gland differentiation**

In th present study there were 30 patients with sweat gland differentiation accounting for 58.49% ofthe all adnexal tumours.

**Eccrine derived tumors**

The occurrence of syringoma (15.4%) was highest in the present study among all the skin adnexal tumors followed by sweat gland carcinomas, eccrine clear cell hidradenoma, eccrine spiradenoma, nodular hidradenoma, eccrine acrospiroma, eccrine poroma, benign eccrine gland tumor, cylindroma.

In the study by Nair SP et al[44] syringoma (42.42%) was the most commontumour.

In the study by Reddy et al[47]hidradenoma(34%) was the most commontumour.

Radhika et al[45] found nodular hidradenomas(14.2%) to be the commonest.

In the study by Samaila MOA[46] et alhigh incidence of eccrine acrospiroma(32.7%).

Histomorphologically among all eccrine tumors solid pattern(53.84%) with basaloid cells(61.53%) constituted maximum

**Syringoma:**Syringoma was the commonest lesion in this study accounting for 15.4% among all the adnexal tumors, occured in a wide age range of 5 to 46 years with a mean age of 15 years.

In this study histologically syringoma showed predominantly glandular pattern accounting for 100% and basaloid cell morphology accounting for 87.5%. Similar observation have been made byNair SP et al [44] which formed heighest among all tumors.

**Eccrine clear cell hidradenoma:** 3 cases were encountered in this study which accounted for 7.52% of all theskin adnexal tumors. Patient were between the age group of 25-35yrs, of which all were female with nodular lesions in the sites like subareolar region, scalp, and anterior aspect of left leg

In the study by Reddy et al[47] eccrine clear cell hidradenoma accounted for 29 cases(34%) was the most commontumour among all adnexal tumor. Radhika et al[45]reported5 cases (14.2%) of nodular hidradenomas which was the commonest tumor among all adnexal tumors.

In this study histologically eccrine clear cell hidradenoma showed predominantly solid with two cell pattern accounting for 100%, similar findings were noted in the study of Samaila MOA[46]

**Apocrine tumors**

Among apocrine tumors 25% of the tumors showed solid pattern, 25% showed glandular pattern and 50% showed glandular cystic pattern. 75% of the tumors showed basaloid cell morphology and 25% showed two cell population, were as study done by Radhika et al[45] showed mixed pattern consisting of solid, glandular and cystic pattern with basaloid cell morphology.

**Syringocystadenoma papilliferum:** Two cases were encountered in the present study accounting for 3.77% of all adnexal tumours.In the study by Vaishnav et al[48] reported 8 cases of syringocystadenoma papilliferum accounting for 16.7%, which formed second commonest tumor after nodular hidradenoma among all adnexal tumors.Samaila et al[46] reported 2 cases accounting for 3.8%

**Hidradenoma papilliferum :** We had a single case accounting for 1.88% among all the SAT, similarly Vaishnav et al[48] reported single case accounting for 2.1% among all skin adnexal tumors. In the study by Radhika et al[45] reported 3cases accounting for 8.5% among all SAT

**Cylindroma:** One case was noted in a 45 year old female with scalp swelling. The tumour characteristically showed dual population of cells(100%) arranged in solid jigsaw puzzlepattern(100%). Samaila[46]et al observed all the 5 cases in males.

**Sweat gland carcinoma**In the present study sweat carcinomas accounted for 7.54% (4cases) of all adnexal tumours. Reddy et al[47]reported2.9%(11 cases) of adnexal carcinomas of adnexal tumours.Vaishnav et al[48] ,Samaila MOA[46]reported 10.4% (5 cases) and 11.5% ( 6cases) respectively of adnexal tumours as shown in table 20.

**Tumours of sebaceous differentiation**

In this study 7 patients with sebaceous differentiated tumors were reported accounting for 13.16% ofthe all adnexal tumours.

Nair PS et al[44] reported 2cases(6.06%) of sebaceous differentiated tumors among which all were reported as Naevus sebaceous accounting for 6.06%.

Radhika et al[45] reported 7cases(20%) of sebaceous differentiated tumors among which Naevus sebaceous were heighest accounting for 14.2%(5cases)

In the present study histomorphologically 71.42% showed solid pattern, 14.28% showed solid and cystic and 14.8% only cystic. 57.14% showed basaloid and remaining 42.86% showed two cell population.Similar observations were made by Reddy et al[47]and Vaishnav et al[48]

**Sebaceoma:** Two cases of Sebaceoma were seen among all the adnexal tumors accounting for 3.77%. Presented with cystic lesions in back and upperlimb.

Histologically sebaceoma showed predominantly solid pattern with basaloid cell morphology acconting for 100%**.**These observations were similar to that of Vaishnav et al[48]

**Sebaceous carcinoma :**Two cases of sebaceous carcinoma were found among all the adnexal tumors which accounted for 3.77%.patient were aged between 70-75years both presented with a nodular lesion in the lower eye lid .

Microscopically both solid and solid/cystic pattern each accounting for 50% and both basaloid and two cell morphology each accounting for 50%. Similar observations were made by Reddy et al.[47]

**Sebaceous adenoma:** In the present study we had two cases of sebaceous adenoma accounting for 28.75%. The histomorphological pattern in the present study among these tumorsshowed predominantly solid pattern with two cell morphology accounting for 100%.similar observations were made in Radhika et al[45] study.

**Steatocystoma multiplex**: A 4years boy presented with multiple lesions over chest and back. Microscopically the lesion is predominantly cystic with basaloid cells accounting for 100%.

**Tumors of hair follicle**

There were 15 patients with hair follicle differentiation accounting for 45% ofthe all adnexal tumours .Nair PS et al[44] reported 12cases(36.36%) among which trichoepithelioma were heighest accounting for 27.27%(9 cases).Radhika et al[45] reported 11cases(31.4%) among which piloleiomyoma (3cases) 8.5% were heighest.

In the present study histomorphologically 73.33% showed solid pattern and 26.64% showed cystic. 40% showed basaloid, 53.32% showed two cell population and 6.68% showed calcification.Similar observations have been made in Reddy et al[47]

**Pilomatricoma :**

Seven cases of Pilomatricoma were seen in this study which accounted for 15.54% of all adnexal tumors. The age of the patients ranged from 13 years to 62 years with mean age being of 26years. Most of the patients present with lesions over scalp, other sites included earlobe, cheek and eye lid. Similar observations have been made in Reddy et al[47] accounting for 10.6% (9cases).

Histologically,57.14% showed solid pattern and 42.86% showed cystic. 85.71% showed two cell population and 14.29% showed calicification.

**Malignant trichelemmal tumor**

The study included 2 cases of malignant trichelemmal tumor which accounted for 13.34% of these lesions. One patient was of a 65 year old female and the other was of 35 year old female with irregular lesion on parietal region of scalp. Both of the patients presented with pale tan or reddish papule, indurated nodule.

Microscopically tumor showed solid pattern and two cell types accounting 100% .Similar observation have been made in Radhika et al[45].

**Mixed adnexal tumor**: We received a case of 37years old male patient presenting with the nodular lesions over scalp, which was diagnosed as mixed SAT(spiradenoma and syringocystadenoma ). Histopathologically composed of lobular proliferation of epithelial cells displaying a spectrum of eccrine and apocrine differentiation.

# SUMMARY

1. Finally the quintessence of the subject of study of skin tumours is it's vastness, it's enormity and its interesting histomorphology.
2. A histopathological study of 53 cases of skin adnexal tumours was carried out in Department of Pathology , Shri B.M.Patil medical college and research centre, Bijapur over a period of 10 years from oct 2004 to sept 2014.
3. Out of 53 cases, 45 were diagnosed as benign and 8 as malignant tumours of skin constituting 85% and 15% respectively.
4. Among all 53 cases of skin adnexal tumors eccrine differentiation constituted the maximum with 26 cases(49.05%) followed by tumors with hair follicle differentiation with 15 cases(28.20%), tumors with sebaceous differentiation 7cases(13.16%) & apocrine 4cases(7.52%). Mixed tumor 1case(2.06%)
5. Among eccrine, syringoma constituted the maximum with 8cases(30.76%), eccrine clear cell hidradenoma 4 cases (11.53%),eccrine sipradenoma 4cases(11.53%), nodular hidradenoma 2 cases (7.69%), eccrine poroma 2cases (7.69%), eccrine acrospiroma 2 cases (7.69%), Benign eccrine gland tumor 1case(3.84%), eccrine adenocarcinoma 1case (3.84%), mucinous eccrine carcinoma 1case(3.84%), syringoid eccrine carcinoma 1case (3.84%), microcystic adnexal carcinoma 1case(3.84%)
6. Among hair follicle tumors pilomatricoma was the commonest with 7cases (47%), trichoepithelioma tumors were6(40%), Malignant trichilemmal tumors were2(13%).

7. Among sebaceous tumors 2(28.57%) were sebaceous adenoma,2(28.57%) were sebaceoma, 2(28.57%) sebaceous carcinoma and 01(14.29%) steatocystoma multiplex.
8. Among apocrine tumors 2(50%) syringocystadenoma papilliferum, 1(25%) hidradenoma papilliferum, and 1(25%) cylindroma.
9. Among all the skin adnexal tumors solid pattern are maximum accounting for 33cases(62.26%, followed by glandular pattern 9cases(16.92%) followed by cystic, solid /cystic,glandular cystic patterns with 5cases(9.4%), 3cases(5.64%) and 2cases(3.79%)respectively. Mucinous 1case accounting for 2.02%
10. Among all the adnexal tumors, basaloid type of cell pattern are maximum 30cases (56.60%), followed by two cell pattern accounting for 19cases (35.76%ses). This is followed by squamoid cell pattern accounting for 3cases (5.64%) and calcification in one case.
11. Among eccrine tumors 16cases(61.53%) of the tumors show basaloid type of cells, 7cases(26.88%) of them show two cell type and remaining 3case s(11.59%) show squamoid type of cells.
12. Maximum pilar tumors showed two cell type accounting for 53.32%(8cases), followed by basaloid type and calcification accounting for 40% (6cases) and 6.68% (1case) respectively. 75%(3ases) of the tumors show basaloid type of cell remaining 25% (1case) two cell type.
13. Among sebaceous 57.14% (4cases) show basaloid and remaining 42.86% (3cases) two cell type.

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# CONCLUSION

A histopathological study of 53 cases of skin adnexal tumours was carried out in the Department of Pathology, Shri B.M.Patil medical college and Research Centre, Bijapur over a period of 10 years. A detailed histomorphological study of skin adnexal tumors was done.

Among all the skin adnexal tumors, predominantly most of them showed solid pattern accounting for 62.26%, and basaloid type cell population accounting for 56.60%.The least common pattern noted were mucinous accounting for 2.02% and calcification accounting for 02%.

Eccrine tumors predominantly showed solid pattern accounting for 53.84% which included eccrine clear cell hidradenoma, eccrine spiradenoma, eccrine poroma, eccrine acrospiroma, benign eccrine gland tumor and eccrine adenocarcinoma. Eccrine tumors predominantly showed basaloid cell population accounting for 61.53% which included syringoma accounting for 87.5%.

Pilar tumors predominantly showed solid pattern accounting for 73.33% which included trichepithelioma accounting for 83.33%. Pilar tumors predominantly showed two cell morphology accounting for 53.32% which included pilomatricoma accounting for 85.71%

Sebaceous tumors predominantly showed solid pattern accounting for 71.42% which included sebaceous adenoma, sebaceoma each accounting for 100%. Sebaceous tumors predominantly showed basaloid cell morphology accounting for 57.14% which included sebaceoma, steatocystoma multiplex each accounting for 100%.

Apocrine tumors predominantly showed glandular cystic pattern accounting for 50%, which included syringocystadenoma papilliferum accounting for 100%. Apocrine tumors predominantly showed basaloid cell population accounting for 75% which included syringocystadenoma papilliferum and Hidradenoma papilliferum each accounting for 100%.

These predominant pattern may help in the diagnosis of SAT whenever there is overlapping of cellular morphology.

Due to the scarcity of few tumors pattern analysis was not clearly established, hence multianalysis of individual tumor may be required along with the other ancillary techniques.

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# PROFORMA

NAME **:** OP/IP No. :

AGE **:**

SEX : D.O.A :

ADDRESS :

D.O.Biopsy:

Date of surgery/resection:

**History of present illness**:

Swelling:

Duration:

Rate of tumour growth:

Solitary or multiple:

Location(s) of the lesion:

Any associated inherited or systemic diseases:

**Past history:**

**Family history:**

**General physical examination:**

**LOCAL examination of Lesion(s)**

Solitary or multiple

Location(s) of the lesion

Size: Shape:

Growth pattern (nodular or plaque): Colour

Presence of ulceration:

Status of the surgical resection margins.

**Systemic examination:**

**Per Abdomen:**

**Cardiovascular system**

**Respiratory system:**

**Clinical diagnosis:**

**Routine Investigations done:**

**PATHOLOGICAL STUDY**

**Gross:**

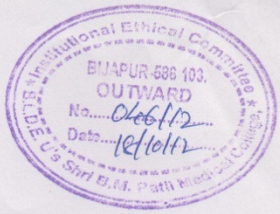
**Microscopy:**

**Special Stains (If any):**

**IHC (if any):**

**Final Impression:**

# ETHICAL CLEARANCE CERTIFICATE




B.L.D.E. UNIVERSITY'S
**SHRI.B.M.PATIL MEDICAL COLLEGE, BIJAPUR-586 103**
INSTITUTIONAL ETHICAL COMMITTEE

## *INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE*

*The Ethical Committee of this college met on* 18-10-2012 *at* 3-30pm *to scrutinize the Synopsis of Postgraduate Students of this college from Ethical Clearance point of view. After scrutiny the following original/corrected & revised version synopsis of the Thesis has been accorded Ethical Clearance.*

*Title* Study of Histomorphological patterns of skin adnexal tumors,

— x — x — x —

*Name of P.G. student* Dr. Sneha Patil
Pathology

*Name of Guide/Co-investigator Dr* Mahesh H. Korigoudar.
Prof, Pathology

DR.TEJASWINI. VALLABHA
CHAIRMAN
INSTITUTIONAL ETHICAL COMMITTEE
BLDEU'S, SHRI.B.M.PATIL
MEDICAL COLLEGE, BIJAPUR.

Following documents were placed before E.C. for Scrutinization
1) Copy of Synopsis/Research project.
2) Copy of informed consent form
3) Any other relevant documents.

## MASTER CHART

| Sl.No | Lab No | Age | Sex | Tissue | Site | Tumor | PATTERN1 Cystic/solid/ glandular | PATTERN2 Squamoid, Basaloid, Clear cell | Pallisading/ Two cell pattern | Calcification/ FB reaction |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5350/07 | 4 | m | skin | chest & back | steatocystoma multiplex | cystic | basaloid | | |
| 2 | 1423/07 | 5 | F | skin | back | Eccrine spiradenoma (e) | solid /cystic | basaloid | | |
| 3 | 8F167/08 | 7 | M | skin | Scalp | Eccrine (clera cell) hidradenoma (e) | solid | | squamoid & clear cell | |
| 4 | 5810/12 | 13 | F | Sebaceous cyst | Right upper eyelid | Syringoma (e) | glandular | basaloid | | |
| 5 | 2354/12 | 15 | F | skin | scalp | Benign eccrine gland tumor (e) | solid | basaloid | | |
| 6 | 3990/12 | 15 | F | skin | scalp | Trichilemmal carcinoma (p) | solid | | basaloid & clear cell | |
| 7 | 1738/13 | 15 | m | skin | scalp | sebaceous carcinoma (s) | solid/cystic | | basaloid & clear cell | |
| 8 | 787/05 | 17 | F | skin | face | Pilomatricoma (p) | cystic | | two cell pattern | calcification |
| 9 | 998/05 | 18 | M | Sebaceous cyst | Scalp | Sebaceous adenoma (s) | solid | | basaloid & clear cell | |
| 10 | 997/07 | 20 | F | skin | eyelid | Syringoma (e) | glandular | basaloid | | |
| 11 | 1092/12 | 20 | F | skin | scalp | Eccrine spiradenoma (e) | solid | | squamoid & basaloid | |
| 12 | 5779/13 | 20 | F | skin | chest | Sebaceous adenoma (s) | solid | | two cell pattern (basaloid & clear | |
| 13 | 4323/13 | 20 | f | skin | scalp | malignant trichilemmal tumor | solid | | two cell pattern (basaloid & clear) | |
| 14 | 1245/08 | 20 | f | skin | eye lid | hidradenoma papilliferum (a) | glandular | basaod | | |
| 15 | 310/06 | 21 | M | skin | Lower neck | Pilomatricoma (p) | cystic | bsaloid | | |
| 16 | 3779/11 | 23 | M | skin | back | clear cell hidradenoma (e) | soild | basaloid | | |
| 17 | 4037/04 | 24 | m | skin | rt upper limb | sebaceoma | solid | basaloid | | |
| 18 | 1130/11 | 25 | M | skin | right arm | Trichoepithelioma (p) | solid | basaloid | palisading | |
| 19 | 2474/10 | 25 | F | Sebaceous cyst | eyelid | Mixed adnexal tumor (Syringocystadenoma + Spiradenoma) | | basaloid | two cell pattern | |
| 20 | 4847/14 | 25 | m | skin | scalp | Pilomatricoma (p) | solid | basaloid | | fb reaction & keratin pearls |
| 21 | 333/11 | 25 | m | skin | eye lid | pilomatricoma (p) | solid | basolid | | |
| 22 | 4D67/04 | 27 | F | Nodular tissue | Subareolar region | Pilomatricoma (p) | cystic | basaloid | | |
| 23 | 3783/14 | 28 | f | skin | vulva | Syringoma (e) | glandular | basaloid | | |
| 24 | 4343/10 | 28 | m | skin | eyelid | Syringoma (e) | glandular | basaloid | | |

| Sl.No | Lab No | Age | Sex | Tissue | Site | Tumor | PATTERN1 Cystic/solid/ glandular | PATTERN2 Squamoid, Basaloid, Clear cell | Pallisading/ Two cell pattern | Calcification/ FB reaction |
|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 1425/08 | 30 | F | skin | scalp | Trichoepithelioma (p) | solid | basaloid | palisading | |
| 26 | 369/12 | 32 | m | skin | scalp | Syringoma (e) | glandular | basaloid | | |
| 27 | 898/08 | 33 | F | ?Neurofibroma | Right cheek | Nodular hidradenoma (e) | solid | squamoid | | |
| 28 | 4628/12 | 35 | F | skin | neck | Syringocystadenoma papilliferum (a) | glandular cystic | basaloid | | |
| 29 | 2871/13 | 35 | F | skin | eye lid | Trichoepithelioma (p) | cystic | basaloid | | |
| 30 | 2285/14 | 35 | F | skin | scalp | Clear cell hidradenoma (e) | solid | | basaloid & clear cell | |
| 31 | 568/13 | 35 | M | Cyst | back | Nodular hidradenoma (e) | solid | squamoid | | |
| 32 | 803/11 | 37 | M | skin | Scalp | Syringoma (e) | glandular | | two cell pattern | |
| 33 | 399/05 | 37 | m | skin | scalp | syringoid eccrine carcinoma | solid/cystic | basaolid | | |
| 34 | 1924/11 | 40 | M | skin | scalp | eccrine adenocarcinoma (e) | solid | | basaloid & clear cell | |
| 35 | 258/04 | 40 | f | skin | left foot | Eccrine poroma (e) | solid | basaloid | | |
| 36 | 3732/06 | 40 | m | skin | axilla | mucinous eccrine carcinoma | | basaloid | | |
| 37 | 1063/05 | 42 | M | Sebaceous cyst | neck | Syringoma (e) | glandular | basaloid | | |
| 38 | 6D53/06 | 44 | M | skin | Scalp | Trichoepithelioma (p) | solid | basaloid | | keratin cyst |
| 39 | 5F11/05 | 45 | F | Tissue mass | Left cheek | trichoepithelioma (e) | solid | basaloid | | |
| 40 | 2875/09 | 45 | f | | scalp | cylindroma | solid | | 2cell type | |
| 41 | 3123/09 | 46 | m | skin | scalp | microcystic adnexal carcinoma (e) | solid/cystic | | basaloid/squamoid | keratin cysts |
| 42 | 5168/06 | 46 | m | skin | back | sebaceoma | solid | basaloid | | |
| 43 | 4123/13 | 50 | M | skin | scalp | Eccrine acrospiroma (e) | solid | squamoid | | |
| 44 | 3657/10 | 50 | M | Sebaceous cyst | chest | eccrine acrospiroma (e) | solid | basaloid | | |
| 45 | 1186/13 | 52 | F | skin | face | Pilomatricoma (p) | solid | basaloid | | |
| 46 | 9C40/09 | 52 | F | skin | Preauricular region | Trichoepithelioma (p) | solid | basaloid | | |
| 47 | 4674/13 | 60 | M | skin | scalp | Syringocystadenoma papilliferum (a) | glandular cystic | basaloid | | |
| 48 | 4493/13 | 62 | F | skin | ear lobe | Eccrine poroma (e) | solid | basaloid | | |
| 49 | 912/13 | 65 | F | tissue bit | eyelid | Syringoma (e) | glandu;ar | basaolid | | |
| 50 | 4713/08 | 70 | m | skin | rt eyelid | meibomian gland carcinoma | solid | basaloid | | |
| 51 | 1039/07 | 72 | M | skin | Left ring finger | Eccrine spiradenoma (e) | solid | basaloid | | |
| 52 | 2766/14 | 75 | F | skin | eye lid | Eccrine Clear cell hidradenoma (e) | solid | | basaloid & clear cell | |
| 53 | 3729/11 | 75 | M | skin | Nose | Pilomatricoma (p) | solid | basaloid | | fb reaction & calcification |