A common sense approach to sweat gland tumors

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Let’s learn a few basic facts of a sweat gland (eccrine and apocrine). It is a gland that makes sweat. The gland has two parts: (1) secretory part that makes the sweat and a (2) duct that delivers the sweat from the secretory part to the skin. Whereas secretory part of both eccrine and apocrine is similarly composed of coiled glands, the eccrine glands deliver the sweat to the skin surface through epidermal pore whereas the apocrine gland delivers the sweat into the infundibular portion of the hair canal, not to the epidermal surface.
**Coiled secretory part of sweat gland**

Epidermis

Sweat gland duct

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**Apocrine gland histology**

Apocrine glands are much larger with larger lumen compared to eccrine glands. Apocrine secretory gland is lined by a single layer of columnar cells with abundant eosinophilic cytoplasm and a round basally placed nucleus. The convex apical border of the secretory cells projects into the lumen which disintegrates to become part of secretion (decapitation secretion). Basement membrane with myoepithelial cells form the outer border of the gland. Duct is similar to that of eccrine gland, lined by two layers of cuboidal cells with myoepithelial cells and basement membrane outside.

**Eccrine gland histology**

Duct is lined by two laters of small cuboidal cells with myoepithelial cells at the basement membrane. Lumen has a thin eosinophilic cuticle.

Secretery glands are lined by one later of cuboidal or columnar epithelial cells, mostly with pale cytoplasm mixed with cells with darker basophilic cytoplasm. Spindle myoepithelial cells are present along the basement membrane.
**Sweat glands** are exocrine glands as the secretion comes out of the glands through a duct system.

**Mode of secretion**

**Sweat glands**: A. **Eccrine** (secretion from the cell as a liquid without disintegration of the cells).

B. **Apocrine** (secretion by pinch off of outer cell parts).

- **Basic facts: Eccrine sweat glands**
  - They are present in most of the human skin (absent in a few locations, such as lip, ear canal, inner surface of prepuce, glans, labia minora etc). They are most abundant in the forehead, palm, axilla and sole.
  
- Each **eccrine sweat gland** is composed of a coiled secretory part in the dermis and a duct for delivery of the sweat to the skin surface. **Intradermal** part of the duct is straight until it enters the basal epidermis when it becomes tortuous (spiral) through the epidermis until it opens to the exterior surface of the skin. Myoepithelial cells present around the secretory coils and ducts, and under control of autonomic nervous system help to squeeze out the sweat to the skin surface.

- **Sweat** is a clear, odorless, thin fluid composed of water (99%) and salt.

- **Main function of sweat is regulation of body heat**. When body temperature goes up, sweat glands pour out the sweat on the skin surface and the evaporation of water in the sweat cools down body temperature. Stress, pain and fear may also stimulate sweating (especially of forehead, palms and axillae) due to sympathetic stimulation. Sweating after ingestion of spicy food is thermoregulatory in nature due to increased metabolism or hot sensation in mouth.

- **Basic facts: Apocrine sweat glands**
  
- They are present mostly in the axillae, breast, ear canal, eyelids, nostril and perineum. Modified apocrine glands are breast, ceruminous glands of ear canal and ciliary glands of eye lid.

- Each **apocrine sweat gland** is composed of a coiled secretory part in the dermis or superficial subcutis and a straight duct for delivery of the sweat to the infundibular part of the hair canal.

- It does not directly open in the skin surface.

- **Apocrine sweat is thicker** due to mixture of watery fluid and part of the apocrine cells (decapitation of apocrine cells). It is odorless.

- Apocrine glands are inactive until puberty when they become fully functional due to hormonal influence.

- Apocrine glands function in thermoregulation just like the eccrine glands. They are very sensitive to stress.
You can have **two kinds of tumors from a gland**:

A. Benign tumor: **Adenoma**: Adeno (gland) + -oma (benign tumor)
B. Malignant tumor: **Adenocarcinoma**: Adeno (gland) + carcinoma (malignant tumor from epithelial tissue)

**Sweat gland tumors are two types:**

**Benign**: Adenoma (from ducts or secretory glands)

**Malignant**: Adenocarcinoma (from ducts or secretory glands)

These are the common sweat gland tumor that you will see. Your question will be “How did we come up with so many odd names for adenoma of sweat glands?“

**Benign:**

**Ductal**: Poroma, Syringocystadenoma papilliferum, Hidrocystoma, Syringoma, Cylindroma, Spiradenoma

**Glandular**: Hidradenoma

**Malignant**: Adenocarcinoma, eccrine or apocrine
This is the explanation of all these names! Not that confusing.....

These are some of the best names of tumor !!
Most names are self explanatory, totally based on anatomy !!!

Benign:
- Pore: Benign tumor from pore called Poroma (Pore + oma)
- Acrosyringium: Benign tumor from acrosyringium called syringocystadenoma papilliferum
  (Syringium + cystic + benign glandular tumor + papillomatous proliferation)
- Duct: Benign cystic tumor from duct called hidrocystoma (Hidro + cyst + oma, a cyst containing watery sweat)
- Syringium: Benign tumor from syringium called syringoma (Syringium + oma)
- Cylinder (Straight part of the duct): Benign tumor from cylinder called cylindroma (Cylinder + oma)
- Spiral part of the duct: Benign tumor from spiral duct called spiradenoma (Spiral + adeno + oma)
- Sweat gland secretory cells: Benign tumor called hidradenoma (Hidra + adeno + oma, benign tumor of sweat gland cells that is full of watery sweat)

Glandular:
- Hidradenoma

Ductal:
- Poroma
- Syringocystadenoma papilliferum
- Hidrocystoma
- Syringoma
- Cylindroma
- Spiradenoma

Benign:
- Ductal: Poroma
- Syringocystadenoma papilliferum
- Hidrocystoma
- Syringoma
- Cylindroma
- Spiradenoma
Poroma is a benign adnexal tumor arising from sweat gland (eccrine and apocrine) duct. Location: Mostly foot and hand. May be painful.

Poroma are three types:

A. Intraepidermal poroma (Hidroacanthoma simplex)
B. Intradermal poroma (Dermal duct tumor)
C. Poroma (Compound poroma), the most common type

Poroma shows intraepidermal nests of small monotonous polygonal cells with low mitotic activity. The tumor cells generally demonstrate direct downward growth into the dermis as interconnected basaloid proliferations. The intraepidermal nests of basaloid cells are smaller than the adjacent keratinocytes and show intercellular bridges. There are foci of maturation towards ducts characterized by lumen formation surrounded by eosinophilic material over small epithelial cells.
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- Differential diagnosis: Basal cell carcinoma, tricholemmoma, seborrheic keratosis
Syringocystadenoma papilliferum

- Syringocystadenoma papilliferum (SP) is a benign adnexal tumor, most commonly located on the scalp or face, which frequently arises from a nevus sebaceus (NS).

Epidermis shows acanthosis and papillomatosis. Cystic invaginations with papillary projections extend downward from the epidermis. The papillary projections are lined by two layers of cuboidal and columnar epithelial cells. Luminal cells may show decapitation secretion. The stroma is infiltrated by a numerous plasma cells. Malformed sebaceous glands and hair structures may be present.
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Mostly in the eyelids. Dermal cyst lined by cuboidal ductal epithelium of sweat gland containing fluid, not keratin. Eccrine or apocrine type epithelial cells may suggest the origin.
Syringoma

Epidermis is normal. Upper dermis shows numerous small epithelial ducts embedded in sclerotic stroma. The walls of the ducts are lined by two layers of cuboidal or flat epithelial cells. Ductal lumen contains eosinophilic, amorphous debris. Some ducts have elongated tails of epithelial cells that produce a comma-shaped or tadpole appearance.
Syringoma

• Syringoma is a benign adnexal neoplasm formed by well-differentiated ductal elements of sweat gland.
• Four variants of syringoma: (1) localized form, (2) associated with Down syndrome, (3) generalized multiple and eruptive syringomas, and (4) familial.
• Syringomas are common lesions, mostly in female, appearing at puberty as symmetrical multiple 1-3 mm clustered lesions in the upper cheeks and lower eyelids.
• Other sites include axilla, chest, abdomen, genital skin.
• Eruptive syringomas are more common in African Americans and Asians.
• Pathology: Epidermis is normal. Upper dermis shows numerous small epithelial ducts embedded in sclerotic stroma. The walls of the ducts are lined by two layers of cuboidal or flat epithelial cells. Ductal lumen contains eosinophilic, amorphous debris. Some ducts have elongated tails of epithelial cells that produce a comma-shaped or tadpole appearance. Keratinous cysts are commonly seen in the subepidermal location. Tumor does not extend into subcutis.
Chondroid syringoma (Cutaneous mixed tumor)
Cutaneous mixed tumor
(Chondroid syringoma)

- Clinical:
  - Solitary, circumscribed dermal or subcutaneous nodule.
  - Mostly in head and neck of middle-aged man.

- Pathology:
  - Epithelial cords with focal ductal lumen and cystic change within a myxoid, myoepitheliod or chondroid stroma.
  - Cytology is bland.
  - Tumor is eccrine or apocrine in origin.
Cylindroma

Lobules of epithelial cells arranged in a jigsaw or mosaic pattern. Prominent red basement membrane-like structure encircles the tumor lobules. Each lobule shows a peripheral lining by dark basaloid cells and an inner larger and paler zone of cells.
**Cylindroma**

Clinical: Sex: mostly female. Location: mostly scalp. Slow-growing, sometimes painful solitary pink or red dermal nodule averaging 1 cm in size. Familial cases are associated with multiple tumors. Such cases may also be associated with facial trichoepitheliomas, and eccrine spiradenomas, called autosomal dominant Brooke-Spiegler syndrome (familial cylindromatosis or turban tumor syndrome).

Pathologic features:
- Presence of numerous scalp lesions is called ‘turban tumor’.
- Non-encapsulated dermal tumor not connected to the overlying epidermis.
- Composed of numerous lobules of epithelial cells arranged in a jigsaw or mosaic pattern.
- Prominent red basement membrane-like structure encircles the tumor lobules.
- Each lobule shows a peripheral lining by dark basaloid cells and an inner larger and paler zone of cells.
- Nodular deposits of red material within the lobules as well as focal well-formed ducts.
- This is a common adnexal tumor of eccrine origin.
Spiradenoma

Well-circumscribed or encapsulated dermal nodule composed of small dark basaloid and large pale epithelial cells within a vascular stroma. Low-power view resembles a lymph node. Stroma contains appreciable number of lymphocytes. Cuboidal epithelial cells form compacted cords with occasional ductal lumen formation with eosinophilic cuticle. Hyalinized matrix around the epithelial cords may resemble that of cylindroma.
Spiradenoma

- **Clinical:**
  - Painful, solitary dermal tumor in the skin of upper half of the body during 2nd to 4th decade.
  - Multiple tumors may be part of Brooke-Spiegler syndrome.

- **Pathology:**
  - Well-circumscribed or encapsulated dermal nodule composed of small dark basaloid and large pale epithelial cells within a vascular stroma.
  - Low-power view resembles a lymph node.
  - Stroma contains appreciable number of lymphocytes.
  - Cuboidal epithelial cells form compacted cords with occasional ductal lumen formation with eosinophilic cuticle.
  - Hyalinized matrix around the epithelial cords may resemble that of cylindroma.
Hidradenoma

Well circumscribed, un-encapsulated solid and cystic lobular dermal tumor, 50% connected to the epidermis. Biphasic cellular pattern: areas of round, fusiform, polygonal squamoid cells with eosinophilic cytoplasm and cells with clear cytoplasm. Duct-like structures, cystic change, focal apocrine change, squamous eddies, goblet cells etc may be present.
Hidradenoma

Location: mostly head and neck, limbs, or any site.
• Middle age and elderly, F>M.
• Solitary, slow-growing solid or cystic dermal nodule, 1-2 cm.

• Well circumscribed, un-encapsulated solid and cystic lobular dermal tumor, 50% connected to the epidermis.
• Biphasic cellular pattern: areas of round, fusiform, polygonal squamoid cells with eosinophilic cytoplasm and cells with clear cytoplasm.
• Duct-like structures, cystic change, focal apocrine change, squamous eddies, goblet cells etc may be present.
• Stroma is fibrovascular, collagenous or hyalinized.
• Tumor ‘budding’ from the periphery to the surrounding dermis should be considered as a low-grade malignant tumor.
• Diffuse nuclear anaplasia, necrosis and tumor giant cells may suggest malignancy.
Most of the sweat gland tumors are benign, malignant tumor is extremely rare.

On biopsy, sweat gland carcinomas look like an infiltrating adenocarcinoma in the dermis.

Exclude metastatic carcinoma to skin from other primary sites, such as breast first.

Malignant sweat gland carcinomas:

Eccrine carcinoma
(Syringomatous carcinoma, porocarcinoma, mucinous carcinoma, papillary carcinoma, mucoepidermoid carcinoma, microcystic adnexal carcinoma etc).

Apocrine carcinoma
Microcystic adnexal carcinoma
(Syringomatous carcinoma)

M 65, left cheek, indurated plaque
• **Microcystic adnexal carcinoma**

• **Rare, malignant low-grade sweat gland carcinoma** occurring in the head and neck and face.

• Locally aggressive but is rarely metastatic.

• Poorly circumscribed, infiltrative, asymmetric tumor composed of keratocysts, squamoid or basaloid nests, infiltrating cords, and ductular structures within a hyalinized or paucicellular desmoplastic stroma.

• Epithelial nests are tadpole shaped (paisley-tie). Lymphoid aggregates are present at the deep dermis or subcutis.

• Tumor shows small ducts lined by 1-2 layers of cuboidal cells with narrow cords of cells infiltrating the deepest part of the tumor. Nests and ducts show tail-like cellular extensions as seen in syringoma. Glycogen-rich, clear-cell change, decapitation secretion, and sebaceous differentiation may be present. The tumor cells show small, irregular hyperchromatic nuclei with minimal pleomorphism or mitotic activity. Perineural infiltration is commonly seen.