

which surrounds the individual vellus follicle resembles perifollicular sheath [28]. The existence of considerable numbers of Merkel cells in all trichofolliculomas underlines their classification as hamartomas with follicular differentiation [967].

#### Variants

TF is a complex lesion with protean features [28]. Some of these are caused by the evolutionary and devolutionary alteration of the vellus hair follicles in their regular biological cycles [2106]. In this context, folliculo-sebaceous cystic hamartoma [1275,2187] may be interpreted as a TF at its very late stage with nearly complete regression of the transient follicular epithelium, but with concurrent growth and maturation of sebaceous elements [2105]. Sebaceous trichofolliculoma [1846] exhibits distinct sebaceous lobules at its outer circumference, but lacks vellus follicles that radiate from the epithelial lining of the dilated infundibulum. The latter criterion militates against the classification of sebaceous trichofolliculoma as a true TF [28]. Hair follicle naevus is regarded as a TF that was histologically sampled at its periphery [28]. There is a striking predominance of mature vellus follicles and the central infundibular lumen may be quite inconspicuous.

#### Prognosis and predictive factors

TF represents an entirely benign cutaneous hamartoma with no reports of tumour progression or aggressive clinical course.

### Pilar sheath acanthoma

#### Definition

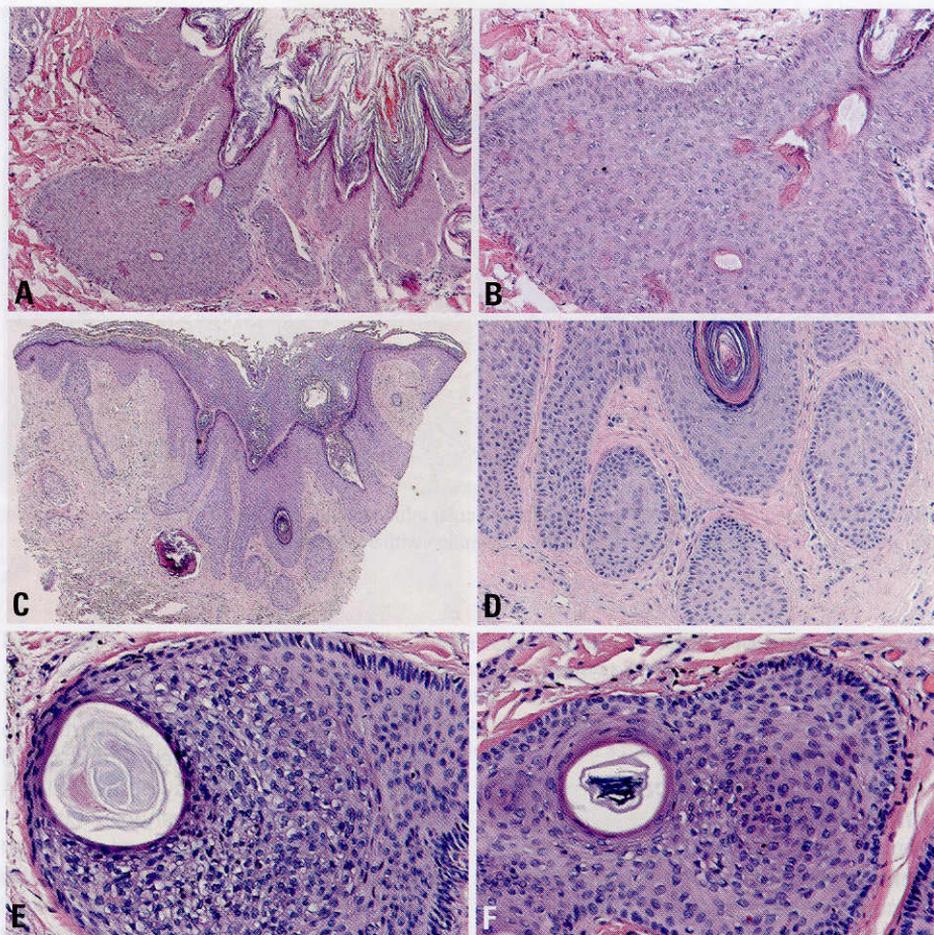
Pilar sheath acanthoma is a follicular neoplasm differentiated toward the permanent part of the hair follicle, to wit, the infundibulum and the isthmus. [The infundibulum is an extension of epidermis to meet the isthmus, but both function as part of the follicular sheath].

#### Synonyms

Infundibuloisthmicoma

#### Clinical features

Pilar sheath acanthomas affect adults of either sex, and are identified usually on the face. They are small, solitary papules up to 5 mm in diameter, with a central 1-



**Fig. 3.45** Pilar sheath acanthoma. **A** The characteristic infundibular and isthmus differentiation is stereotyped. Note the lack of a hair filament or inner root sheath. **B** The lobule contains red-pink corneocytes, characteristic of the isthmus. **C** This pilar sheath acanthoma does not have the obvious widened ostium, but it does contain the lobules of isthmus epithelium. **D** The lobules have a nearly syncytial pattern. **E** This lobule has clear-cell changes and syncytial, pink cell changes. Note the lack of inner sheath or hair filament. **F** The small, partly cornified cyst seen here contains no hair filament. Parts of the transient portion of the follicle are rarely seen in pilar sheath acanthoma.

2 mm punctum, lacking hair filaments, and will express corneocytes if squeezed. There are no known associated syndromes and no known genetic abnormalities within the neoplasms [29, 232,473,1570,2212,2402].

#### Histopathology

The classical example consists of a patulous infundibulum that connects with lobules of epithelium differentiated toward both the infundibulum and the isthmus. This differentiation results in blue-gray (infundibular) and pink (isthmus) corneocytes that fill the follicular canal. There can be a minor component of stem or bulb (or both) differentiation in some examples. Consequently there is, as a rule, no evidence of hair filaments in these neoplasms.

#### Differential diagnosis

Pilar sheath acanthoma should be differentiated from dilated pore (Winer), trichofolliculoma, and fibrofolliculoma/trichodiscoma. Dilated pore is an infundibular cyst that has proliferated minimally, but lacks isthmus differentiation.

Trichofolliculoma is a hamartoma and contains fully formed vellus hair follicles that radiate around a centrally positioned cyst. Fibrofolliculoma/trichodiscoma is also a hamartoma found characteristically in the Birt-Hogg-Dubé syndrome and that contains thin strands of infundibular epithelium connected so that fenestrations of delicate fibrous stroma are found within. Additionally, considerable stroma, lacking epithelium, is often identified (trichodiscoma).



**Fig. 3.46** Histopathology of a typical tumour of the follicular infundibulum, with horizontal proliferation of pale keratinocytes in the papillary dermis. Note the connection with the overlying epidermis.

### Prognosis and predictive factors

The neoplasm is benign; no treatment is necessary.

## Tumour of the follicular infundibulum

### Definition

Tumour of the follicular infundibulum (TFI) is a benign epithelial neoplasm of follicular origin.

### Synonym

Infundibular tumour.

### Epidemiology

TFI is an uncommon tumour occurring in adults, mainly after the age of 50. In two studies, TFI accounted for less than 10 per 100,000 skin samples. They can be observed on the face of patients with Cowden syndrome or on the surface of naevus sebaceous.

### Localization and clinical features

Solitary TFI is mainly localized on the face and presents as a small flesh-coloured nodule, resembling basal cell carcinoma. Multiple or eruptive TFI present as hundreds of symmetrically distributed hypopigmented geometric macules localized on the face, neck, trunk, or on the periocular area. Sun exposure increases the contrast between normal skin and the tumours.

### Histopathology

TFI is a plate-like horizontal proliferation

of pale keratinocytes, which is localized in the papillary dermis and shows multiple connections with the overlying epidermis or with the infundibulum. The cells are paler and larger than normal keratinocytes and their cytoplasm stains with PAS. The tumour is sharply circumscribed and limited by a dense network of elastic fibres easily demonstrated by orcein staining. Desmoplastic and sebaceous variants have been described {557,1485}.

### Histogenesis

TFI derives from the normal follicular infundibulum. The occurrence of multiple TFI suggests a possible genetic basis, which remains to be established.

### Prognosis and predictive factors

The prognosis is good, except in rare patients with multiple TFI who may develop basal cell carcinomas.

## Fibrofolliculoma / trichodiscoma

### Definition

Fibrofolliculoma and trichodiscoma are different developmental stages in the life of one single benign appendageal hamartomatous tumour, which differentiates towards the mantle of the hair follicle {27}. Fibrofolliculoma represents the early and trichodiscoma the late stage in the development of this lesion {27}.

### ICD-O code

8391/0

### Synonyms

Trichodiscoma first was erroneously thought to arise from or to differentiate toward the hair disk (Haarscheibe) and therefore bears this name {1836}. Fibrofolliculoma was often used for perifollicular fibroma in the past. Neurofollicular hamartoma and trichodiscoma are the same {2048}. "Mantleoma" was used as the overall term for both fibrofolliculoma and trichodiscoma {27}.

### Epidemiology

Fibrofolliculomas/trichodiscomas are rare appendageal tumours, occurring equally in males and females, usually not before the third decade of life.

### Etiology

The etiology of the solitary lesions is unknown. The Birt-Hogg-Dubé (BHD) gene was mapped to 17p11.2 {1256}.

### Localization

The preferred sites of location are the face, neck and chest.

### Clinical features

Fibrofolliculomas and trichodiscomas cannot be distinguished clinically {248}.



**Fig. 3.46A** Fibrofolliculoma / trichodiscoma. **A** Multiple fibrofolliculomas and trichodiscomas in a patient with BHD. **B** Fibrofolliculoma. Three adjacent dilated follicular infundibula with bizarre mantle-like proliferations are embedded in a prominent specialized stroma, well demarcated from the surrounding dermis.

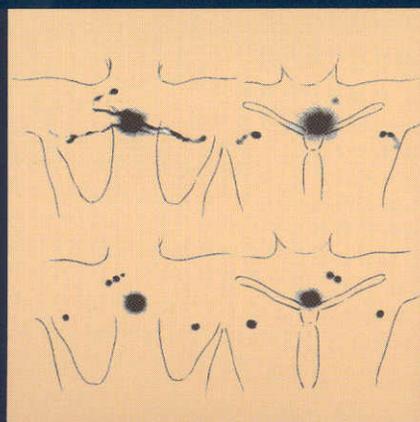
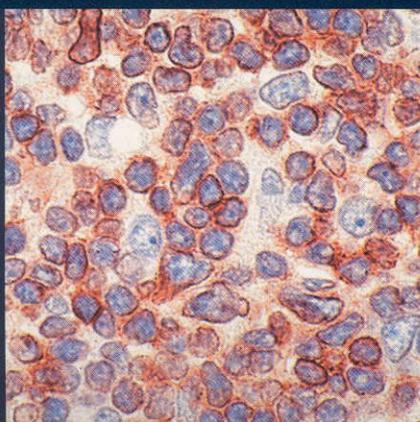
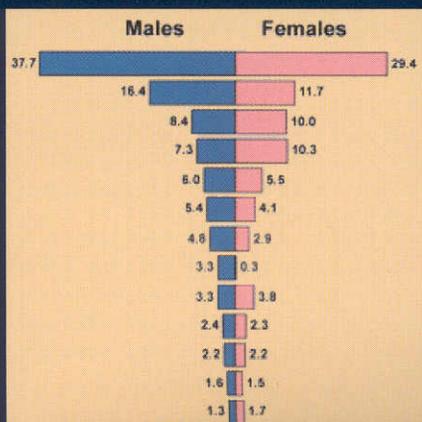
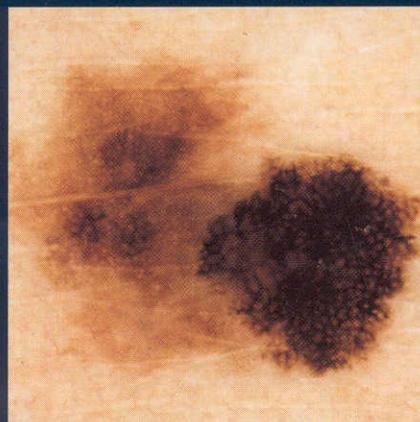
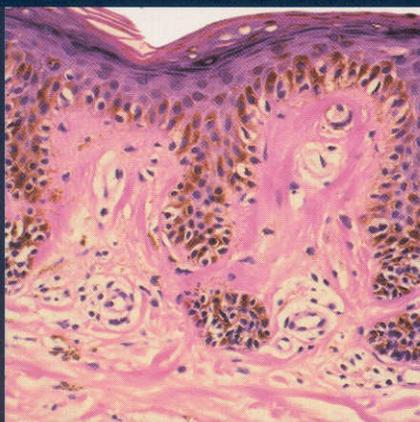
# World Health Organization Classification of Tumours



## Pathology & Genetics

### Skin Tumours

Edited by Philip E. LeBoit, Günter Burg, David Weedon, Alain Sarasin



# Benign tumours with follicular differentiation

## Trichoblastoma

### Definition

Trichoblastoma is a benign neoplasm differentiated toward the trichoblast, i.e., the folliculo-sebaceous-apocrine germ, or follicular germ, for short. In many cases, advanced follicular differentiation can be present also [28,989,1083].

**ICD-O code** 8100/0

### Synonyms

Trichoepithelioma, trichoblastic fibroma, trichogenic trichoblastoma, lymphadenoma (adamantinoid trichoblastoma), trichogerminoma, sclerosing epithelial hamartoma, Brooke-Fordyce disease, Brooke-Spiegler disease.

### Clinical features

Trichoblastomas, as a rule, are solitary, small papules that occur on any hair follicle-bearing location (usually head and neck), at any age, and can affect either sex. They can also present as multiple centrofacial papules or nodules, particularly in the diseases of Brooke-Fordyce and Brooke-Spiegler. The size of an individual neoplasm can vary from a few millimetres to several centimetres, but most are less than 1 cm in diameter. Most are skin-coloured and ulcerated only rarely.

The differential diagnosis is non-specific for solitary lesions, but includes the "angiofibroma" of tuberous sclerosis when multiple.

### Histopathology

Trichoblastic epithelial components associated with stereotyped stroma, chiefly the follicular papilla, must be present to establish the diagnosis with surety. There are five patterns; these can be mixed in any given neoplasm.

Large and small nodular trichoblastomas are usually circumscribed, sometimes subcutaneous, and contain a uniform distribution of solid trichoblasts with follicular papillae. In some cases, the follicular "papillae" are not papillary in that they fail to invaginate into the epithelial components of the germ. The epithelial cells are deeply basophilic, uniform, and overlap each other usually. Melanocytes can be prominent within the epithelial areas in some cases. Some cases have nodules that are lymphocyte-rich, a pattern termed originally lymphadenoma [1561,2053].

It should be noted that, rarely, lesions with a pattern similar to nodular trichoblastoma are really trichoblastic (basal cell) carcinomas that mimic trichoblastoma. While it is not completely understood what are all the factors that

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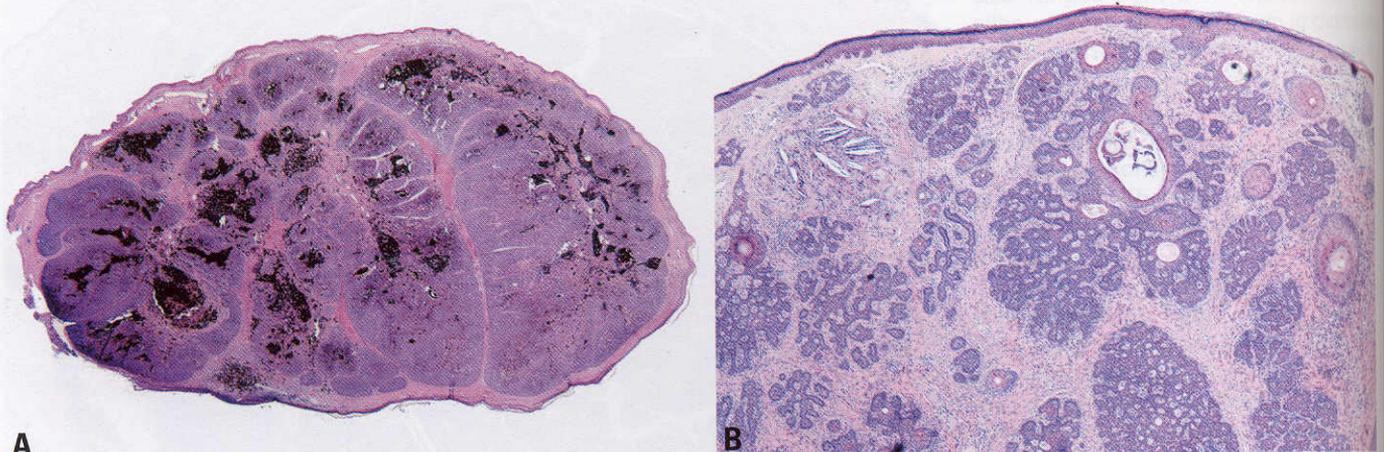
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differentiate these lesion from trichoblastoma, one seems to be that the carcinomas infiltrate through skeletal muscle or other deep structures while there is a conspicuous absence of the usual stroma present in a classic nodular trichoblastoma. Rare examples with this pattern have metastasized [1960].

Retiform trichoblastomas are reticulated, with large fenestrations containing follicular stroma.

Cribriform trichoblastoma is the most common pattern when the neoplasms are multiple, characteristic of Brooke-Fordyce disease. The trichoblasts are usually fenestrated, but with small fenestrations compared to the retiform pattern. Racemiform trichoblastoma contains epithelial nests that simulate "clusters of grapes". This results in stromal components that connect with the surrounding stroma rather than being isolated from it in fenestrations.

Columnar trichoblastoma (desmoplastic "trichoepithelioma") occurs most commonly as a solitary depression on the face of a young woman. As a rule, these neoplasms are confined to the superficial dermis. They contain stereotyped, thin strands of epithelium compressed by dense stroma. Small trichoblasts can be seen in some cases, but are less common compared to conventional forms of



**Fig. 3.39** Trichoblastoma. **A** Large nodular trichoblastoma. Note the circumscription. Melanin pigmentation is present in this lesion. **B** Cribriform trichoblastoma. At scanning magnification, there are small groupings of basophilic cells containing small fenestrations of stroma.