Chapter 29

Fungal Infections of the Scalp

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1 Definition

Fungal infections of the scalp and hair are divided into two types: one affects only the hair while the other also affects the surrounding skin. Piedra is an example of a typical fungal infection confined to the hair (see Cortés and Orfanos, this volume). Occasionally a microspore possessing the capability of infecting skin and hair may affect only a few hairs.

The causative organisms affecting skin and hair belong to various species of the genera Microsporum and Trichophyton. Only T. concentricum does not have an infectious effect; with the exception of Epidermophyton floccosum, dermatophytes infect only the hair. These are divided into the groups endothrix and ectothrix according to the respective mode of hair infection. Several dermatophytes are able to cause changes of the beard (tinea barbae), similar or identical to those of the scalp.

2 Synonyms

Fungal infections of the scalp and hair are classified according to the respective causative organisms; tinea capitis, for example, that is caused by Microsporum is distinguished from tinea capitis that is caused by Trichophyton. Since these terms, however, suggest a definite mycological diagnosis, it is common to use the general term tinea capitis (ringworm of the scalp) until the causative organism is identified with certainty.

Among fungal infections affecting the scalp and hair that are caused by species of Trichophyton, only favus – caused by T. schoenleinii – warrants separate consideration since its scutula and other clinical characteristics justify a special term. Still in use, however, are designations such as trichophytosis capitis, trichophytosis favosa, microsporosis capitis, and Audouin’s microsporon.
3 History

Mycoses acquired from the environment have probably been present for a long time. In historical medical reports numerous descriptions of skin disorders can be found which correspond to fungal infections that are known today. These disorders were identified by laboratory diagnostic techniques and classified according to a botanical system as early as the second third of the last century, thanks to the introduction of the agar culture method.

The study of the trichophytons, and therefore of tinea capitis, began with the discovery of Achorion schoenleinii (Trichophyton schoenleinii) in 1839. These studies were stimulated when Balsomo and Bassi discovered the fungal organism that causes silkworm disease. The observation of dermatophytes in human hair by the Hungarian physician Gruby was particularly important; he named the causative organism after the French zoologist Audouin: M. audouinii. Finally, Virchow coined the term mycosis.

4 Geographical Distribution and Epidemiology

The dermatophytes that cause tinea capitis occur all over the world, although their incidence is higher in some regions than in others. According to the literature, in recent decades the relative frequencies of the individual causative organisms have changed. M. audouinii was earlier the most significant among the causative organisms of tinea capitis because it had the capacity to spread rapidly, however the frequency of infections with M. audouinii has greatly decreased. The reason for this decline is unclear. One factor may be the important progress made in therapy, such as with the early introduction of griseofulvin, which has replaced coal tar caps and X-ray epilation as routine management.

In the Federal Republic of Germany (FRG), the last cases of infection with M. audouinii were reported at the beginning of the 1960s. In contrast, infections with M. canis have increased in the FRG during the past decade. M. canis is transmitted almost exclusively by cats and dogs (Fig. 1), and the increase of cats and dogs kept as household pets since the Second World War may explain this increase. (The number of cats is estimated to be 7 million and that of dogs 3 million; the number of household guinea pigs, hamsters, and rabbits has not been estimated.) The remaining dermatophytes of tinea capitis in the FRG are, in terms of descending frequency, T. mentagrophytes, T. verrucosum, and T. tonsurans. T. rubrum rarely cases fungal infections of the scalp. Infections with T. tonsurans are carried into the FRG mostly by children of foreign workers from Southern European countries. Favus caused by T. schoenleinii is a mycological rarity in the FRG.

In the United States, a change in the relative frequencies of causative organisms has also taken place in recent decades (Robinson 1974). In the middle of the 1930s, M. audouinii and M. canis occurred in about equal numbers in New York, whereas 10 years later M. audouinii was predominant, and in the 1960s an increase of T. crateriforme (corresponding to T. tonsurans) was observed. The trend in