REFRESHER COURSE FOR GENERAL PRACTITIONERS

FUNGUS INFECTIONS OF THE SKIN

BY

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Most fungus infections of the skin involve only the epidermis and its appendages, the hair and the nails, with comparatively little reaction of the underlying tissues. For this reason they are not a very potent cause of serious disability except when complications arise. Their increasing prevalence, however, gives this group of infections importance. I propose to deal with them in roughly their order of frequency in this country at the present time.

Tinea Pedis

This occurs in two very different clinical forms, which are, however, often associated together either simultaneously or at different times in the same patient. The vesicular form nearly always starts in the centre of the sole, under the arch of the foot, as a group of perhaps half a dozen watery vesicles of large pin-head size which after a few days become superficial pustules. At this stage irritation may be considerable, but the thickness of the corneous layer is usually sufficient to keep the vesicles intact in spite of scratching.

The pustules gradually dry up and, as they do so, take on a brownish colour so that they are eventually shed in the form of thick brown scales a quarter of an inch or so across. It is a week or ten days before these scales are formed, and by this time fresh vesicles are often forming near by. This process may continue for some weeks, eventually appearing on the sides of the feet and toes and even on the dorsum of the foot. Even without treatment, however, the process eventually seems to burn itself out and the attack subsides for a time.

The interdigital form develops more insidiously and may consist of no more than a maceration of the skin between the fourth and fifth toes, which the patient attributes to moisture. The eruption is usually a little more extensive, affecting the under surfaces of the fourth and fifth toes and the skin between the third and fourth toes as well. Thick white sodden scales are formed, and, with any unaccustomed walking, painful fissures are likely to appear between and under the affected toes. Once this interdigital form of ringworm starts it seems to continue almost indefinitely, and probably forms a reservoir of infection from which attacks of vesicular ringworm on the sole periodically originate.

A generation or so ago this kind of ringworm was chiefly to be found in the Tropics and was spread in this country in the public schools and sports clubs. It has now become so widespread that the name "athlete's foot" is no longer merited. Dr. Jacqueline Walker has recorded that National Service men, on entry to the Army, showed a 3.8% incidence of foot ringworm.

The diagnosis is not always easy, and I believe that the clinical appearances of both types of the disease may be mimicked by other affections. For this reason it is most

desirable to examine scrapings before treatment is started so that the diagnosis may be assured. All too often this examination is left until a preliminary period of treatment has failed, and the fungus may then be very difficult to find even though it was originally present and the cause of the trouble. For this examination a few scales or the roof of a vesicle are removed from the margin of the affected area, placed on a microscope slide, and flooded with 10% liquor potassae. After five or ten minutes the preparation is sufficiently softened to flatten out under pressure of the coverslip and is then

Skin scales showing fungus: unstained preparation, high power. From a case at the Middlesex Hospital.

examined unstained with the high-power objective. In an untreated case, fungus is usually easy to find after two or three minutes' search (see Figure); if it is not found quickly it is better to take fresh scrapings rather than to spend a long time over any individual slide.

Complications

It is the complications of foot ringworm far more than the disease itself which cause incapacity. They are

nearly always due to secondary infection with pyococci or to contact dermatitis resulting from the prolonged use of antiseptics and fungicides.

Treatment

In my experience, the old-fashioned Whitfield's ointment is still as good as anything. Now that coco-nut oil is again available the original formula can be used :

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Salicylic acid, 15 gr. (1 g.)
Benzoic acid, 25 gr. (1.65 g.)
Coco-nut oil, 6 drachms (21 ml.)
Soft paraffin to one ounce (30 g.)

The ointment should be liberally applied twice daily and the foot enclosed in a thin cotton sock or a single layer of calico held in place by normal socks or stockings.

In recent years a good deal of research has been carried out into fungicides, and several elegant preparations are now on the market. There can be no doubt that most of them are very effective, perhaps more so than Whitfield's ointment, but most of them are more liable to cause contact sensitivity and a severe form of dermatitis which may be far worse than the original disease.

Three or four weeks' treatment is usually sufficient, and during this period the patient must be schooled to the regimen which he should adopt if he is to avoid recurrence. Recurrences are, of course, all too frequent. In some cases they seem to be definitely related to re-infection by walking bare-foot in a club changing-room or hotel bathroom. It is known that the organism may remain for months on an infected floor and that it may survive the ordinary process of washing with soap and warm water. Once the patient has shown that he is susceptible to this infection it is important that he should get into the habit of never putting the bare foot to the floor even in his own home. Socks should be sterilized either in the autoclave or by soaking for twelve hours in 3% cresol before they are washed. This period of sock sterilization should continue for a week or so after the skin has returned to normal. Bedroom slippers in which bare feet are placed should be either thrown away or packed with formalin swabs and enclosed in an airtight box for three days. Shoes which are worn with socks need not be dealt with.

Sometimes there is no history of reinfection, and in these cases attacks often seem to follow unaccustomed exercise in which the feet have perspired more than usual. There is little doubt that excessive perspiration predisposes to infection, and it is impossible to say whether the organism has been lying dormant in the skin during months of quiescence or whether there is, in addition, a fresh infection from without.

It is therefore important for the patient to avoid those things which are apt to lead to excessive perspiration of the feet. He should wear light shoes, avoiding rubber soles, and in summer open sandals are helpful. Thin cashmere socks are usually best. The feet should be washed every day with soap and water, swabbed with industrial spirit, and powdered with zinc oxide and starch powder to which 2% of boric acid may be added. When recurrence takes place the patient should be carefully questioned in order to ascertain, if possible, why the relapse occurred. A search should also be made for ringworm infection elsewhere on the skin, particularly in the nails.

Tinea Unguium

It is my impression that ringworm of the nails has become a good deal more common in recent years. Clinically, the most constant physical sign is separation of the distal part of the nail from the nail bed with a dirty yellow or orange discoloration. The nail usually becomes brittle, and may be ridged or furrowed. These changes are, of course, produced by the fungus growing in the substance of the nail, the nail having been originally well formed. For this reason the changes of ringworm are usually confined to the distal half of the nail and the proximal part remains normal. This is perhaps the most useful differential diagnostic point, since most other affections of the nails are true dystrophies and affect the nail matrix so that the irregularity of the nail is present from its first formation. Another useful diagnostic point is the fact that ringworm of the nail nearly always starts in one finger or toe and others are affected one by one at random. True dystrophies often affect all the nails simultaneously or, if they do not, are at least symmetrical. Ringworm of the nail produces no inflammatory reaction in the soft tissues around and no symptoms other than the ugly appearance and awkwardness resulting from brittleness and discoloration. For this reason the patient will usually complain of ringworm in a finger-nail, but an infected toe-nail may go unheeded, particularly if it is one of the smaller toes.

Ringworm of the nails is caused by the same organisms as those which may give rise to ringworm on the feet and elsewhere on the skin. An infected nail may therefore constitute a reservoir of infection from which tinea of the foot or groin may repeatedly develop.

Although the diagnosis can often be made with reasonable certainty on clinical grounds alone, it is essential to make sure by finding the fungus before embarking on the long and tedious treatment which is necessary. Clippings of nail and the debris beneath are steeped in 20% liquor potassae until macerated and examined in the same way as scales. The fungus may be difficult to find, and repeated careful search may be necessary.

Treatment

Sir Norman Walker referred to ringworm of the nails as "a calamity which no decent person would wish on his worst enemy." Treatment is difficult and exacting, and, to most patients, seems at first out of all proportion to the severity of the disease. It must be pointed out, however, and the patient must understand, that with half-measures the affected nails will never clear up; they will remain a source of infection for the rest of the skin, and, as the years pass, more finger- and toe-nails are likely to be involved. The great difficulty in treatment arises because the fungus grows in the substance of the nail, the solid tissues of which protect the micro-organism from fungicides. X-ray treatment is without effect. The problem, therefore, is to remove the infected nail and thus to expose the fungus to attack with antiseptics.

Conservative treatment consists in cutting away the separated nail, as far as possible, with pointed scissors. The nail plate must then be systematically scraped as thin as can be borne; the best instrument for the purpose is a piece of broken glass of suitable size, and the

scraping should occupy at least ten minutes every day. After the patient has scraped away as much as he can bear, a suitable application is 1:2,000 perchloride of mercury in 50% spirit. This treatment needs to be continued for two or three months. It is a treatment which requires a great deal of determination and perseverance on the part of the patient. It is seldom possible to carry it out properly on any toe-nail except that of the big toe, and, since it is time-consuming, it is not likely to be successful if more than one or two nails are affected. For these reasons I advise conservative treatment with any confidence only for an intelligent adult with one or two finger-nails affected.

The alternative is removal of the affected nails. In this way the bulk of the inaccessible fungus is removed, but it must be remembered that the organism remains on the nail bed and will infect the new nail if it is not dealt with. The affected nails are therefore avulsed under local or general anaesthesia and the nail bed lightly curetted to remove debris. A dressing of tulle gras may then be applied and need not be changed for a few days. After four or five days the tenderness of the nail bed rapidly diminishes and the area may then be dressed with Whitfield's ointment twice daily. In the case of toe-nails, rest in bed will be necessary for a few days, but normal shoes can usually be worn after a week or so. Fingers must be kept covered with a finger-stall, preferably of leather: it is not satisfactory for a rubber glove or finger-stall to be worn for long periods. Treatment with Whitfield's ointment should continue for two or three months, by which time the new nail will be growing up.

Even this drastic treatment, with its upset of the normal life of the patient, is not always successful, and it should be explained to the patient at the outset that, although this method is far more satisfactory than conservative treatment, there is nevertheless a substantial risk of recurrence. If this occurs the more drastic step of excision of the nail matrix may be considered. On the toes, particularly the small toes, this involves little disfigurement, but many patients do not like the idea. However, the permanent loss of toe-nails constitutes no disability, and excision of the nail bed is probably wise in recurrent tinea of toe-nails if finger-nails are not already affected. Permanent removal of finger-nails constitutes as much disfigurement as tinea and some degree of disability as well. For this reason I would advise repeated avulsion of finger-nails, if necessary, rather than complete excision.

Tinea Tonsurans

Had this article been written four or five years ago scalp ringworm would have taken first place. It became very common during the war, but, as soon as more normal conditions were restored and treatment could be better organized, the disease was brought under control. It is now comparatively uncommon. The clinical problem has been epitomized by Darier: "Any multiple scaly patches or dry eczema localized to the scalp in children impose the need for a meticulous search for broken hairs. . . ."

This type of ringworm is very seldom seen in adolescents or adults and affects principally children, especially boys between the ages of 5 and 10. The well-outlined scaly patches are not truly bald, since the hairs do not fall out by the roots but snap off,

leaving the affected area covered with stumps. While this is the characteristic picture, some patients present no more than a scaling patch and the hairs do not seem to become brittle. In nearly all types of scalp ringworm the affected hairs fluoresce in ultra-violet light; this is best seen with a mercury vapour lamp screened with Wood's glass, which cuts off most of the visible rays. When this is shone on an affected scalp in a darkened room individual hairs containing the fungus shine conspicuously with a green fluorescence. In this way an infected child can be picked out in a few moments' examination, and even single infected hairs can be found at a stage when the disease could not be clinically diagnosed. For this reason a lamp to provide Wood's light is essential for the examination of contacts, the prevention of epidemics, and the detection of relapses. The fluorescence produced by soft paraffin should be carefully distinguished; it is of a blue colour, and of course can be removed by cleaning the hair with ether.

Characteristic fluorescence with Wood's light is pathognomonic. In cases of doubt, or if Wood's light is not available, the diagnosis of ringworm should be confirmed by examining a hair in the same way as scales. The fungus appears as a close mosaic of regular rounded spores encircling the hair-shaft. A proportion of cases of scalp ringworm are due to the organism of cat or dog ringworm. Unlike ringworm of the human type, these cases seldom occur in epidemics, since the infection does not readily pass from one human to another. The distinction can be made with certainty only by culturing the organism.

Treatment

The treatment of ringworm of the scalp presents a problem similar to that of ringworm of the nails. The organism is protected by the relatively impervious material—in this case the hair-shaft—in which it grows. The search for a fungicide and for a vehicle which would penetrate into the hair-shaft was being actively pursued in this country a year or two ago. Now, however, the disease has become comparatively rare, and it seems as though these researches are likely to come to a standstill. Since, up to now, no certain way of reaching the fungus has been found, successful treatment depends on the removal of the infected hairs. They cannot be removed manually, since they are brittle and break off, and the only successful method which has stood the test of time is epilation with x rays. When carried out by an experienced operator this procedure is absolutely safe. The hair usually falls from the whole of the scalp about a couple of weeks after the x rays have been given and gradually grows again after a further lapse of three or four weeks. X rays have no effect on the fungus itself, and during the period of baldness Whitfield's ointment should be rubbed into the whole of the scalp twice daily.

This may seem a drastic treatment, but parents should be urged to adopt it without delay; conservative treatment is exacting, time-consuming, and most uncertain in its results.

A child with scalp ringworm should, so far as possible, be isolated from other children until after x-ray epilation is complete. Throughout this period he should wear a washable linen cap in order to minimize the spread of infection. The detection of a case of ringworm imposes

the need of routine examination of his brothers and sisters, playmates, and schoolfellows. For this purpose Wood's light is indispensable.

Tinea Cruris .

This is usually caused by organisms which may also infect the feet or the nails. Known as dhobie itch, it was formerly chiefly familiar as a tropical infection contracted by wearing clothing which had been infected during laundering. The eruption appears as a bright red itchy disk on the inner aspect of the thigh two or three inches below the crutch. The affected area is scaly and sometimes there are a few tiny vesicles at the margin; very often the margin is a little raised and palpable, with a tendency for the patch to clear up spontaneously in the centre. As the patch enlarges it extends to the inguinal region, thigh, perineum, or scrotum. In differential diagnosis this form of ringworm is to be distinguished from intertrigo; the latter always starts exactly in the groin fold and not a few inches down on the thigh. Extending from the fold, it usually affects opposing surfaces symmetrically. At the margin of a patch of intertrigo follicular lesions are very often to be seen: tinea of the thigh is never follicular. Unless the clinical diagnosis is quite certain it is always best to remove a scale, preferably from the margin of the patch, and examine it microscopically. The fungus is easy to find.

Treatment

This form of ringworm responds well to treatment. Whitfield's ointment may be rubbed into the affected patch twice daily for a fortnight or three weeks, and seldom fails. Recurrences are not very unusual and are probably most often due to a reservoir of infection on the feet or nails. In order to avoid reinfection from clothing, underwear should be boiled during the period of treatment.

Pityriasis Versicolor

It is difficult to say how common this type of ringworm is; very often it is found on patients who are being examined for another purpose, and, although some patients complain of slight irritation, many people do not notice its presence. The eruption appears principally on the back and front of the trunk and is made up of patches or sheets of a faint fawn or brownish colour. It is usually only when the patches are scraped that a fine adherent branny scaling becomes evident. The patches are well outlined, but there is no erythema or other alteration of the skin. When scales are examined microscopically, fine filaments of fungus can be seen together with clusters of spores.

From the absence of any inflammatory change it is clear that this infection is extremely superficial. Symptoms are negligible, and it is not easy to persuade patients to use messy ointments over a wide area of the body for such a trivial complaint, since there are indeed no complications. Because of this I usually give a lotion consisting of 50% spirit containing 1:2,000 mercury perchloride to be swabbed over the affected areas twice daily. Underclothes should be boiled during the period of treatment. In practice, the eruption is rather resistant to treatment, and shows a strong tendency to relapse; I suspect this is largely because it is so difficult to ensure that treatment is effectively carried out.

LORD HORDER 80

Lord Horder, who is 80 years old on January 7, can look back on a life of unrivalled service to the profession and the public. Still having the physical energy and mental alertness of a man many years younger than himself, he can, too, look forward to giving—and we to receiving—many years of active and pertinent counsel in all those various aspects of life and medicine which have engaged and held his unflinching interest. As was said of him in the *Sunday Times* a year ago, "The societies of which he is either president or chairman are mainly those which support the right of an individual to decide for himself those matters which concern only himself." Some men prominent in public life come to assume a public mask. When on the public stage they play a part which has been carefully studied and rehearsed. But Lord Horder, on public and private occasions, has always been himself, forthright and direct in speech that at times has the precise sharpness of the etcher's tool. He has been and is an individualist in the best meaning of this word. It is surely this, added to his brilliant qualities of mind and unusual capacity to observe what he sees, which has made him the supreme clinician of his day. It was an almost uncanny observation that led him to supply a critical piece of evidence when he was called in during one of the illnesses of Edward VII.

It is just over forty years ago that Dr. Thomas Horder (as he then was) published his classical description of sub-acute bacterial endocarditis. He was the first to isolate a streptococcus from the blood in this disease and establish it as an infective condition. This was the fruitful outcome of his early awareness of the importance of clinical pathology, the subject of his first published book in 1910. In the early years of his consulting practice he "did" his own pathology, with the help of what came to be known as "Horder's box," containing test-tubes, culture tubes, blood-counting apparatus, and a blood-culture syringe. He brought clinical pathology to the bedside at a time when too many were content to bring only the bedside manner. Lord Horder's clinical exemplar was that great Bart's physician and teacher to whom he was house-physician, Samuel Gee, and Bart's holds in grateful memory Gee's house-physician who in the course of time also became a great physician and teacher in an institution which for over 800 years has been an active witness to the continuity of medical history.

The International Hospital Federation's *News Bulletin* reports some differences from British practice noted in a tour of Swedish hospitals. Bedpans are never sterilized, a good dousing in cold water being considered sufficient. Creeping plants in pots and boxes are often trained up the inside walls of wards and hospital rooms; the patients like it, and doctors and nurses see no harm in it.