REFRESHER COURSE FOR GENERAL PRACTITIONERS

SCABIES AND LICE

BY

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An infective organism such as the meningococcus on finding a congenial soil flourishes and sets off an epidemic, but in the course of time, even without the aid of medicine, the case incidence declines and the epidemic comes to an end because the community has gained some degree of immunity.

Those ectoparasites of man, the itch-mite and the louse, given the opportunity, will also multiply and spread themselves far and wide until the disorders they cause assume epidemic proportions. Unfortunately the body does not become immune to them, though certain people do not seem to be incommoded by their parasites, and the epidemic is usually brought to an end only when the public health authorities get an almost complete control of the parasites. Quite apart from times of war, the incidence of infestation varies from year to year. The number of cases of scabies in L.C.C. schoolchildren fell from a very high level in 1919 to a low one in 1926, and then rose again, slowly at first and later more rapidly, until in 1938 the numbers were practically the same as in 1919. This swinging of the incidence reminds one of similar cycles in the intensity and virulence of certain zymotic diseases and may have a similar biological origin. It must not be forgotten, however, that in the lean years many students and nurses graduate without ever seeing a case of scabies; unfamiliar with the physical signs, they fail to diagnose the disease when they see it, and the possibility of its presence does not enter their minds, so control of the early isolated case is lost and the chances of dissemination are increased.

SCABIES

The itch-mite, *Sarcoptes scabiei* var. *hominis*, has long been known to cause human scabies, but two world wars, with a concomitant enormous increase in the incidence of this disease, have been needed to stimulate full investigation of its *modus operandi*. The adult female is the largest form and so the one most often seen, as she is about 1/60 in. (0.4 mm.) long and just visible to the naked eye when extracted from her burrow. During the 1914-18 war Munro demonstrated that an adult female mite placed on the skin showed a decided preference for certain sites, and that if placed elsewhere on the body she would migrate to one of these areas before settling down to carry on her life-cycle. At a site of election she bites and tears a way into the horny layer and then burrows horizontally in it at a rate not exceeding 5 mm. a day. She also lays two or three eggs daily, and may in favourable circumstances carry on in this way for a couple of months. The eggs hatch in three to four days to larvae, which migrate to hair follicles for further development; the larvae moult to nymphs and these to adult males or immature females. From the egg to the egg-laying stage lasts about a fortnight.

Signs and Symptoms

After infestation has taken place there is a variable period without symptoms which is followed by the chief and the most characteristic symptom, itching that is worse at night

and usually severe enough to keep the patient awake and scratching. This is a time when the skin is warmest and the cold-blooded mite consequently most active. Those patients who work on night shifts itch more during the day. Dr. Kenneth Mellanby, who intensively investigated the problems of scabies during the last war, believes itching to be a manifestation of sensitization.

By the time a sufferer from scabies is driven by his complaint to seek advice, a secondary polymorphous rash is usually widespread over the trunk and limbs, and vesicles, pustules, wheals, small patches of eczema, impetiginous and ecthymatous crusts, follicular papules, pustules, and boils are obvious when the patient is stripped for examination. Despite the severe irritation linear excoriations are not common. A history of nocturnal itching or the special intensity of the rash in certain areas should arouse suspicions of scabies and lead to a closer search for the diagnostic lesion, the burrow, in the sites of election. These are the sides and webs of the fingers, the front and ulnar aspects of the wrist, the point of the elbow, the anterior axillary fold, the umbilical margin, the buttocks, knees, and over the tendo Achillis. In males they are also common on the glans and shaft of the penis, and in women around the nipples. Infants and young children often have numerous and large burrows on the palms and soles. The face is unaffected except in nursing infants in whom there has been a spread from the maternal breast.

The burrow itself is a thin very slightly raised irregular line seldom more than 1/4 in. (1.3 cm.) long. The epidermis at the point of entry is slightly frayed, with the free edges often a little dirty. Where washing has been irregular a burrow may look like a piece of fine black cotton in the skin, but in those who bath frequently and rub away the tops of their burrows the lesions are often difficult to identify. If in doubt put a small blob of ink over the suspected area and wipe off immediately, when a burrow will show as a dark line. The far end of a burrow usually has a distinctive termination: a whitish spot—the mite itself, a vesicle, or a pustule. Where the horny layer is very thin, as on the penis, umbilicus, or anterior axillary fold, the burrows are usually obliterated in a surrounding inflammatory reaction and the characteristic lesions are oval or sausage-shaped pink papules.

When burrows have been identified the diagnosis can be confirmed by microscopical examination. The parasite is extracted either with a triangular needle or by slicing off the blind end of the burrow with a razor blade and mounting the cutting; either method needs practice to do with ease and certainty.

Papular urticaria in small children is often mistaken for scabies, particularly because it is often more itchy when the child goes to bed. The lesions, however, are all variants of a primary small urticarial spot that rapidly develops a central vesicle which may be secondarily scratched, crusted, and perhaps impetiginized. In adults the itchy condition most often wrongly diagnosed and treated as scabies is the milder form of dermatitis herpetiformis, better described by its alternative name—painful polymorphous dermatitis of Duhring-Brocq. In the cases that are usually mistaken for scabies the polymorphy of the lesions varies rather from one attack to another than from a variety of simultaneous ones.

Unusual Forms of Scabies

Despite the high reproductive powers of sarcoptes the average number of adult mites on any patient with scabies is small. Perhaps the heavy mortality rate results from rubbing and scratching to allay itching, for when infestation occurs in someone who by reason of paralysis is unable to scratch or who is insensitive to irritation from some lesion of the sensory nervous system—for example, neural leprosy—or from mental deficiency, there is sometimes an enormous increase in the mite population, which, perhaps due to overcrowding, spreads beyond its usual habitat and may even be found living beneath the free edge of the nails. The skin itself is often covered with patches and large sheets of thick dry mortar-like crusts. This rare form, known as Norwegian or crusted scabies, is likely to remain undiagnosed until those in contact with the patient show the ordinary manifestations of scabies.

Mites that are related to those of human scabies are prevalent in animals, in which they are a cause of mange, and may be transmitted to man and set up irritation. Animal scabies is caught most often from the dog, but those who come into close association with other animals may also be affected—for example, veterinary surgeons, or those who groom horses or camels. On their new host the mites will live but practically never form true burrows or reproduce themselves, so unless the infestation is reinforced from the original sources it will die out in a few weeks. Direct transmission from man to man seems not to happen, and when several members of a household are affected they acquire infestation from the animal. In general practice animal scabies is most likely to turn up in those who fondle pet dogs and present themselves with small urticarial wheals and itchy papules on the face, neck, and forearms. According to Whitfield the point of the elbow is the most likely spot for lesions to be found.

Treatment

The aim of treatment in scabies is to apply some substance that will be effectively lethal both to the various stages of the mites and to the eggs, or, if the action is only on the breeding forms, it should be effective until the eggs have hatched—fortunately, not a long period. Until the last war sulphur ointment and Marcussen's ointment (containing polysulphides) were the most widely used cures for scabies and were most effective when correctly applied. Even so they provoked some degree of reaction (sulphur dermatitis) in a small proportion of cases, and when applied in haphazard fashion or for too long a period the complications were more frequent and less amenable to treatment. These drawbacks made sulphur therapy unsuitable for infants and small children, for whom an ointment containing balsam of Peru had been used empirically and successfully for many years. It occurred to Neilsen about 1912 and Kissmeyer 20 years later to investigate the properties of the balsam, and it was found that the most active constituent against the mite was benzyl benzoate. The later synthetic production of this substance in large quantities has revolutionized the treatment of scabies in the last decade. The early mode of application was in a soapy alcoholic solution, but now an oil-in-water emulsion has been found to be equally effective and also cheaper.

The method of treatment is as follows. A preliminary bath with soap and water is preferable but is not an essential prelude to parasitocidal applications. Scrubbing has also been shown to be unnecessary. Bathing will remove dirt from those who have not bothered to do so and will soften and wash away crusts of any secondary pyoderma. No matter how extensive this may be, treat the scabies first and the infection later. After thorough drying in a warm room the patient is painted—this is preferable to painting himself—from the neck to the toes with applicatio benzylis benzoatis B.P.C. on a flat brush, and the emulsion allowed to dry on. If the operator is capable and experienced a

single application should suffice, but the inexpert should be advised to apply a second coat to lessen the chance of any spot being missed. When the skin is dry the patient dresses and should not wash again for 24 hours. Underclothes and bed linen should be washed, but it is unnecessary to send blankets, bedding, and clothes to a disinfecting station, as the chance of reinfestation from them is negligible.

Sometimes a patient may still complain of itching at the end of 24 hours' treatment. This should never be regarded as a persistence in the infestation, and emulsion should not be reapplied within a week. The persistence of itching after treatment may be a reaction to the benzyl benzoate or to another constituent of the application, but it is more likely to be due to the eczematous rash that often accompanies scabies. Avoidance of soap and the exhibition of 1% liquid phenol in lotio calaminae oleosa B.P.C. will usually allay the irritation within a few days.

Before recommending a further course of benzyl benzoate treatment for continued itching, the possibility of a faulty diagnosis in the first instance should be considered. If burrows and mites had been found originally, a persistence of infestation is due either to inefficient application of the remedy or to insufficient inspection of the household. When scabies occurs all close contacts should be examined, and if the patient shares a bed the other person should be treated *at the same time*, even though he does not complain of itching or show obvious signs of scabies.

Secondary pyogenic infection in scabies ranges from trivial to severe degrees, and may be associated with moist eczematous areas which should be a warning sign against any treatment with strong or irritating germicides. Where there is extensive sepsis begin treatment, after the 24 hours' application of benzyl benzoate, with a warm permanganate bath. Do not add crystals to the bath water; some may not dissolve, and if the patient sits on them his skin will be burnt. A better way is to add $\frac{1}{2}$ oz. (14 ml.) of a 4% solution to each gallon (4.5 litres) of bath water. After soaking for a few minutes crusts and debris are gently wiped off with swabs and then the patient can remain in the bath for a quarter of an hour. Such a bath will benefit most eczematous patches. After the patient has been patted—not rubbed—dry with warm towels, a mildly antiseptic lotion should be applied to the affected areas. Lotio calaminae B.P. may suffice. If a more rapid antiseptic action is thought to be necessary acriflavine can be added to make a concentration of 1/1,000 (I have found the other dyes less satisfactory), or to 20 oz. (570 ml.) of lotion add 10 minims (0.6 ml.) of "monsol," a tar derivative with both antiseptic and antipruritic properties which is particularly useful for infected eczematous areas. For severe cases it may be necessary to resort to an antiseptic bath for several days. Permanganate stains on the bath can easily be decolorized with hydrogen peroxide. Sulphonamides should not be used as local applications, but if the regional glands are enlarged and tender they can be given internally. As *Staphylococcus aureus* is usually the preponderating organism sulphathiazole is perhaps the most useful one. It should not be given for more than four or five days, and to avoid sensitization rashes the dose should be kept low—1 g. three times a day is usually adequate.

Mild septic lesions or the later stages of severe ones can be treated with pasta hydrargyri oxidi flavi N.F. or 10 minims (0.6 ml.) of monsol and 1 oz. (28 g.) pasta zinci oxidi cum acido salicylico B.P.C. (Lassar's paste).

Mellanby investigated the efficiency of other applications for scabies and found that only unguentum sulphuris B.P., Marcussen's ointment, and dimethyldiphenylene disulphide were as effective as benzyl benzoate. The first two have the disadvantage of messiness and the last is more expensive.

Sulphur powder, sodium thiosulphate, derris root and its extracts, pyrethrum, and sulphur internally or in soap are less efficient agents in the treatment of scabies and should be forgotten. A newer compound, tetraethylthiuram

monosulphide ("tetmosol"), incorporated in soap will cure most persons in a few weeks and will certainly prevent scabies spreading in a closed community, so it may be a very useful adjunct in an epidemic.

LICE

Three types of louse infest man and man only—the head louse, *Pediculus capitis*; the body louse, *Pediculus corporis*; and the crab louse, *Pediculus pubis*. The last differs somewhat in shape and is more rotund than the others: a specialist, it leads a more circumscribed life and seldom wanders, though occasionally it strays from its special field up to the armpits and even to the eyelashes; its incidence is never high, and epidemics of it are unknown.

Lice multiply by laying eggs or nits, which are usually attached very firmly to the side of a hair low down near the surface of the skin. At the temperature of the skin the eggs hatch into larvae in about nine days, and the larvae take about the same time to become adults, which may survive for a month. From 8 to 10 eggs a day are laid. Despite the large number of eggs laid the average infested scalp harbours fewer than 10 lice. The heavier the crop of hair the more likely is it to be more often and more heavily infested—hence the higher incidence in females. Infestation is also commoner in children than in adults.

Pediculosis capitis is prevalent in schoolchildren. During the war the affection spread more widely and was not uncommon in young women, not only because of less time being available for attending to the toilet of the hair but also because of an unwillingness to disturb a permanent wave by brushing, combing, and washing.

As lice puncture the skin to feed on blood their bites irritate; this leads to scratching, and usually to secondary pyogenic infection of the skin. An impetigo of the scalp or adjacent area should arouse suspicion of pediculosis capitis, and a search should be made for nits, which are much easier to find than a louse crawling over the scalp. If the infection has been present for some time the adherent nits or the empty shells will have been carried upwards by growth of the hairs and be obvious to the naked eye without unduly close inspection. When infestation is light the most likely place to find nits is on the hairs behind the ears. They are easily distinguishable from bits of scale by being immovably fixed to one side of a hair.

The body louse has adapted itself to the diminished hairiness of the human body by living in the clothing and migrating to the skin to feed. Its eggs can be found attached to lanugo hairs, but more will be found on the clothing, particularly in the seams, which should be carefully examined in suspected cases. Linear excoriations across the shoulder blades are a characteristic sign of pediculosis corporis. Such marks may also be seen in senile pruritus. Some old people wear a garment next the skin for a week or two without taking it off at night for fear of getting a chill. This habit favours the proliferation of body lice, but the infestation can be missed, as clean underclothing is often put on just before a visit to the doctor.

The symptoms of crab lice arise from the irritation set up by the bites, which in the paler skins of some patients show up as bluish grey macules. Occasionally itching is very slight and the infestation is only detected on a routine examination such as the Army inspection for freedom from infestation. What usually brings the patient to seek advice is that rubbing and scratching often sets going in the pubic area a secondary eczema that rapidly becomes moist and crusted, matting the pubic hairs. Such an appearance makes a careful search for evidence of the parasite imperative. The nits are rather darker than those seen in the scalp and sit close to the surface of the skin. If no definite evidence is found on the male pubis examine the perianal region, where the sparser distribution of hairs makes both the louse and its eggs easier to see.

Apart from carrying typhus, a severe infestation of lice will occasionally cause fever, anorexia, and an eruption of macules and papules scattered mainly over the trunk.

Treatment

A great advance in the prevention and treatment of lousiness was also made during the last war, and the newer types of applications have made the task of delousing a population much easier for public health authorities. Mass treatment of the inhabitants of Naples with a powder containing 10% D.D.T. blown under their clothes rapidly brought to an end an epidemic of lice and typhus in 1944. Applicatio dicophani B.P.C., the official preparation containing D.D.T., can be used for all types of pediculosis. About $\frac{1}{2}$ oz. (14 ml.) of this emulsion well rubbed into the hair and scalp and left for 24 hours before washing out will kill the lice there. It has no direct action on the nits, but D.D.T. remains adsorbed on the hair and egg shell to kill larvae when newly hatched. Benzyl benzoate emulsion has a similar action and the further advantage of loosening the cement that binds the nits to the hair, so enabling them to be combed out easily after the hair has been washed. "Lethane" has a similar action to D.D.T. but does not persist quite so long in the hair after washing out, and, as some eggs may take nine days to hatch, a second application may be needed about a week after the first.

Pediculosis pubis can be treated in the same manner as the scalp. Shaving off the hair before treatment is quite unnecessary.

In severe pediculosis corporis, in addition to treating the body, disinfestation of clothes and blankets may be required. A simple method of dealing with a few articles is to go over them with the domestic hot iron, paying particular attention to seams and folds, the most likely places for eggs to be laid.

The treatment of secondary infection in pediculosis is on the same lines as for scabies, except that for hairy regions ointment bases should be soft—for example, unguentum hydrargyri ammoniati dilutum is preferable to a paste unless the hair has been cut close to the skin.

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The third seminar for European sanitary engineers was held in London from October 27 to November 1, sponsored jointly by the World Health Organization and the Rockefeller Foundation. The main topic of discussion was the provision of sewage facilities for small communities. Dr. J. A. Scott discussed the health considerations involved in the effective disposal of sewage and the importance of avoiding both water and land contamination. Lieutenant-Colonel Hill and Mr. G. Lloyd Ackers (England) spoke about the principles of design for small domestic sewage works, and Mr. A. E. J. Pettet and Mr. E. E. Jones described the behaviour of five small experimental sewage plants in this country. Professor Meinck (Germany), Professor Leclerc and his colleagues (Belgium), Mr. Walter Dardel (Switzerland), and Mr. Allen and Miss Hazel Smith (England) discussed other aspects of the subject. The provision of proper sewage facilities is a subject still of great importance in many countries, including those in Europe, for methods of disposal and treatment are often inadequate, especially among small communities.