

Unna (p. 9.) 11



[Reprint from ST. LOUIS MEDICAL AND SURGICAL JOURNAL, August, 1890.]

HYPHOGENIC, COCCOGENIC AND BACILLOGENIC SYCOSIS. BY DR.
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There is scarcely a department in dermatology in which the great idea or principle of Parasitism has not operated toward advancement, enlightenment and (what was here so necessary) simplification. I say the principle of parasitism, because the fructifying influences of the same reach far beyond the mere point where the chain of positive demonstration has thrown itself around some particular parasite and some definite form of skin disease and linked them together. We experience this progressive, educating influence in our daily clinical work, enabling us, it may be, to trace the etiology of forms of disease, hitherto considered identical, to differing parasitical causes, and thus to differentiate them; or, it may be, to discover a common parasitical cause for a series of manifestations and thus for the first time, make clear their relationship.

This influence is felt, naturally enough, most strongly in those fields of dermatology wherein an exact demonstration of parasitism has already been made. And here I would call especial attention to the fact that we speak not merely of new (uninvestigated) skin diseases, but of those dermatoses as well, whose cause has for a long period been ascribed to micro-organisms. For happily we are no longer so simple as to believe that in a skin disease having the clinical aspect of herpes tonsurans, for instance, we can by a microscopical exhibition of hyphen and spores make exact demonstration that a certain fungus, viz., trichophyton is the cause thereof. We have learned only too well that such absolute demonstration can be made only by isolation and inoculation of the fungus obtained by pure culture. Indeed, we are just now in condition to say that we do *not* know that this particular fungus, trichophyton, is the cause of a simple disease (trichophytosis)¹ and that right here the work must be taken up at the beginning, exactly as with most other skin diseases.

(1.) NOTE.—At present it is simply probable that the diseases known under the common name of *herpes tonsurans* and affecting the heads of children, the beard of adults, the bare skin, the nails, etc., owe their origin to closely related but not identical causes.

presented by the author

The subject of sycosis furnishes us a striking example on this very point. It sounds almost ridiculous in the light of our present knowledge, to hear the best authors of the past decade prating in sober earnest of a parasitic and non-parasitic sycosis! True, Köbner, Bärensprung and Hebra, Sr., rendered good service in their day when they raised the question of a difference between the ordinary *folliculitis barbæ* and the knotty form of sycosis harboring hyphomycetes. But here their progress stopped. For twenty long years (1867-1887) the simple, easy doctrine was taught that there is one form of sycosis which is caused by the common trichophyton and another by simple "inflammatory processes," and, according to Wertheim, even mechanical disturbances of the beard follicles—the one as undemonstrated as the other improbable.

A sudden termination to this highly unsatisfactory condition of affairs came in 1887, when Bockhart² succeeded in demonstrating that the ordinary pus cocci, under certain circumstances, and among others by irruption into the hair follicles, could set up a sycosis of the skin, and that a sycosis so caused presented the typical phenomena of the disease known by this name. With a single blow the entire structure toppled over, and where, up to this period we had been compelled to resort to a flood of verbiage to conceal our ignorance concerning the ordinary sycosis, one sure fact, determined by exact demonstration, by pure culture and inoculation, made everything clear. Where, on the contrary, we thought that we knew something certain—that is in regard to trichophytosis of the beard—it became only too plain that, on account of the lack of this very experimentation by pure culture and inoculation, we were still a long ways from any exact knowledge.

Coccogenic sycosis became suddenly one of the best understood of skin diseases, while the hyphogenic sycosis (for such we must provisionally call it) was relegated to the limbo of those diseases of the skin which the younger generation of dermatologists of to-day rightfully claim as belonging to their experimental domain.

And already we have to register a third form of parasitic sycosis, whose discovery was made by means of pure culture and inoculation, and which therefore has reached the sure basis of exact experiment in advance of the only form of the disease formerly recognized as of parasitic origin (the hyphogenic). This differs from both the others in that it is bacillo-genic, and it was demonstrated in my laboratory, by Dr. Tommasoli to be a distinct form of sycosis. But before I describe

(2.) Monatshefte f. Prak. Derm. Dec. 1887, p. 456.

the clinical characteristics of this disease it is best that I bring to your attention somewhat more accurately the clinical differences existing between the only two forms of sycosis hitherto known.

The starting point of hyphogenic sycosis (the so-called *herpes tonsurans barbæ*) lies, as is well known, within the substance of the hair itself. It is indeed, a peculiarity of the hyphomycetes that they do not develop *in* liquids but upon the surface of the same, and that they thrive best upon moist solid substances. The hyphomycetes, therefore, which affect the skin are found in the horny layer of the epidermis; in the hair they are found in the narrow clefts between the horny cells, above the border where the lymph circulates freely between the epithelium.

The hyphomycetes which cause sycosis penetrate deeply into the hair follicle. The invasion of the hair papillæ, the cutis and even the subcutaneous substance, is often maintained, but hitherto not supported with evidence. In consequence of this invasion the hairs become brittle. On attempted epilation they break either just above or just below the level of the skin. Epilation is painless but attended with meagre results.

The staphylococci attack the hair bulb in a totally different manner. They thrive in the midst of the fluids of the textures, but an independent invasion of the horny substance is forbidden them. The hair is therefore never the first seat, nor point of departure, of the disease, but rather the lymph space first, the fibrous coating next and finally the structural portion of the follicle. Pinkus has incidently called attention to the broad space between the hair and the root sheath as a road or path for invading cocci. Fortunately this space terminates, normally, as a blind pocket at the point where the root sheath is not completely cornified. When by traumatism or by mechanical friction with material containing cocci, this cleft is stretched at the blind terminal in such a manner that some of the cocci get into the canal and there proliferate, the invasion of the follicle by cocci is rendered possible, and coccogenic sycosis makes a beginning.

It is late before the hair substance is altered in this case and not until a considerable lapse of time after an œdema of the root sheath and the fibrous layer of the hair follicle has occurred. The hair never becomes brittle, but kinks up, and up to this latest stadium epilation of the sound hair is very painful, but results in the withdrawal of the shaft entire.

As in the method of invasion, so throughout the further stages, the clinical characteristics of the two affections are

radically different, especially in what concerns the immediate surroundings of the follicle.

Hypohogenic sycosis exhibits large tubercles which reach down into the subcutaneous tissues and there become broad based. These are very soft, often quite fluctuating, and cause but little pain. They appear to be studded with the broken-off stumps of trichophytic hairs.

Coccogenic sycosis also converts the hair follicles into tubercles, but these are small and firm, lie entirely within the cutis, are hard to the touch, hot, painful and usually crowned with a small postule.

The intermediate interfollicular skin in hypohogenic sycosis is frequently not at all affected, especially in the onset of the disease. When, however, this occurs, the sycosis appears in the form of an epidermal desquamating eruption, with but little tendency to inflammation (displayed either as a deep redness around the edges or as a blister)—in short pityriasis, if you will, or psoriasis-like.

Coccogenic sycosis may also leave the inner skin for a long time intact, but in the course of time it is always involved, at least at those points where the follicles are very close together. The skin is strongly and diffusely reddened, shining, tightly stretched, hot to the touch, and either free from desquamation or but slightly affected in this direction. It quickly thickens and becomes swollen, by a strong infiltration of the entire cutis, into thick plates, which beneath the nostrils become condylomatous pads. Here we have to deal with a true dermatitis—an inflammation of the entire cutis, resembling erysipelas.

The same fundamental differences of the two forms of sycosis occur in their course from day to day. The hypohogenic folliculitis begins acutely and progresses ruthlessly from hair to hair. As the fungus invades the hair substance itself and is spread by the daily manipulations of combing, brushing, washing, etc.,—by handkerchiefs, napkins, pillows, but especially by the finger nails, it finds no boundary save that of the beard itself, passing from the chin and cheeks to the mustache, but stopping at the hair of the head. It is for this reason that we say that while it is, very likely, closely allied to the *trychophyton tonsurans* which affects the scalp in childhood, it is not identical therewith (See Note, *ante*). Here also (in the *trychophyton tonsurans* of childhood), the infection from hair to hair is confined to a definite region within which, however, it progresses steadily, without a halt, and relatively rapidly.

Altogether different is the case in coccogenic sycosis, where the march of infection is controlled not so much by the nature

of the capillary substance itself as by the nature and method of its insertion in the body, and by external auxiliaries. Like the last mentioned, the progress of coccogenic beard areas varies within the widest limits. In cases where the infection proceeds by means of pus cocci from the nose as a starting point, it may be confined for months, or even years, to the portion of the upper lip directly under the nose, which is kept excoriated by wiping the latter with the handkerchief. In the same manner infiltrated, pustule-covered areas may remain stationary for a very long time, upon the chin and cheeks, when circumstances are not favorable for the spread of the infection.

Generally, however, the manipulations which have been mentioned, and still more, an insufficient salve therapeutics, serve to slowly but surely spread the coccogenic sycosis over the hairy skin. For if the medicaments which are used have no power to destroy the cocci, the rubbing serves to infect the follicles with certainty. This then in no manner stops at the boundary of the beard but often rises above this sufficiently to get in front of the ears up to the hair of the head. I remember seeing some extraordinary cases of this sort, in which the entire hairy scalp was affected by a coccogenic sycosis.

In other cases a single manipulation may have the same result; for instance, shaving with a dull razor on a skin infected but superficially, may at one stroke infect a large number of follicles and immediately cause an acute attack of coccogenic sycosis. The spread is generally slow, irregular, progressive, but not limited to any particular region, the course on this account being eminently chronic.

So the spread of both diseases from case to case stands in most intimate connection with the aforementioned and shows the typical difference. The hyphomycetes of *hyphogenic* sycosis requires only a single infection, in order to affect the whole beard rapidly; it is not in its nature endemic. On this account we find by careful observation that this form of sycosis occurs in small epidemics spread from some barber shop. Such was an epidemic I observed in 1882, among the employes of a street car line, and which had spread from one barber shop. Since that time *hyphogenic* sycosis has shown itself much more common here as it has in Leipzig and Berlin, although not observed as frequently as in Paris.

Contrary to this, *coccogenic* sycosis is everywhere endemic. For the originators of this form are present everywhere, being the universal pus-cocci. It is not necessary that clinically similar cases be present to call this trouble into being. A furuncle, a simple impetigo, a phlegmon, any suppuration, even the dirt under a nail which has been used for scratching is

sufficient, under some circumstances, to give rise to a coccogenic sycosis which will last for years. Especially is the pus-cocci-laden dust dangerous, as it becomes attached to the vibrissæ of the nostrils, remaining there and facilitating the entrance of the cocci into the follicles of the mustache when blowing the nose, being rubbed in as it were. The limitation of the occurrence of coccogenic sycosis therefore does not depend, as in the hyphogenic, in the limited occurrence of the parasites but in the necessity of favorable opportunities for its implantation.

So too, the course of both diseases is, in typical cases, the widest and most different. Nothing is easier than to cure a fresh case of *hyphogenic sycosis*, which is, by the by, also in sharp contrast to the herpes tonsurans of the scalp of children. For our parasticides not only attack directly the point of origin of the disease—the hairs—but the causative hyphomycetes is killed by the simplest and weakest agents of this class. Even after the formation of considerable tubercles, the treatment of the affection is a relatively simple and even pleasant task.

In contrast to this, the final and rapid healing of a coccogenic sycosis is one of the most difficult problems within our knowledge. Nevertheless it is in this that is to be noted a marked advance, for which practice once again has to acknowledge thanks to theory which precedes it. Since we have learned simple epilation does not reach the deeper and more powerful disease masses in the lymph spaces of the noncorneous epithelia and of the hair bulb; that by this means we only produce a means of entrance for a more extensive infection, that further rubbing and kneading with infected ointments can only give rise to a new eruption and must necessarily do so, the therapeutics by exclusion has become much more rational and more rapidly effective.

That a cure may take place without any disfiguring bald spots or scars is also a matter which concerns therapeutics entirely. A hyphogenic sycosis should be cured without leaving any visible traces; for the suppuration and with it that of the hair-bulbs do not belong clinically to the pure form.

In coccogenic sycosis, on the contrary, if left to itself the necessary result is to observe here and there the total suppuration of the follicle with the formation of scars. Nevertheless, a pustular affection of the upper half of the hair-bulb, may exist for a long time without the appearance of the above results. However, should the lower part of the hair-bulb be transformed into a pus-sac, the prickle layer being broken up and destroyed, the bulb will be filled with connective tissue scars. To obvi-

ate this final result is one of the particular objects of treatment.

But because this final result is dependent upon the recognition of the suppuration, I wish to say here a few words on this last as it is a very important point in the differential diagnosis.

So far I have only compared the pure cases of both diseases. But it must not be forgotten that in old cases, the sharp boundaries of both dermatoses may be somewhat obliterated, because after the long continuance of hyphogenic sycosis the coccogenic form is generally added to it. Indeed considering the ubiquity of pus-cocci, it would be remarkable did such a thing not occur. For through the destruction of many hairs by the hyphomycetes there are affected so many points of entrance for the cocci. Through the avenues, opened by the hyphomycetes, the cocci are enabled to penetrate into the subcutaneous tissues more rapidly, and in addition, cause extensive phlegmonous processes such are not met with in purely coccogenic sycosis. Indeed, the broader and up to the present unsolved, if not difficult, question presents itself, whether the tubercles of hyphogenic sycosis are not indebted for their existence to the infiltration of some cocci following the hyphomycetes, or if this strong inflammatory œdema is caused by the presence of the latter alone. In a word, it is a question whether these tubercles are due to a mixed infection or not.

But the occurrence of this mixed infection disturbs but very little the visible contrast, from all pathological points, between hyphogenic and coccogenic sycosis.

What is the relationship to these two opposite conditions, of the third, new, *bacillogenic* form? Of course the necessary a priori impression immediately suggests itself that this form is intimately connected with the coccogenic and equally remote to the hyphogenic.

In a case of sycosis at my clinic, which clinically presented the appearance of a mild coccogenic sycosis, Tommasoli obtained at the commencement of the disease, a culture of bacilli with no trace of an admixture of pus-cocci. The bacilli were short rods, somewhat thick, with rounded ends, elliptical in form. They do not liquefy gelatin; upon inoculating it with a needle, yellowish white, nail cultures with a smooth head are formed. They grow most rapidly and characteristically upon potatoes as a thick, yellow, mucoid growth, which spreads a very unpleasant odor, and around which the potato assumes a dark green color. Morphologically this bacillus ranks next to the *B. parvus ovatus* (Höfler) and to the *B. pyogenes fetidus*, Passet. It is distinguished from the former by its

inocuousness to rabbits, from the latter by the whitish yellow color it assumes in potato cultures. On this account I have, in conjunction with Tommasoli in particular, called it *Bacillus sycosiferus foetidus*).³

By inoculating pure cultures upon the skin of rabbits and upon his own skin, Tommasoli obtained typical sycosis. In the latter he obtained the same picture as that presented by the original disease which furnished the material. There appeared red, indurated papules at the sites of the hair-bulbs, which carried at their apices small pustules. The intervening integument was red, the touching of the papules being painful; still more so in epilation, which brought forth apparently healthy hairs. Placed upon plates, the latter gave pure cultures of the *Bacillus sycosiferus foetidus*, although the contents were the minimum of pus accumulation whether of bacilli or of pus-cocci. The latter were found in the pus of pustules which appeared during the treatment, and obviously transformed a pure case to one of mixed infection.

As the bacilli as well as the cocci are incapable of invading the horny layer, they can only call a sycosis into being by way of the hair-bulb. After the marked case in my clinic, and that produced by experimental inoculation on himself by Tommasoli, it was seen that the symptoms of bacillogenic sycosis are very similar to those of a light coccogenic. The tubercular folliculitis attacks chiefly the upper portion of the hair-bulb; it suppurates but sparingly in the follicle of the hair-bulb; the inter-follicular coat shows a strong erythema, but less swelling and infiltration than in the coccogenic form; the course is chronic and apparently dependent upon further conditions of infection. It does not lead to suppuration attended by scarring. Besides this, bacillogenous sycosis is much less frequent than coccogenous. But it is very possible that, in a short time, we may find a much more frequent occurrence than we have heretofore observed.

To me at least it appears that some of the cases of what has heretofore been looked upon as mild cases of coccogenic sycosis are really bacillogenic, so far as can be determined from the mild clinical appearance, especially in the case of mild interfollicular disease with a small amount of suppuration.

The rapid development, even revolution in the study of sycosis, which we have observed during the few past years, is a beautiful illustration of the value of a systematic experimental science, which has released itself from the bondage of the dogmas of Hebra's catechism.

(3). Further details upon this subject may be obtained from the following: Ueber bacillogene Sykosis, von Dr. P. Tommasoli: Monatshefte f. Prakt. Dermat. 1889, Heft 11.