The etiology and treatment of anal and perineal pruritus are still poorly understood. Exhaustive investigations in individual cases are necessary to ascertain the cause of the pruritus (systemic diseases, psychic disturbances, anorectal and dermatologic lesions) which can be demonstrated in practically all cases providing the patient has fortitude and the physician has perseverance.

GENERAL DISEASE

The etiologic role played by general disease in initiating or perpetuating localized pruritus is minimized by some investigators and even denied by others (1, 2). The latter extreme view is contrary to my experience. I have seen patients with uncontrolled diabetes mellitus who suffered from localized pruritus, vulvae and ani, which responded solely to dietetic and insulin therapy. In others, pruritus ani improved with a diabetic regime but nevertheless persisted so that local therapy was also required. It is however, realized that these cases of pruritus ani may result from an extension of pruritus vulvae, and that both may occasionally be due to an undetected monilia infection to which the diabetic is said to be more susceptible than the normal person. Kobacker (3) feels that hyperglycemia without glycosuria may also be of importance.

Localized pruritus has also been observed in pellagrins. I recently saw a patient with pruritus ani and definite perianal skin changes whose pruritus responded to nicotinic acid therapy.

It is possible that systemic disease as a cause of localized pruritus has been

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overemphasized. This especially applies to the incrimination of allergy as an important factor. Although patients with localized pruritus may have an allergic background there is no clearcut proof that atopy is a necessary prerequisite for its development. However, idiosyncrasy to food is occasionally reported to be of importance.

Regional disease in the genital and lower urinary tracts (4, 5) may cause and perpetuate pruritus ani. Disturbances of the intestinal tract resulting in the alteration of the character of the feces, or the presence of intestinal parasites, especially Enterobius vermicularis, may initiate pruritus ani in adults as well as children.

**PSYCHIC DISTURBANCES**

The functional psychic factors are difficult to evaluate. It is most trying to establish the cause and effect. Accumulating experience authorizes the conclusion that the mental instability noted in many of these patients is the result of pruritus. Sulzberger (6) believes that severe pruritus may lead to a “complete disintegration of the morale, and occasionally to suicide.” Tuttle (7) stated that “to the patients it (pruritus) means an agony beside which pain would be a pleasure.” Occasionally, a patient with localized pruritus is encountered in whom this is an expression of conflict and anxiety.

**ANAL LESIONS**

Accumulating experience shows that the inflammatory and infectious anal lesions as well as pruritus ani in many cases have a common cause in infection of the preformed anal ducts. These structures empty into the crypts of Morgagni but may lead to racemose multiglandular structures (8, 9, 10, 11) situated in the perianal tissues, and may pierce the anal sphincter muscles, especially the internal sphincter. The anal ducts are lined with a secreting columnar epithelium which in branches is cuboidal (12) and may become natural incubators for bacteria under suitable conditions. Infection of these anal structures may lead to the development of perianal and perirectal suppurations, anal fistulas, anal ulcers with spasm and stenosis, hypertrophied papillae, hemorrhoids, and anal as well as perineal pruritus in some cases. A cure cannot be expected unless both the infection of the anal structures and the anal lesions secondary to this infection are removed surgically. In the recurrent cases of pruritus ani following proctologic operations, it is possible that either the local anal lesions or the common underlying cause or both were incompletely eradicated.

**DERMATOLOGIC LESIONS**

General dermatologic lesions having local perianal representation, such as atopic dermatitis, bacterial and fungous infections, psoriasis, lichen planus, seborrheic dermatitis, dermatitis medicamentosa, circumscribed neurodermatitis, chemical dermatitis and allergic, contact-type eczematous dermatitis are important causative factors in pruritus ani and perinei. Local chemical dermatitis may also be initiated by the passage of feces containing irritating substances, such as an excess of skatole or other hydrocarbons (13).
TATTOOING WITH MERCURY SULFIDE AND OTHER CHEMICALS

Tattooing with mercury sulfide for pruritus ani is an unusual therapeutic procedure first studied by E. Hollander and reported in 1938 (14). Of historic interest is the description (1909) of the therapeutic use of tattooing by the native savages of North Africa for a variety of lesions (15). The more rational basis for therapeutic tattooing with mercury sulfide (and other drugs usually employed topically) was suggested (16) in 1922 for the treatment of chronic localized cutaneous lesions on the basis of an observation that the intracutaneous deposit of mercury sulfide by tattoo prevented the occurrence of syphilitic skin lesions in the areas tattooed with mercury sulfide.

Mercury sulfide is still the chemical of choice for the treatment of intractable pruritus ani, but the therapeutic effectiveness of a variety of other drugs is under investigation (17). It has been determined that mercurous chloride though effective is undesirable because it causes superficial skin necrosis with pain. The effects of sulfanilamide are transient. A search is particularly made for an effective colorless drug.

The details of our technic of tattooing were described in another communication (18). The procedure is now completed in one sitting, and is preferably performed in a hospital.

Infiltration anesthesia with 0.5 to 1 per cent solution of procaine hydrochloride is preferred. Occasionally, general anesthesia is employed for the apprehensive patient. In order to evaluate the results of tattooing with mercury sulfide, the oil soluble anesthetics (which alone are frequently used for the relief of pruritus ani) are not utilized. Their inclusion would mean the equivalent of employing two forms of therapy.

UNTOWARD EFFECTS OF MERCURY

There are apparently no reported studies on the systemic manifestations of the toxicity resulting from the intracutaneous deposit of mercury by tattooing of normal or pathologic skin. However, two cases of transient renal irritation with spontaneous recovery were observed by the author (19).
Late local cutaneous reactions to mercury sulfide used in ornamental tattooing have been observed (20, 21). In three instances I have noted transient scaly dermatitis in the tattooed perianal areas, which has persisted for over nine months in one patient. Two of these cases gave negative results to patch tests for cutaneous sensitivity to mercury; the third one was not tested.

Eight patients developed paresthesias in the tattooed perianal region, the character of which was definitely unlike the original pruritus. They appeared about two weeks after the completion of the tattooing and disappeared spontaneously in 4 to 6 weeks.

PATHOLOGIC PHYSIOLOGY

The rationale of tattooing with mercury sulfide for therapeutic purposes is still undetermined. Our control studies revealed that the mechanical trauma alone as produced by the tattooing machine without the use of mercury sulfide is ineffectual in controlling pruritus ani permanently (18).

It is held (16) that mercury sulfide may act as an antiseptic by storing and liberating of mercury intracutaneously. This view is in agreement with the belief of Neisser and Ehrlich that mercury alone is spirocheticidal, and that tissue interaction with mercury is unnecessary. On the other hand, Ernest Pick believes that part of the insoluble mercury sulfide deposited intracutaneously may become soluble by the interaction with the fatty acids normally found in the skin and only thus may the mercury sulfide act as an antiseptic.

The effect of the deposit of various chemicals in the corium upon the activity of the cells of the reticuloendothelial system is under investigation. The fact that mercury sulfide to be effective must be deposited in the corium suggests that macrophages (cells of the reticuloendothelial system) which are found in abundance in the corium of the normal skin may play an important part. The phagocytic activity of the macrophages may be enhanced by the presence of mercury; thus nonspecific local immunity against infection is stimulated, and repair of tissues augmented.

Studies now in progress suggest that a pharmacodynamic
degenerative effect may be exerted by the mercury sulfide (in the native insoluble or modified soluble forms) on the cutaneous terminal nerve supply altering its capacity to respond to adequate stimuli. Further investigation concerning the exact disposition of these changes in the sensory modalities is being pursued (22).

CHOICE OF PATIENTS

At first only those patients who had intractable pruritus ani of long standing and who had failed to respond to established therapeutic measures were accepted for tattooing with mercury sulfide. The results obtained in twenty-two such instances were so satisfactory as to encourage the continuation of tattooing as a therapeutic procedure (18). Subsequent experience (now a total of 37 cases) justifies the extension of this form of treatment to a wider variety of cases.

Tattooing with mercury sulfide is now extended to patients who have pruritus ani that is recalcitrant to treatment regardless of the duration of the lesion, for I believe as Tuttle that “the longer it (pruritus) lasts the worse it gets” (7).

At present tattooing is also extended to the small number of so-called psychoneurotic patients, especially when the perianal skin shows changes consistent with pruritus. These “nervous” patients usually have consulted a number of physicians; they have employed a great variety of topical medications (at times over 100), and have notoriously remained unrelieved. The continuance of symptoms is conducive to psychotic manifestations in those cases. Two patients who developed suicidal tendencies as a result of pruritus ani have responded to tattooing with mercury sulfide. The first patient who was treated over a year ago has remained free from pruritus and psychotic manifestations to date. However, it is realized that in some instances, tattooing with mercury sulfide, like other therapeutic procedures, may in addition to the pharmacodynamic action exert a psychotherapeutic effect (18) although in normal (non-neurotic) patients, our control studies of tattooing without mercury sulfide indicated that the psychic effect is of no therapeutic value in relieving pruritus.
Anal pruritus may spread to the perineum, especially in women, although the maximal intensity continues to be localized to the perianal region. There is also primary pruritus perinei with or without extension to the perianal and posterior vulval areas. The distinction of these two types is important because from present indications, tattooing with mercury sulfide is apparently ineffective in the group of patients in whom the pruritus is primary in the perineum and posterior vulva. However, tattooing is effective in the cases where there was a spread of the pruritus from the posterior to the anterior perianal areas involving the perineum and the posterior portion of the vulva. Five such patients were successfully tattooed and have remained pruritus-free for over six months.

Tattooing with mercury sulfide for the treatment of pruritus vulvae either of undetermined origin or with superimposed dermatitis has thus far proved of little value. I had anticipated results comparable to those obtained in pruritus ani because the "histologic appearance of pruritus vulvae and pruritus ani is quite similar" (23). In a future communication, the anatomic and technical factors which may account for the therapeutic failure at this stage of the investigation will be described.

**GENERAL PROCEDURE**

Systemic and local dermatologic diseases are always appropriately treated, and eliminated if possible, prior to tattooing. However, one is forced to treat a symptom when the underlying disease cannot be identified and successfully eliminated (24).

Estrogenic therapy, the equivalent of 150,000 to 250,000 rat units of estradiol benzoate (Progynon B) is administered intramuscularly in biweekly doses of 10,000 r.u. to women with localized pruritus which occurs at or past menopause. If the pruritus is unrelieved following endocrine therapy, tattooing with mercury sulfide is carried out in these cases.

Tattooing with mercury sulfide or other chemicals is under no circumstances performed in the presence of inflammatory and infectious disease of the preformed anal ducts, anal glands, and the crypts of Morgagni. Lesions such as anal ulcers, hyper-
trophied papillae, suppurations, fistulas, and hemorrhoids which are the result of infection of the aforementioned anal structures are always eradicated prior to tattooing. Redundant perianal skin, even in the absence of anal lesions, is removed to facilitate tattooing.

Operation and tattooing are never done at one sitting because the primary operation may be adequate for the control of pruritus. Secondly, in the presence of open wounds the mercury sulfide may get into the subcutaneous tissues and form mercury proteinate which is toxic because it is gradually absorbed.

RECURRENT

In the present series of thirty-seven there were three cases of recurrence of pruritus ani following tattooing with mercury sulfide; but in no instance, was the recurrent anal pruritus as intense as the original itching.

In a patient, (18) an auto mechanic, whom I tattooed because of persistent pruritus ani which was not controlled permanently by a perianal neurectomy performed in 1932 according to the technic of Charles Ball; by subcutaneous injections of alcohol and benacol (a proprietary local anesthetic said to contain paraaminobenzoyl ethanol benzoate and phenmethylol) in 1935, or by an anal operation in 1936, a recurrence limited to the left perianal side took place fourteen weeks and again on two occasions ten months subsequent to tattooing. The latter two episodes were definitely unilateral in distribution. Examination revealed that the pruritic (left) side was stained the lighter red color indicating that a smaller intracutaneous deposit of mercury sulfide was made. A study of the sensory modalities performed December 7, 1939, revealed that the right perianal area which was adequately tattooed had fewer nerve endings (?) capable of responding to tactile and painful sensations than the left side. This suggests that tattooing with mercury sulfide may alter the sensory cutaneous modalities which within limits, is proportional to the amount of the intracutaneous deposit of mercury sulfide.

In this case, there was also present a transient bilateral, scaly dermatitis in the tattooed perianal region and an intermittent bilateral irritation caused by his oil or grease laden clothes.

Since the last two factors were bilateral in distribution and the recurrent pruritus was unilateral (confined to the incompletely tattooed side), it is logical to believe that an insufficient deposit of mercury sulfide in the skin was responsible for the recurrence of pruritus ani in this instance.

Another patient developed mild recurrent anal pruritus six weeks after tattooing with mercury sulfide. The itching occurred only after defecation lasting for two to five minutes and was accompanied by discomfort. Examination revealed one superficial fissure on the anterior and one on the posterior aspects of
anal canal, which were probably the result of defecatory trauma. The recurrent pruritus and the discomfort disappeared following the healing of the fissures after the application of topical medication.

The third patient developed recurrent mild pruritus ani seven months following adequate tattooing. The itching (which was later accompanied by pain) was localized in the posterior arc of the anal canal, and disappeared subsequent to excision of a posterior infected crypt of Morgagni. This patient is of special interest because he demonstrated that infection of the anal canal may initiate mild pruritus even after adequate and successful tattooing with mercury sulfide.

In the last 2 cases, the itching was very mild and inconsequential in character. In both instances, treatment was directed to the associated or underlying anal lesions only.

**SUMMARY AND CONCLUSIONS**

1. Tattooing with mercury sulfide is indicated for the treatment of recalcitrant cases of pruritus ani and perinei.

2. General disease and dermatologic lesions should be appropriately treated, and eliminated if possible, prior to tattooing.

3. Concomitant anorectal lesions should always be eradicated before tattooing. Operation and tattooing with mercury sulfide should never be done at one sitting.

4. Occasional recurrences of mild pruritus ani have been observed and described.

5. The rationale of the intracutaneous deposit of mercury sulfide by tattoo for the treatment of localized pruritus is still undetermined. It appears that a pharmacodynamic degenerative effect upon the cutaneous terminal nerve supply is produced which alters the capacity of the terminal nerve network to respond to adequate stimuli.

6. A critical attitude should be maintained until a large series of treated cases have been observed for a long time.

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