The purpose of this article is to call to the attention of the proctologist and those physicians treating diseases of the anal region a pyoderma infection involving the apocrine sweat gland of that region.

The disease is frequently misdiagnosed as multiple anal fistulas, tuberculosis of the anal skin, granuloma and other inflammatory conditions. An understanding of the distribution, anatomy and function of the glands infected will lead to the proper diagnosis and treatment.

I am presenting eight case reports of patients with hidradenitis suppurativa who came to us because they believed they had an anal fistula. (Table I.)

**HISTORY**

The first description of hidradenitis suppurativa was made about one hundred years ago. Most early reports dealt with its occurrence in the axillas and later involvement of the head, breasts and perineum.

A very comprehensive thesis was written by Brunsting in 1937 in which he ruled out tuberculosis as the cause of the condition. In 1939 Smith reported to the American Proctologic Society six cases of very extensive pyodermia about the anus in which he stated that one case was thought to be hidradenitis suppurativa. Jackman published a paper in 1942 which dealt with this disease as found about the anus. Others have reported cases but among the general profession including the proctologists the disease is little known and, therefore, not often recognized.

**HISTOLOGY AND ORGANOLOGY OF THE APOCRINE GLAND**

There are two types of sweat glands. They are the apocrine glands and the common eccrine sweat glands. They are similar but differ definitely in many respects. While the eccrine glands secrete without rupture of the cell, the apocrine glands secrete partly in this manner and, also, partly by pinching off the outer portion of the cell which makes up much of the secretion coming from the gland. This secretion contributes to the problem of perspiration odor. While there are several million eccrine glands distributed over nearly the entire body surface, the apocrine type are estimated in the hundreds and are confined to the hair-bearing areas. For the most part apocrine glands are seen about the neck, axillas, undersurface of the breasts, pubic skin, vulvas and peri-anal skin.

The apocrine glands have been called sex glands because they do not become active until puberty and gradually regress in the declining years. In women they are definitely more active in the day or two preceding menstruation.

**SYMPTOMS AND FINDINGS**

The first evidence of infection of the apocrine glands will be one or more firm, tender and injected nodules in the skin. Tenderness will continue and after two to six days a small amount of slightly cloudy, oily fluid will begin to be discharged. This lesion may regress and very slowly return to near normal. Often the scar as it develops in the subcutaneous tissues tends to draw the skin into a stellate design in the center of which is an enlarged pore. The gland then may or may not be dormant for a long period of time. If the inflammatory process continues, the lesions become large and more tender. There is a distinct tendency for a direct subcutaneous spread or tunneling to develop in lines following the folds of the axillas or groin. The tunneling makes long ridges. A probe may be passed through the tunnel and out through the orifice of each involved gland. Many of the so-called blind, incomplete and external fistulas described in the past may have been this type of skin disease and in no way a true anal fistula. As the process continues it may involve all gland-bearing skin of the region.

In the advanced, acute case the gland open-
ing may erode showing some of the rough, granular membrane forming the base of the tract. The overlying skin often becomes thin in areas and develops an atrophic glassy appearance. This involved skin may be darkly pigmented, deep red or a cyanotic color. The bacteria most frequently found in the infected glands were Staphylococcus aureus and Streptococcus viridans.

The discharge encountered in hidradenitis suppurativa is moderate in amount, thin, cloudy and has a musty odor while from an anal fistula the discharge often is copious, thick, grayish and usually has an odor of hydrogen sulfide.

Extensive infection involving the para-anal tissue is common and surely pyogenic organisms are always present. Why then is pyogenic infection of the apocrine glands of the para-anal region so uncommon? In patients consulting us for the relief of proctologic conditions the incidence of hidradenitis suppurativa is roughly one in one thousand. A more careful search would have revealed a higher incidence. I am led to conclude that some unusual condition is present in the apocrine glands of these few patients which makes them susceptible to pyogenic infection. It may be much like the sebaceous glands of the skin of the patients with acne vulgaris.

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**Table 1**

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Age</th>
<th>Sex</th>
<th>Duration (Yr.)</th>
<th>Onset and Sites Involved</th>
<th>Treatment and Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M. N.</td>
<td>25</td>
<td>F</td>
<td>7</td>
<td>Axillas and perineum</td>
<td>Excision of sinus in the para-anal tissue; still has dormant involved glands in the axillas.</td>
</tr>
<tr>
<td>2</td>
<td>J. L.</td>
<td>30</td>
<td>M</td>
<td>2</td>
<td>Para-anal</td>
<td>Excision of scarred areas in the right lateral area; some openings healed, others active; typical discharge follows.</td>
</tr>
<tr>
<td>3</td>
<td>O. C.</td>
<td>31</td>
<td>F</td>
<td>5</td>
<td>Para-anal blind sinus</td>
<td>Excised; no connection with the anus; several openings into the shallow sinus follow.</td>
</tr>
<tr>
<td>4</td>
<td>R. B.</td>
<td>40</td>
<td>M</td>
<td>10</td>
<td>Very extensive para-anal both sides and into the groins</td>
<td>Had penicillin treatment with no cure; three operations in one year appear to have cleared the infection.</td>
</tr>
<tr>
<td>5</td>
<td>R. I.</td>
<td>40</td>
<td>M</td>
<td>1</td>
<td>Axillas and para-anal; drained repeatedly before entrance; very extensive both sides</td>
<td>Excision of para-anal sinuses followed by complete relief; very marked improvement of involved glands in the axillae without treatment.</td>
</tr>
<tr>
<td>6</td>
<td>H. G.</td>
<td>41</td>
<td>M</td>
<td>15</td>
<td>Axillas and para-anal very extensive; much scarring in both groins; has acne</td>
<td>Excision of para-anal sinuses; complete relief; axillae now dormant.</td>
</tr>
<tr>
<td>7</td>
<td>E. C.</td>
<td>49</td>
<td>M</td>
<td>3</td>
<td>Followed abscess of pilonidal cyst; developed sinuses; has acne</td>
<td>Excision of involved tissue; later development of infection of single glands on the scrotum; healed after excision.</td>
</tr>
<tr>
<td>8</td>
<td>L. C.</td>
<td>56</td>
<td>M</td>
<td>12</td>
<td>Had recurring sinuses on the neck and scrotum; later, para-anal and scrotal scar, which continued to drain</td>
<td>Excision of involved tissue of scrotum and para-anal skin; other areas dormant.</td>
</tr>
</tbody>
</table>
MICROPATHOLOGIC CHANGES

Sections from all cases reported were observed histologically. An extensive inflammatory reaction near the abscess was observed in each instance with a milder reaction as indicated by scattered groups in lymphocytes in the surrounding tissue.

The glands appear to become infected by way of the lymph channels of the subcutaneous tissue as well as by surface contamination. Normal glands are seen near those diseased. Once involved in a destructive process the gland appears to be destroyed and does not regenerate.

Fibrosis is evident in the chronic stage. The basement membrane is composed of a very thick layer of fibrous tissue cells with near normal fat on its deeper surface. Plasma cells and lymphocytes are found covering the abscess side of the membrane. The greatest destruction occurs in the subcutaneous tissue, causing a definite undermining process beneath the skin.

PROGNOSIS

When only a few isolated glands are infected, it is possible that they may drain and spontaneously return to near normal in from ten to fifteen days. In all cases, however, the prognosis must be guarded because as occurred in some of these cases reported the patient had remissions of the inflammatory process and further operative procedures were necessary.

It has been observed that when an area of active disease was resected and healing occurred, other areas of lesser involvement would often improve. In my judgment the patient who has a chronic sinus will avoid a more extensive operation and possibly forestall the spread of the disease by having an early excision of the involved tissue.

TREATMENT

The patients here reported came to our office because they had a draining para-anal sinus. They were, therefore, all advanced chronic cases and in general the treatment consisted of surgical removal of the involved glands followed by continued local treatment and removal of any glands subsequently infected.

In 1939 Brunsting suggested such general methods of treatment as incision of the individual abscess followed by filtered roentgen rays and administration of sulphanilamide in those cases in which hemolytic streptococcus was found to be the infecting organism. Nonspecific therapy, including the use of desiccated thyroid and autogenous vaccine, was of little value. He further stated that in the advanced case excision of the gland-bearing skin and involved tissue was necessary, followed by skin grafts when indicated. Sutton and Brunsting warn against the use of ointments and suggest the use of 1 per cent phenol with 1:5,000 bichloride of mercury in 70 per cent alcohol.

In my own experience large doses of penicillin will reduce and thicken the discharge and will quiet down an area of acute inflammation but it will not bring about healing of the multiple sinuses. Penicillin may be of value, therefore, in treating a patient during an acute attack of the disease following which the involved tissue can be excised.

Treatment will vary with each patient depending upon the extent of involvement. One or more acutely infected glands may heal; but when the process is extensive and many openings are present, it should be removed en bloc. The wound is grossly infected; and since this region is contaminated repeatedly, closure is not attempted. The process does not extend deeper than the subcutaneous fatty tissue and, therefore, no important structures are encountered. The wound should be thoroughly explored for side tracts beneath the skin edge and all edges beveled so as to saucerize the wound. Scarring is no problem in the peri-anal area so it is not necessary to do any skin grafting in this region.

The wound may be covered with dressings wet with mild antiseptics. Later, wet dressings and hot sitz baths may be used until healing is complete. The use of silver nitrate to control areas of excessive granulation tissue is necessary. The wounds usually fill in rapidly.

Involvement of new areas or separate glands may occur at any time requiring immediate excision.

CONCLUSIONS

Attention is called to pyogenic infection of the peri-anal apocrine glands. Patients with this condition come to the proctologist because the advanced lesions simulate anal fistulas.

Eight cases are reported; all were advanced cases exhibiting fistula formation. Our treatment was excision and satisfactory results were obtained. The patient is warned of the likelihood of recurrence and involved areas should be excised if suppuration occurs.
of the disease and illustrate the invo1vement of proper therapy. His case reports are representative features of the disease and indicated the other parts of the body, most frequently the axillae.

Illustrate the clinical aspects of the disease.

Doctor Christensen's brief presentation of an interesting condition. He has outlined the impor-
ting this paper which is informative and practical on1y one of hidradenitis suppurativa among the cases which I presented but that in the case I wouId Iike to correct one misinterpretation. Doctor N. D. Smith has pointed out a good diagnostic feature, the clear, uninvolved area that is usually present in the tissue immediately adjacent to the anal verge. This is especially demonstrable in the advanced cases which are the ones with which we are particularly concerned. It is also worthy of mention that a search for fistula-in-ano, pilonidal disease, etc., should always be made, even in the face of typical hidradenitis, since all of us have found them in association on occasion and correction of the usual case of hidradenitis does not effect cure of the fistula. We should also inspect the crypts carefully so as to avoid the recurrence of a lymphatic abscess as described by Buie. Careful study of the individual cases will reveal the extent of the disease, thereby avoiding needless surgery and yet being sure of adequately dealing with the existing disease. Mention is also made in the literature of tumor formation invo1ving these glands; these hidradenomas are thought by some to be carcinomas. However, metastases has not been demonstrated and local excision has been curative.

In conclusion I shouId Iike to thank Doctor Christensen for his excellent presentation. I believe we have all profited by the renewed con-

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REFERENCES
3. JACKMAN, RAYMOND J. Hidradenitis suppurativa; diagnosis and treatment of its perianal manifesta-

DISCUSSION
N. D. SMITH (Rochester, Minn.): I have enjoyed the privilege of studying Dr. Christensen's paper and I am impressed by the fact that there can be litte disagreement with his basic observations and conclusions. Most of the members of this Society, I believe, are keenly aware of the occurrence of such lesions and understand the underlying pathologic process. Also, all seem to agree that surgical ex-
cision is the best or only curative therapy at present. The newer chemical or antibiotic agents and physical therapeutic efforts accomplish little, if any, temporary improvement and they probably do not alter favorabIy the ultimate progress of the disease. Such measures seem to postpone curative measures and unnecessarily add to the patient's financial expenditure.

In those cases in which it is necessary to remove large portions of skin a subsequent skin graft will assist materially in reducing the healing time and also will improve the result.

I would like to correct one misinterpretation. Dr. Christensen, in mentioning an article presented to this Society in 1938, said that I stated "that one case was thought to be hideradenitis suppurativa." I meant, however, not that this case was the only one of hidradenitis suppurativa among the cases which I presented but that in the case referred to distribution of the disease was especially typical. Lesions were in the perianal, gluteal and labial regions, in the groins, under the breasts and in the axillae.

Careful study of the individual cases will reveal the extent of the disease, thereby avoiding needless surgery and yet being sure of adequately dealing with the existing disease. Mention is also made in the literature of tumor formation invo1ving these glands; these hidradenomas are thought by some to be carcinomas. However, metastases has not been demonstrated and local excision has been curative.

In conclusion I should like to thank Doctor Christensen for his excellent presentation. I believe we have all profited by the renewed con-

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R. E. Pumphrey (Dayton, O.): I have enjoyed Doctor Christensen's brief presentation of an interesting condition. He has outlined the important features of the disease and indicated the proper therapy. His case reports are representative of the disease and illustrate the involvement of other parts of the body, most frequently the axillae.

Much in the way of speculation concerning the actual mechanism of the disease could be added

but this Doctor Christensen has wisely refrained from doing. There are many questions that cannot be answered in the light of our present knowledge. We know that the apocrine glands are compound tubular glands which usually open into a hair follicle and that they function by rupture of the cell membrane, the cellular protoplasm forming a thick secretion of unknown composition. They are not activated until puberty and tend to become infected in persons having an oily skin and the so-called acne diathesis. The disease may be initiated by the infectious processes associated with a fistula-in-ano or pilonidal disease. Aside from these facts, most of us are not prepared to explain exactly why a given individual has the condition.

Doctor Christensen has mentioned how often this disease is confused with fistula-in-ano. His point is well taken and his description of the patchy, irregular, brawny infiltration of the involved tissues with multiple draining sinuses should easily guide us to the correct diagnosis. Doctor N. D. Smith has pointed out a good diagnostic feature, the clear, uninvolved area that is usually present in the tissue immediately adjacent to the anal verge. This is especially demonstrable in the advanced cases which are the ones with which we are particularly concerned. It is also worthy of mention that a search for fistula-in-ano, pilonidal disease, etc., should always be made, even in the face of typical hidradenitis, since all of us have found them in association on occasion and correction of the usual case of hidradenitis does not effect cure of the fistula. We should also inspect the crypts carefully so as to avoid the recurrence of a lymphatic abscess as described by Buie. Careful study of the individual cases will reveal the extent of the disease, thereby avoiding needless surgery and yet being sure of adequately dealing with the existing disease. Mention is also made in the literature of tumor formation invo1ving these glands; these hidradenomas are thought by some to be carcinomas. However, metastases has not been demonstrated and local excision has been curative.

In conclusion I should like to thank Doctor Christensen for his excellent presentation. I believe we have all profited by the renewed con-

Mark M. Marks (Kansas City, Mo.): I enjoyed listening to Dr. Christensen's paper. We have been friends for a long time and have had opportunities to argue various phases of the subject. In a paper read before the Southern Medical Association which convened in 1945 in St. Louis, Missouri, I,
too, recorded a large series of cases of this type which came under my care while in military service. From these cases certain conclusions were reached.

Hydradenitis suppurativa and acne conglobate, postauricular sebaceous cyst, saddle sores and steatoma of the scrotum are all related in that they are local evidences of systemic disease. This was proved by a consistent clinical picture of low basal metabolism, chronic fatigue and hypercholesterolemia which ranges from 178 to 400 mg. per cent.

Because of the chronic fatigue it was found all of these people were eating foods rich in lipids which were deposited in the apocrine and the sebaceous glands. In the treatment of these patients it is imperative that they be instructed as to mode of metabolic failure and warned against excessive use of fats, both vegetable and animal.

In April, 1943, Dr. Richard Sutton, Jr. and I reported a case of perianal pyoderma and acne conglobate in the Journal of the American Medical Association. The patient had a very extensive involvement of the neck, axilla, hips and buttocks. The patient had been drinking three quarts of milk daily. When his diet was corrected, when sufficient thyroid was given to raise basal temperature to normal and with the addition of ammonium chloride, satisfactory healing occurred without interruption. It is important to remember that perianal lesions like other manifestations are evidences of systematic conditions.