

PILONIDAL CYSTS AND SINUSES

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It is our purpose in this paper to present and analyze a series of 288 cases of pilonidal cysts and sinuses with especial reference to treatment and end-results. Pilonidal, sacrococcygeal or dermoid cyst, postanal dimple, or foveola coccygea, are congenital malformations in the sacrococcygeal region characterized by acute and chronic inflammation; the presence of tufts of hair; occasional islets of squamous epithelium and foreign body giant cells.

The first description in the literature was given by Anderson¹ in 1847, who reported a case of "hair extracted from an ulcer." Vaughn, quoted by Markoe and Schley,² reported three cases of "pilous cysts" in 1865. Warren^{3, 4} in 1867 named the condition pilonidal cyst, although he had described some cases previously in 1854. They were mentioned and described as medical curiosities, frequently, a few cases at a time, from this time on, but practically all the literature up to 1900 dealt with the embryologic and etiologic aspects of the condition, with little emphasis on treatment, although Gussenbauer⁵ recommended excision by thermocautery as early as 1893.

All commentators with the exception of one early writer (who considered them due to ingrowing hairs) agree that the conditions are of congenital origin. The theories, however, vary widely as to the particular embryonal layer from which they arise, as well as their mode of origin. Walker²⁵ believed his case to be a "monstrosity by inclusion." Feré²⁶ and Bland Sutton⁶ regarded sinuses and cysts as "slight defects in the coalescence of the superficial portions of the medullary folds in the sacrococcygeal region." Terrillon⁷ stated they were a special form of spina bifida involving the skin. Lawson Tait⁸ suggested that the coccygeal dimple is the "cicatrix of the spina bifida by which the human tail has been lost." Lannelongue^{9, 10} suggested the following interesting theory: "The mesoblast lies, after the formation of the medullary canal, between the external epidermis and the vertebral column, except in the region of the sacrum, where little of this tissue is interposed, so that this region is reduced to epidermis and bone. Consequently, the superficial layer, the epiblast, joined at a later period to the mesoblast, preserves closer relation with the bone, and later, when the subcutaneous tissue is developed around these places a depression will be formed. If deep and narrow enough, the orifice may close up and a dermoid cyst will be the consequence." Tourneaux and Hermann,¹¹ who worked with the greatest amount of material, concluded that the sinuses and cysts were remnants of the conflict for survival

of the medullary tube as encroached on by the last portions of the spine to close, believing they were epidermis invaginated by the pull of the filum terminale. The foveola coccygea (or fossette medullaires) *i.e.*, the English "dimple," they attributed to the inturning of the coccyx. They could find no evidence of contact with the postanal gut.

Mallory¹² in America, after dissection of six fetuses, confirmed the work of Tourneaux and Hermann¹¹ as to remnants of the medullary canal, and believed these capable of giving rise to the picture seen in congenital sinuses and cysts. He stated that in all probability it is only these congenital sinuses and cysts that give rise to suppurative sinuses. Most French and German authors lean to the views developed by Lannelongue.⁹ Aschoff¹³ also threw the weight of his authority to the view that sinuses and cysts are due to faulty median skin agglutination of the sacrococcygeal region, although he agreed with Tourneaux and Hermann¹¹ that the foveola coccygea are due to antero-flexion of the coccyx in which the remaining strands of the medullary tube act as tractors on the skin. Nasse¹⁴ mentions the neurenteric canal as a possible origin, and thinks all cysts can be explained as arising from this or the medullary canal. Klemm,¹⁵ while attributing the cysts to faulty skin development, believed that after invagination, growth of the invaginated skin occurs to produce the multiple sinuses.

Masson¹⁶ quotes Ewing as stating that the embryonal structure which gives rise to all growths in this region are chiefly: (1) Fovea coccygeal and coccygeal vestiges of the neural canal. (2) Neurenteric canal. (3) Postanal gut. (4) Proctodeal membrane. To these must be added the epithelium of the sacrococcygeal region. All commentators agree, however, that the cysts, sinuses and dimples of the sacrococcygeal region arise from one primitive layer only.

Against the theory of inclusion bodies are the facts: (1) That hair and squamous epithelium only of the possible teratoid structures are found constantly in these conditions. (2) The structures present are fully differentiated. (3) Malignant change has never been described as occurring in a definite pilonidal cyst.

Between the structures under discussion and the various tumors of this region there are in the case of the first only true skin formations, whereas in the latter all types of epithelial structures are found as well as connective and nervous tissue. If we are to assume that the neurenteric canal or neural groove or medullary canal have anything to do with the formation of cysts or sinuses, we must explain why only true skin tissues are ever found in these latter structures. One would certainly expect to find some transition from columnar to squamous epithelium. One has also to explain why nerve tissue is notably absent in cysts. The rôle of the vestigial structures in the formation of tumors of the sacrococcygeal region is undeniable. They probably never play a rôle in the formation of cysts or sinuses. The dimple may possibly be due to the traction caused by the inturning of the coccyx.

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We are led, therefore, to feel that these cysts and sinuses are purely and solely derived from faulty agglutination of fetal skin folds. The presence of similar lesions in other parts of the body in the midline are confirmatory inferentially. Clinically this is confirmed by the findings at operation. It has been found that the sinuses and cysts are in the skin and subcutaneous tissue and invariably are bounded by the deep fascia covering the dorsum of the sacrum and coccyx. In our series it has never been found necessary to incise this covering in order to completely excise these lesions.

In those cases where multiple sinuses are found they are probably due to infection resulting in multiple pointing and rupturing and are as a general rule lined by granulation tissue. Certain cases, however, are said to show multiple epithelium-lined sinuses and if these exist, we must fall back to the theory of Klemm¹⁵ for the explanation. If our explanation is to be accepted

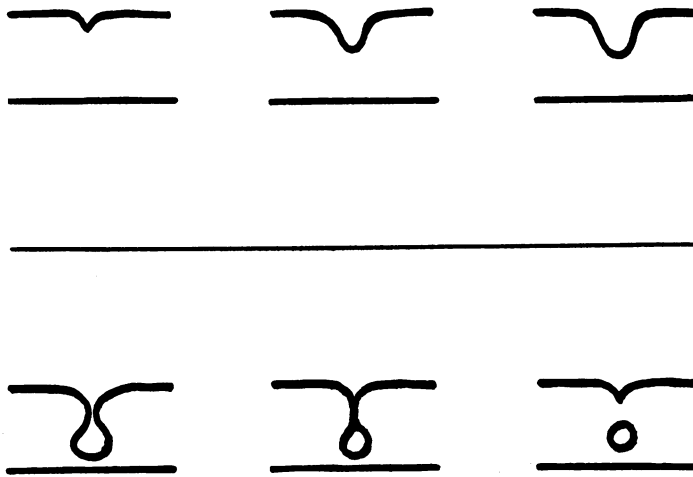


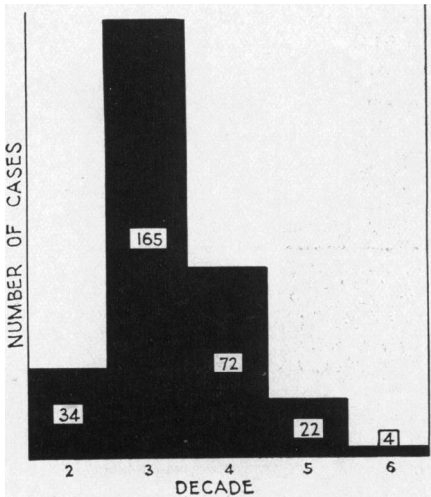
FIG. 1.—Illustrating the formation of the variations found
(from Markoe and Schley).

the following simple diagrams taken from Markoe and Schley² adequately illustrate the formation of the variations found (Fig. 1).

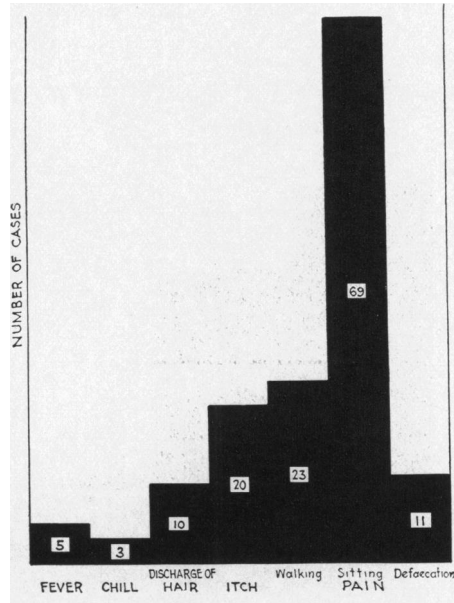
The true microscopic pathology of these conditions is probably rarely seen. The sections of these cases showed no case of simple uninfamed tissue. The predominant picture was acute and chronic inflammation. The peculiarities were numerous foreign body giant cells, and hair for which we could find no hair follicles. No sweat or sebaceous glands were found in the interiors of the cysts and sinuses, which could definitely be said to be connected with them or part of these congenital conditions. So far as our examinations of this large collection of material are concerned, the origin of the hair found in these conditions remains unexplained. Small islands of squamous cells were occasionally found either free or doubtfully attached to the cyst linings. Squamous epithelium containing the normal structures was found dipping into the sinuses at their entrances, but this epithelium became continuous at once with the inflammatory cyst or sinus lining. Harvey Stone¹⁷ had one

clear cut specimen in 61 cases. He notes only: "In a short sinus is a slightly modified invagination of true skin. None of its elements is fully developed."

In the earlier literature Gussenbauer,⁵ Crone,¹⁸ describe the presence of squamous epithelium, hair follicles, sebaceous and sweat glands. As neither of them had many cases (Crone¹⁸ had only six), it is curious that they should have seen these things. The origin of the conception that these things are present in sacrococcygeal cysts probably can be traced to these writers. They are not described by pathologists or commentators on much larger series. The most careful microscopic studies made, those of Oehlecker,¹⁹ including serial sections, showed no characteristic epithelial structures.



GRAPH 1.—Showing age groupings of patients on admission.



GRAPH 2.—Showing incidence of the various symptoms on admission.

Incidence.—Winkler²⁰ found 30 cases in 19,000 hospital admissions or 1: 600. Wette²¹ found seven cases in 15,000 hospital admissions or 1: 2,143. Our 288 cases were found in 481,384 hospital admissions or 1: 1,683.

Race.—Thomason²² in Texas (1934), and Stone¹⁷ in Maryland (1924) found no colored patients in their series. Our series shows one female and three male colored patients.

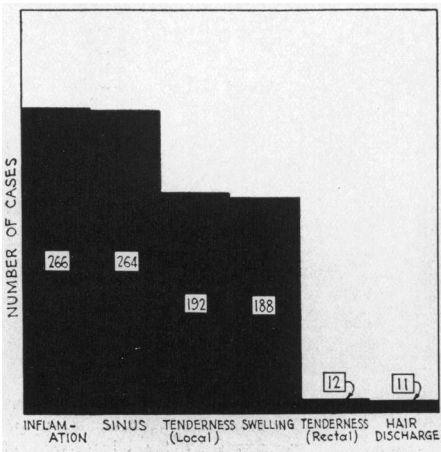
Age.—Depres²³ and Lannelongue⁹ state that congenital sacrococcygeal cysts occur in one-third of all new born in some degree, but only 3 per cent of adults show it. Tait⁸ stated that they occurred in 23 per cent of all women examined. Over one-half of the cases come for treatment in the third decade, and one-fourth in the fourth decade (Graph 1).

Sex.—In this series 241 were males and 47 females. One might expect this to have some bearing on the question of trauma. Of the 39 cases who

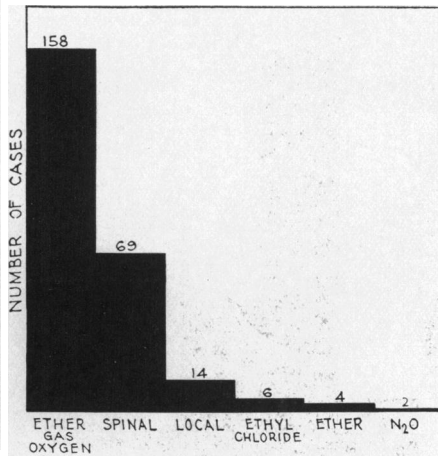
gave histories of trauma, 27 were males, 12 females, the time varying from one week to eight years, the greater number being within one month. They consisted of blows, falls, jolting of cars, *etc.*

Hereditary Factors.—There was no evidence of any familial disposition to these abnormalities, only five cases having a family history of pilonidal cysts and sinuses. Congenital malformation other than sacrococcygeal sinuses and cysts were present in only one case—club feet. Syphilis and tuberculosis: We found no cases of tuberculosis and curiously enough of 123 Wassermanns taken, only seven were positive, a slightly lower incidence than usual for this age grouping.

Symptomatology.—Itching, pain on sitting or walking and the discharge of pus were the predominant symptoms. One child of four had a tumor



GRAPH 3.—Showing incidence of the various physical signs on admission.



GRAPH 4.—Showing types of anesthesia used.

above the anus since birth. The average time of symptoms before admission was 795 days. The shortest period was three days, the longest 8,760 days. Seventy-six cases had symptoms for a period of three years or over (Graph 2).

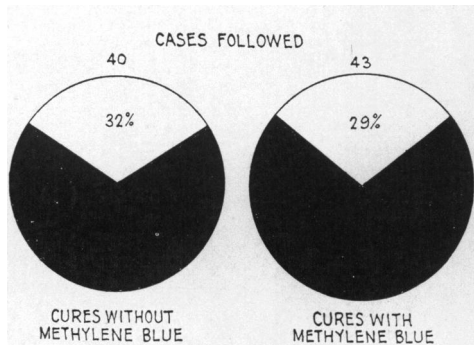
Physical Examination.—All cases in this series showed evidence of inflammation upon admission. It would seem that the simple presence of these abnormalities caused no symptoms important enough to bring the patient to the doctor (Graph 3).

Differential Diagnosis.—Occasionally the following conditions may be considered: Simple acute suppurative inflammation (furuncle), sebaceous cysts, lipomata, fibromata, tuberculosis, chancroid, fungous infections, malignant ulcer, inflammation of congenital tumor, syphilis and anthrax.

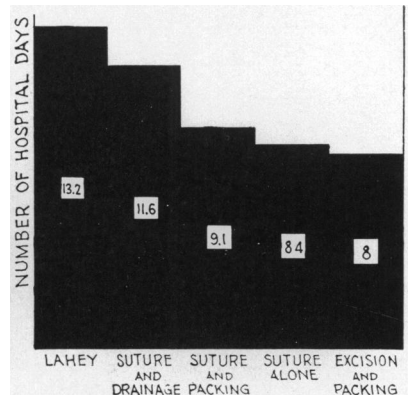
Anesthesia.—In this group, it is noteworthy that only 14 local, and no caudal anesthetics were employed probably because of the juxtaposition of the inflammatory area. Sixty-nine spinal anesthetics were used, probably partially, due to the fact that the renewal of favor to this type of anesthetic

reached its height in the period covered by our series. We feel definitely that the possibility of introducing organisms by spinal puncture, in the presence of an inflammatory lesion of the back, is very great. Gas, oxygen and ether was used in the greater number of cases and would seem to be the method of choice. (Graph 4).

Treatment.—There is unanimity of opinion as to the necessity for complete surgical excision of sacrococcygeal cysts and sinuses for the cure of these conditions. One hundred and six of our cases had one or more previous incisions and drainages. Twenty-nine cases had had previous excision. The method of insuring complete excision and the after treatment of the wounds has been a matter of great debate. The use of a delineating reagent such as methylene blue for outlining the ramifications of the sinuses would seem to be a helpful measure in the excisions. Actually our percentages of



GRAPH 5.—Showing comparative results with or without methylene blue as delineating reagent.



GRAPH 6.—Showing average stay in the hospital postoperatively for all methods of extirpation.

recurrence are the same with or without such a reagent (Graph 5). We have not used roentgen ray of opaque media injections in our series.

Follow Up.—We have been able to follow 83 cases of our series of 288, a rather remarkable percentage of follow up for such a condition, in a general hospital (such as Bellevue) with a large floating population. The follow ups vary from two to 14 months. The methods of extirpation and closure used with their end-results, including the number of postoperative hospital days are shown in Table I. The total cures for the series were 73 per cent for all excisions. Excision and packing show 30 cures for 32 cases. Excision and suture (including plastic procedures) without drainage show 56 per cent cures; excision, suture and packing show 63 per cent cures; excision, suture and drainage show 66 per cent cures, an average of 62 per cent cures for 50 cases in which sutures were used. There was one cure by incision and drainage alone in this series. The postoperative hospitalization for all methods is shown in Graph 6. There were no deaths. There was one case of severe bleeding postoperatively, which, however, did not need transfusion, and one case developed erysipelas. There were five late

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complications. One had marked tenderness still at the end of eight months. Two complained of pain about the scar. One note was made of adhesion to the sacrum, and one case formed crusts and failed to epithelialize satisfactorily.

Discussion.—Since all these cases are infected on admission to the hospital and the wounds are in close proximity to the rectum, we have seen practically 100 per cent infection in our follow up observations present during the convalescence in every method used. Thus any method involving closure of the wounds would on general surgical principles seem to be contra-indicated. The tendency to widespread infection is undoubtedly lessened by preliminary incision and drainage of abscesses prior to excision if one be present. The

TABLE I.
Showing End Results for the Various Types of Operation

TYPE OF OPERATION	TOTAL NUMBER OF CASES	NUMBER OF CASES FOLLOWED	NUMBER OF CURES	PERCENT OF CURES
Excision & Packing	132	32	30	94
Excision, Suture & Packing	79	24	15	63
Excision & Suture	29	18	10	56
Excision, Suture & Drainage	27	9	6	66
Incision & Drainage	21	16	1	7
All Types (totals)	288	99	62	63
Corrected For I. & D.	267	83	61	73

probability is that infection will be a less prominent factor if the excisions are really radical. The tendency to try to conserve tissue cannot be considered in the removal of pilonidal cysts and sinuses. The necessity for dressings from six weeks to three months should be understood by the patient from the beginning and this period in our experience has not been shortened by any method of suture attempted, including that of Lahey, in which drainage from the lower angle of the wound has lasted regularly six to eight weeks. The Lahey²⁴ operation differs from other methods of suturing in that it displaces the scar lateral to the midline, in order to prevent tenderness and pain on sitting. Only three of our cases with midline scars complained of pain over the scar, obviously not enough to warrant the opening of a new area to infection.

We have emphasized the almost universal presence of infection. This is minimized to a great extent by meticulous care and frequent dressings. In the majority of our cases iodoform gauze packing was used as a deodorant,

but antiseptics in general, dichloramine T, potassium permanganate, mercurochrome, *etc.*, have been used only for the first few days. We have not noted any superiority of antiseptics to packing alone.

The dressing is important. It should prevent the seepage of exudate over the anal region and perineum. It should remain in place during defecation, sleep and walking. The following has been found most practical. The patient is dressed in the erect position. The wound is washed with tincture of green soap and peroxide. The wound is packed lightly with a large gauze fluff to completely fill the cavity. A marine or rubber bath sponge about an inch thick and somewhat larger than the wound is placed over the gauze and cut off squarely at the internatal cleft about an inch above the anus. A two-inch "dryback" adhesive plaster strip is applied tightly across the inferior border of the sponge and carried around to below the anterior superior spines of the ilia. A similar strip is applied at the upper border. The wound is dressed about every fourth day.

CONCLUSIONS

(1) A ten year survey of 288 cases of pilonidal cysts and sinuses from the Surgical Services of Bellevue Hospital, New York City, has been reported, including the follow up of 83 cases.

(2) These congenital malformations originate from faulty skin development.

(3) Trauma is not ordinarily a factor in the onset of symptoms.

(4) The predominant symptoms are due to infection.

(5) The pathologic picture is that of acute and chronic inflammation of skin.

(6) Spinal, caudal, and local anesthetics are definitely contraindicated.

(7) Delineating reagents in the operation have not reduced the incidence of recurrence.

(8) Complete excision and packing is the method of choice.

(9) A method of dressing is suggested.

NOTE.—We wish to express our appreciation to Dr. Arthur M. Wright, Dr. Guilford S. Dudley and Dr. John A. McCreery for their courtesy in allowing us to use the cases from their respective services at Bellevue Hospital; and to Dr. Douglas Symmers, of the Department of Pathology, for permission to examine the microscopic sections from these cases.

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