TUBERCULOSIS—DAVID

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The pathologic changes in tuberculosis of the spine are well known, and the clinical picture of the disease is recognized without much difficulty. In contrast, tuberculosis of the os coccygis presents a rather characteristic pathologic picture, which has been but seldom described and is generally unrecognized clinically. This has led to failure of diagnosis, years of invalidism in the patients thus affected, and futile operative procedures for the cure of the lesion. The literature of the subject is sparse. Darrah 1 compiled twenty cases in 1893, and in 1904-1905 Caubet 2 reported three cases he had observed and reviewed twenty-five cases compiled from the literature, including Darrah’s. With the exception of these reports, only one reference to the subject has been found since 1905.

The histories of two patients observed during the past year will be given, as they illustrate well the essential pathology and clinical picture.

Case 1.—Mrs. A. T., aged 60, seen with Dr. J. A. Chilcott for examination of an indurated area in the rectum which suggested carcinoma, complained of discomfort in the rectum and vagina and a very painful back low down over the sacrum, which was especially marked on sitting or on attempting to arise from a sitting position. She had been weak and had not been sleeping well. The pain was first noticed in November, 1921. It was intermittent at first, and then became constant. It was worse after sitting, and was not increased by bowel

movement. Discharge from the rectum had been noticed occasionally in the morning. She had never had an abscess in the ischiorectal region.

The general history was negative. She had had hemorrhoids for years. A general physical examination, including a pelvic examination, was negative for pathologic changes. Rectal examination revealed an indurated area of the ischiorectalis on the posterior wall of the rectum.

Under procain, 0.5 per cent., the rectum was anesthetized. A probe passed into the sinus went backward toward the sacrum and coccyx, but did not touch denuded bone. Barium paste injected into the sinus came up in the posterior lumen. Tissue was curetted from the sinus for microscopic examination. Up to this point, it was thought probable that a foreign body had perforated the bowel, causing an abscess in the hollow of the sacrum, and that this had secondarily reperforated into the rectum through the sinus low down in the rectum. Stereoscopic roentgenograms of the pelvis were taken with a probe in the sinus and with barium injected into the sinus, but no involvement of bone was made out. At this point, the sections from the tissue removed were examined, and the granulation tissue was found to be tuberculous. Repeated examination of the spine and pelvis and urinary tract revealed nothing. Thinking that more adequate drainage of this abscess would give the patient some relief from the constant discomfort she was experiencing, I passed a heavy piece of silk through the lower opening of the sinus in the bowel to the upper opening of the sinus, which was just above one of Houston's valves, and this silk was tied tightly in the hope of cutting through the intervening tissue. This result was obtained in a few days, and some relief was afforded; but in a short time all of the symptoms returned. The patient felt that perhaps hemorrhoids, which were bleeding and protruding, were the cause of the pain; and though doubting this, I removed them at another operative session under local anesthesia. This procedure did not relieve the pain. About this time, a very slight redness developed over the coccyx. This was only suggestive, but, owing to the tenderness in this region, I decided to explore the coccyx. Under gas anesthesia, an incision was made over the coccyx and a pus pocket was entered. The coccyx was the seat of an osteomyelitis, and the lower two segments of the sacrum were removed. The patient obtained almost instantaneous relief, and at present, about eleven months from the time of the removal of the coccyx, she is symptom free and has gained in weight and strength. She still has a small sinus, which reaches to the rectum, but apparently does not connect with it. This sinus is becoming progressively smaller. The microscopic examination of the coccyx revealed a tuberculous osteitis.

Case 2.—R. G., a man, aged 47, referred by Dr. Carl H. Dragstedt, complained of a discharging perirectal sinus and pain in the back and rectum, loss of weight, weakness and marked constipation. During the last ten years, he had had three perirectal abscesses opened, and six years ago had an extensive operation performed for fistula in ano, which resulted in a partial incontinence of the sphincters and left him with pus discharging from three external openings in the right ischiorectal fossa, as well as a pus discharge from the rectum which necessitated frequent changes of dressings. Bowel movements had been induced by cathartics to avoid fistulization, which caused severe pain during and after bowel movement. For several months, severe pain in the lower spine had made it difficult for the patient to sit down with comfort. He had lost 20 pounds (9 kg.), and had an afternoon rise of temperature. He had been drinking heavily to relieve the pain.

Examination showed no constitutional evidence. The anus on the right side was three discharging sinuses, which communicated with an indurated ulcer the size of a dime on the posterior wall of the rectum, just above the mucocutaneous line. In all of the lesions, a copious discharge of pus was present, and the process had the clinical appearance of tuberculosis. The external sphincter muscle had been cut, and was incompetent. At the level of the ulcer, a stricture had developed which admitted the index finger snugly and which compensated for the incontinence of the sphincter. There was some tenderness over the coccyx exteriorly, but no redness. The appearance of the lesion was that of an ischiorectal tuberculosis which had secondarily broken into the rectum.

Nov. 7, 1922, under gas-ether anesthesia, three ischiorectal sinuses on the right side were dissected out and connected with the rectum low down outside of the sphincter. A probe in the rectal ulcer passed through the bowel wall posteriorly and then upward for 5 inches, but no denuded bone was touched. This rectal opening was dilated to insure better drainage. Section from tissue showed all the signs of tuberculosis. Roentgenograms were now taken of the pelvis, spine, sacrum and coccyx, but no bone changes were seen.

The patient improved greatly as far as local discomfort was concerned, but had a great amount of pus discharging from the rectal opening. His temperature was around 100.5 F. in the evenings. At this period, the patient went home, but returned in three weeks with a temperature of 104, profuse discharge from the rectum, and marked tenderness over the coccyx and over both ischiorectal regions. Examinations, including roentgenograms of the sacrum and coccyx, revealed no additional findings except a slight hyperemia over the region of the coccyx, and some induration deep in the ischiorectal region. Exploration of these regions was decided on.

December 14, under gas-ether anesthesia, the coccyx was exposed by an incision directly over it, and when the posterior ligaments were divided, the whole coccyx was found lying free as a complete sequestrum. Through its bed, a sinus ran anteriorly to the ulcer in the rectum and laterally into the ischiorectal fossa on each side, where well fixed abscesses, deep in the fossae, were drained by separate incisions through the ischiorectal fat. The sacrum was not involved. All wounds were left wide open.

Sections of the os coccygis showed tuberculosis of long standing.
After the last operation, the patient's health at once improved. He has gained 20 pounds in the last four months, has no pain, and is actively at work. He has a slight pus discharge from the rectal defect, which is not entirely closed. There is also a small sinus in the scar of the incision over the coccyx. This is gradually becoming smaller.

In neither of these two cases was a history of trauma present; nor was there any known reason for localization of the tuberculous process in the os coccygis. It might be suggested that the tuberculous process in the bowel was primary and the involvement of the bone secondary. Opposing this view are the facts that the lesions in the bowel were more recent than the bone changes in both cases, as the coccyx was completely sequestrated. In addition, primary tuberculosis of the rectal mucosa without pulmonary or other intestinal tuberculosis is extremely rare. Lastly, the rectal lesions were not active ulcerative processes, but were openings of fistulas into the bowel.

If the tuberculosis of the os coccygis is considered in the light of the twenty-seven reported cases, it is found that seventeen patients were men and ten were women, and that the age of the patients had varied from 2½ years to 70.

Traumatism to the coccyx by falls or injuries has been mentioned in ten cases, but the active symptoms of tuberculous osteitis have not developed at once but following the trauma from three months to six years. The latter time limit obviously throws some doubt on the importance of trauma as an etiologic factor. It would be fair to assume that it played about the same rôle as it does in the production of bone and joint tuberculosis elsewhere.

The general health of the patients prior to the onset of symptoms of the local lesion has been good, and generalized tuberculosis has been conspicuously absent. The onset of the lesion is usually insidious, and the patient first suffers backache, which is over the sacrum and coccyx. Difficulty of locomotion, and inability to rise from a sitting position due to discomfort as well as tenderness over the coccyx while sitting, are early symptoms. Defecation is usually not painful.

Abscess formation is constant and usually develops insidiously as a chronic inflammatory swelling, finally reaching through the skin over the coccyx or more rarely, as evidenced in the two cases just reported, into the rectum. When the abscess finally opens externally, a rather copious seropurulent discharge continues from it. If the abscess opens into the rectum, a secondary infection may supervene with fever, prostration, loss of weight and all of the findings of an acute infection. Usually the course of the infection is of slow progress, and the disease continues for years until the dead bone is removed or, rarely, is discharged spontaneously, as occurred in one patient.

**Fig. 2.—Tuberculosis of os coccygis, as shown on microscopic examination.**

**PATHOLOGY**

Tuberculosis of the os coccygis usually develops as the sole known lesion of tuberculosis in the patient, and is probably a hematogenous infection. Secondary involvement of the coccyx by extending from tuberculosis of the spine or sacrum is very rare. Likewise, when tuberculosis of the coccyx has been observed, the sacrum has been uninvolved except in three cases observed by Caubert and Darrah and in one of the cases reported in this article. The essential pathology of tuberculosis of the coccyx is that of bone tuberculosis elsewhere, resulting in bone necrosis and cold abscess formation. In cases of several years' standing, the coccyx is entirely sequestrated and lies free, encased in the fibrous capsule composed of the anterior and posterior ligaments. The cold abscess that forms has some very characteristic features in that it usually forms on the anterior wall of the coccyx and secondarily takes three courses. It may rupture into the rectum, as it did in the two cases here reported. The site of rupture into the bowel is above the sphincters in the lower portion of the ampulla of the rectum. In one of the cases there were two openings into the rectum. More frequently, the abscess gravitates downward and points at the tip of the coccyx in the midline just posterior to the anus. The third location for the cold abscess to gravitate is into one or both ischiorectal fossae. When this happens, the abscess lies deep in the fossae just below the levator ani muscle, and may reach considerable size before any external transformation or color changes in the skin occur. Finally, these ischiorectal abscesses reach the surface and ulcerate through the skin, making sinuses into one or both ischiorectal fossae.

If the abscess ruptures into the rectum, secondary infection of the whole abscess cavity results, and a rapidly spreading acute pyogenic infection may occur.

**DIAGNOSIS**

The diagnosis of tuberculosis of the coccyx is generally not made, though, I believe, the condition is present more often than is suspected and is responsible for a number of persistent tuberculous sinuses in the ischiorectal region. It must be thought of in patients having backache and discomfort in the back while sitting or in the act of rising from a sitting position, who have a chronic discharging sinus in the ischiorectal region. Pain on pressure over the coccyx, either externally or through the rectum, in such a case is contributory evidence, and a sinus developing in the midline over the coccyx or at its tip is very suggestive. The roentgen ray, peculiarly enough, is not very helpful. A series of stereoscopic plates was made in both of my cases,
with negative results. This is due to the difficulty in getting a clear picture of the coccyx and, more especially, because there is practically no new bone formation and also that the sequestrated coccyx is not especially deformed in the early stages of the disease and still contains a considerable amount of calcium salts.

The passage of a probe through an ischiorectal sinus toward the coccyx which touches dead, denuded bone, is pathognomonic.

One of the most important points in diagnosis is to think of the fact that the coccyx may be the seat of a tuberculous osteitis.

The differential diagnosis must exclude pyogenic fistula in ano, the origin of which is an acute, rapidly developing ischiorectal abscess, which differs materially from the insidious onset of the tuberculous process. The internal opening of the ordinary fistula in ano is at the mucocutaneous line between the sphincters and the external opening, and allows a probe to be introduced into it toward the rectum and away from the coccyx.

Tuberculosis of the ischiorectal fat is harder to differentiate. It is more common than tuberculosis of the coccyx, and usually develops more superficially, with the appearance of several nodular masses, which coalesce and break down to form sinuses over one or both ischiorectal fossae. The involvement of the rectum is usually secondary, owing to the process rupturing into the rectum by continuity. In this, it resembles tuberculosis of the coccyx. Every such ischiorectal tuberculosis should be examined to determine where the coccyx is tender and as to whether a probe intro-

and the lesion thereby becomes large. I have seen the entire ischiorectal fossa filled with such a tumor. The underlying bone is rarely involved, as it is protected by firm ligaments so that the course of least resistance is away from the coccyx and sacrum. The similarity of these two conditions lies in the position of a sinus in the midline over the coccyx.

Gravitating abscess from tuberculosis of the sacroiliac synchondrosis, Pott's disease, tuberculosis of the
tubes or appendix and tuberculosis of the hip may rarely appear in the ischiorectal fossae, but concomitant symptoms of the original lesion will usually make the diagnosis possible.

Old fractures of the coccyx or pain in the region of the coccyx from chronic arthritis of the spine would be very easily recognized.

TREATMENT

The treatment of tuberculosis of the coccyx is removal of the coccyx by an incision over it. Jean Louis Petit reported the first case in 1790, and resected the coccyx.

In nineteen cases in which the coccyx was resected as reported by Darrah, sixteen of the patients recovered. In both of the cases reported in this paper the patients are symptomatically and generally well, but each one has a small sinus reaching from the incision to the bed of the coccyx. These sinuses are getting smaller, and seem to have every prospect of closing.

Where the abscess has opened into the rectum, a subsequent plastic operation to cover the defect may be necessary. The operation proposed by Elting, of sliding a flap of mucosa over the opening into the bowel, would be adaptable for this purpose.

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Automobile Fatalities in United States, 1917-1922.—The Department of Commerce announces that the returns compiled by the Bureau of the Census show that during the year 1922 11,666 deaths resulting from accidents caused by automobiles and other motor vehicles (excluding motorcycles) occurred within the death registration area of the United States (exclusive of Hawaii), which area contains 85 per cent, of the total population. This number represents a death rate of 12.5 per hundred thousand population, as against 11.5 in 1921, 10.4 in 1920, 9.4 in 1919, 9.3 in 1918, and 9 in 1917. In the twenty-seven states for which data for 1917 are available the number of these deaths increased from 6,014 in that year to 9,381 in 1922, the corresponding rates for these two years being 8.7 and 12.9.—Pub. Health Rep. 38:2889 (Dec. 7) 1923.