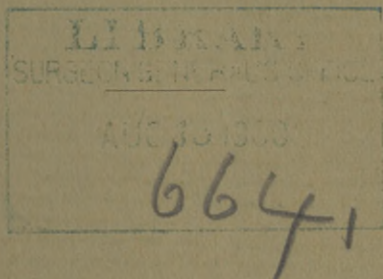


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WITHOUT SACRAL RESECTION.

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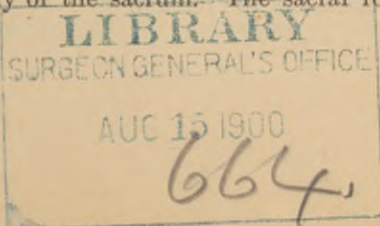
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EXCISION OF HIGH RECTAL CARCINOMA WITHOUT SACRAL RESECTION.

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SINCE Lisfranc introduced his operation of excision of the rectum for malignant disease as a legitimate surgical procedure, a number of modifications have been devised by different surgeons for the purpose of perfecting its technic and of enlarging its sphere of application. Experience soon demonstrated that in the removal of a high carcinoma of the rectum, Lisfranc's incision did not furnish sufficient room to render the operation safe and effective. With a view of bringing the upper portion of the rectum, when the seat of malignant disease is within the reach of radical removal, Kocher advised and practised excision of the coccyx as a preliminary step in performing the operation. Emboldened by the greater safety attending all operative interventions brought about by the general adoption of antiseptic and aseptic precautions, more extensive resections of the posterior bony wall of the pelvis were planned and carried into effect, for the purpose of securing additional room in the removal of malignant disease involving the upper portions of the rectum. Kocher was followed by Kraske, who first suggested partial resection of the last two sacral vertebrae. Kraske's sacral resection consists in cutting through the left half of the last two sacral vertebrae in the form of a curve inward and downward from the third to the fourth sacral foramina, and from here to the body of the sacrum. The sacral route to



the rectum is generally known as Kraske's operation, although sacral resection has been carried much further by Bardenheuer, Volkmann, and E. Rose. Bardenheuer resects the sacrum from below as far as the third sacral foramen. Volkmann and E. Rose divide the sacrum transversely on a level with the second sacral foramen, and claim that opening of the spinal canal, which takes place in performing this operation, has seldom been followed by serious results.

Temporary resection of the lower portion of the sacrum was first introduced by Heineke as a preliminary step to the operation of excision of the rectum. This has been variously modified by different surgeons, but for obvious reasons has never become popular with the profession. Kraske's method, which found ready introduction in Germany, is almost unknown in England, and has never been extensively practised in France. In America the sacral route has had a fair but not extensive trial. Opinions in this country are somewhat at variance in reference to the advantages offered by this method. The writer has resected the carcinomatous rectum by the sacral route in 25 to 30 cases. He has never resorted to temporary resection of the sacrum, and has always performed either the typical Kraske operation, that is, partial resection of the left half of the last two sacral vertebrae, or total resection of the last two sacral vertebrae. After an extensive experience with Kraske's method, the writer has become satisfied that the room gained by this operation is an inadequate compensation for the additional danger to life incurred. I have often been greatly disappointed at the gain in space furnished by the Kraske method in the removal of a high rectal carcinoma, and recent experience has convinced me that sacral resection is not only unnecessary, but absolutely harmful in all operations for malignant disease of the rectum.

I wish to place myself on record as being absolutely opposed to the sacral route in all operations for the radical removal of the carcinomatous rectum. The sacral route has been selected, of course, only in cases in which the carcinoma involved the upper portion of the rectum, but I am fully convinced by ample experience that radical operations can be performed in all cases justifying such a procedure without this additional trauma and mutilation. I have become satisfied that sacral resection constitutes an important item in determining the high mortality of operations for high rectal carcinoma. I have become equally well convinced that all legitimate and well-grounded indications for the radical removal of high rectal carcinoma can be met and ample room for performing the operation secured by a preliminary excision of the coccyx. In extirpation of the rectum below the peritoneal reflexion even the removal of the coccyx is superfluous. In excision of the upper portion of the rectum the peritoneal cavity must be freely opened, and in such cases ample space is secured by removal of the coccyx. If excision of the coccyx does not furnish the necessary space it is much safer to resort to the combined operation than to persist in creating additional space by sacral resection. I hope and trust that, at least in this country, the Kraske operation will soon become obsolete.

With the intention of placing my objections to the sacral route on a clinical basis I have selected from my practice two cases of rectal carcinoma representing the two principal pathologic varieties of this affection as a text for this paper. Both of these cases were operated upon during the same week, more than two years ago. Both patients were females less than 40 years of age. In one case the disease involved the lower portion of the rectum primarily, and in the course of time in-

volved at least $5\frac{1}{2}$ inches of the rectum, without causing any serious mechanical obstruction. In the other case the disease had a high primary origin and was characterized clinically by symptoms which pointed to mechanical obstruction in the lower portion of the intestinal tract. In the first case the excision necessarily included the sphincters of the rectum, and during the operation it was found impossible to bring the proximal end down to the level of the anus, and I had to establish a sacral anus not as a matter of choice but of stern necessity. In the second case the lower portion of the rectum remained intact, the disease had a high origin enabling me to preserve the sphincters by making a circular resection and suturing the proximal to the distal end to the extent of uniting the anterior two-thirds of the circumference of the bowel. The detailed account of these two cases ought to satisfy any unprejudiced surgeon that sacral resection is destined to become an obsolete procedure in the near future in operations for malignant disease of the rectum.

A few words in reference to contraindications to radical operations for high rectal carcinoma. I regard as legitimate contraindications to such operations all cases in which the proximal limits of the tumor are beyond the reach of the index-finger, extensive involvement of the retroperitoneal glands and marked extension of the disease beyond the rectal wall, that is extensive infection of the pararectal connective tissue. In the absence of such positive contraindications I deem it probable that a radical operation can be performed without sacrificing any portion of the sacrum by limiting the resection of the posterior bony wall of the pelvis to removal of the coccyx.

RESECTION OF FIVE AND A HALF INCHES OF LOWER END OF RECTUM FOR CARCINOMA, INCLUDING SPHINCTER; PERMANENT COCCYGEAL ANUS; RECOVERY WITH PARTIAL CONTROL OVER RECTUM.

CASE 1.—Patient is a married woman, 36 years of age, of German parentage, and housewife by occupation. Family history negative. She has passed through the usual diseases of childhood, but otherwise has always enjoyed good health. She was married at the age of 18, and is the mother of four children, of whom three are living, aged respectively 15, 13 years, the youngest 3 months. Menstruation has always been normal, no indications of previous pelvic disease of any kind. She dates her present illness back to the summer and autumn of 1895, when she suffered from an attack of typhoid fever which kept her confined to bed for 6 weeks.

Some time previous to this illness she was subject to occasional attacks of constipation which were relieved by the use of laxatives. After she recovered from the typhoid fever these attacks became aggravated, and about one year and three months ago she discovered traces of blood and mucus in the fecal discharges. Pain which appeared about that time was most severe during defecation. The symptoms gradually increased in severity, the quantity of blood in the feces increased, being at times of a bright arterial hue, at others in the form of clots, variable in size.

A physician who was consulted made a diagnosis of hemorrhoids without making a rectal examination, and prescribed a course of treatment based on such supposition. For the last six months her general health has failed, and from that time a marked emaciation developed.

She entered St. Joseph's Hospital November 2, 1897. Examination of chest, abdomen and urine revealed nothing abnormal. Uterus and adnexa healthy. A rectal examination left no doubt as to the malignant nature of the rectal affection. From the margin of the anus the whole circumference of the rectum was studded with papillomatous masses to a distance of about five inches. Healthy mucous membrane and a normal rectal wall was within reach of the index-finger. The lumen of the rectum was somewhat diminished by the fungous masses, but there were no indications of cicatricial stenosis.

The carcinoma seemed to permeate nearly the entire thickness of the rectal wall and a few small indurated lymphatic glands could be felt in the mesorectum and between the rectum and the anterior vaginal wall. The surface of the affected part of the bowel was extensively ulcerated. With the exception of a few lymphatic glands the pararectal tissue appeared to be intact, a condition which encouraged me to recommend and perform a radical operation.

After thorough preparatory treatment the operation was performed November 5. A cot was used in place of an oper-

ating table. When completely under the influence of ether the patient was placed in the ventral position with the pelvis well elevated and the thighs and legs flexed and wrapped in a warm flannel blanket. It was the intention to remove the rectum completely at least an inch beyond the macroscopic limits of the disease. The operation was commenced by making an incision from the sacrococcygeal joint to the margin of the anus. The coccyx was next disarticulated and removed. After exposing the rectum the anus was circumscribed by two semilunar incisions which included the sphincter muscles. The rectum was lightly tamponed with iodoform gauze during the enucleation. As soon as the lower end of the rectum with the sphincter muscles was liberated the lower end was tied with a strip of iodoform gauze for the purpose of preventing the escape of feces and to facilitate manipulation of the bowel during the remaining steps of the operation.

The separation of the surrounding structures and the vaginal septum was effected largely by resorting to blunt dissection.

Hemostatic forceps were used in arresting hemorrhage temporarily. Vessels of considerable size were secured by the same means before cutting them. No ligatures were applied before the excision was completed. After liberating the rectum from the vaginal septum as far as the peritoneal reflection from rectum to uterus, usually a distance of about two and a half inches, the culdesac of Douglas was opened freely, when it was found that the disease extended at least an equal distance above this point. The enlarged lymphatic glands behind the rectum in the hollow of the sacrum were carefully included in isolating the rectum by dividing the mesorectum near the sacral surface. The peritoneal cavity was protected against infection by the insertion of a dry gauze compress which at the same time prevented all possibility of prolapse of the small intestines. As soon as the upper limit of the disease was reached the rectum was tied with a strip of iodoform gauze above the proposed line of resection. By making traction upon the gauze ligature the rectum was brought down as far as could be done without creating harmful tension.

The rectum was then removed by making a transverse section at least an inch above the tangible proximal limits of the tumor. The prolapsed mucous membrane of the rectum below the ligature was carefully disinfected. All vessels of sufficient size requiring ligation were tied with catgut ligatures. The tampon was removed from the peritoneal cavity and the parietal peritoneum was carefully stitched to the rectum with four or five fine catgut sutures. The proximal end of the resected rectum was stitched to the skin at a point about two inches below the sacrum after having reduced the lumen of the bowel to the desired degree by pursestring catgut suture.

The wound-cavity behind the rectum was tamponed with a long strip of iodoform gauze which was brought out to the surface and properly secured with a safety-pin immediately below the sacrum, and the wound below it sutured with silk-wormgut as far as the artificial anus, the last suture being made to include a part of the posterior wall of the rectum minus the mucous membrane. The cavity and wound in front of the rectum were treated in a similar manner.

The patient did not lose more than two ounces of blood during the operation, which lasted a little over an hour. At the completion of the operation the pulse was 115 per minute with great diminution of its volume, a condition which necessitated the employment of cardiac stimulants. Brandy was given by the stomach and strychnia every 4 hours subcutaneously in doses of $\frac{1}{32}$ of a grain. Dry, external heat was also used in an endeavor to reestablish in as short a time as possible the normal peripheral circulation. Under this treatment the patient soon recovered from the immediate effects of the operation, Thirty-six hours after the operation the temperature after a slight rise was normal.

On the fourth day a sudden rise in the temperature led to the suspicion that the drainage was not satisfactory. The gauze tampons were removed and a copious discharge of pus followed. The cavities were flushed with a saturated solution of acetate of aluminum every 3 hours and tubular was substituted for capillary drainage. The next day the temperature was normal, after which flushing was practised only once daily. An attack of diarrhea yielded promptly to opium and astringents.

The patient made a rapid and uneventful recovery. The rectum became attached to the skin, the cavities rapidly diminished in size so that the patient was able to leave the hospital at the expiration of four weeks. During this time her general health improved materially, and when she left the hospital only a small fistulous tract remained behind the rectum, and she had recovered partial control over the rectum, being able to retain solid fecal stools the usual length of time. I have recently been informed by the family physician that so far there has been no recurrence.

CIRCULAR RESECTION OF THE RECTUM, SUTURING OF THE PROXIMAL TO DISTAL END; TEMPORARY COCCYGEAL ANUS; RECOVERY WITH PRESERVATION OF FULL USE OF SPHINCTER MUSCLES.

CASE 2.—This patient was a married woman, only 29 years of age, American by birth, and housewife by occupation. Family history in reference to tuberculosis, syphilis and malignant disease negative. With the exception of the usual diseases incident to infancy and childhood the patient has always been in good health until about 6 years ago, when she commenced to suffer from constipation and painful defecation; the pain being particularly severe at times when constipation became most obstinate. Since that time the solid fecal masses have been gradually diminishing in size, and during the last year diarrhea has been a conspicuous clinical feature with absence of any well-formed stools. For a long time mucus in greater or less quantity has been observed constantly in the stools.

Symptoms pointing to chronic intestinal obstruction have been gradually increasing in frequency and intensity during the last 6 months. The patient's general health has been gradually failing, and the various kinds of treatment resorted to at different times have proved unavailing in affording anything but temporary relief. The last diagnosis made based on a rectal examination was cicatricial stenosis of the rectum.

The patient was admitted into the Presbyterian Hospital October 31, 1897. At the time of her admission she was anemic and considerably emaciated. The abdomen was tympanitic, and during the paroxysmal abdominal pains the intestinal coils, in a state of violent peristalsis, could be distinctly outlined on the surface of the abdomen. Examination of the urine and organs of the chest revealed nothing abnormal. Uterus, tubes and ovaries healthy. Digital examination of the rectum disclosed a tight circular stricture about 4 inches above the anus. The lumen of the bowel at this point did not much exceed the size of an ordinary leadpencil. It required a good deal of patience to pass the tip of the index-finger through the stricture sufficiently far to determine the extent of the disease. The stricture was surrounded by a solid, firm mass, which involved the entire thickness of the rectal wall and included the whole circumference of the bowel. Above the stricture the rectum was dilated; the mucous surface was the seat of a catarrhal inflammation.

The tumor, which involved about three inches of the rectum, was spindle-shaped, the center corresponding with the location of the stricture. The affected portion of the rectum was freely movable. Behind the tumor, and firmly attached to it, could be felt two hard lymphatic glands, considerably enlarged. By making a vaginal examination the tumor could be traced above the pouch of Douglas. The carcinomatous lymphatic glands could be felt most distinctly by

dragging the tumor down and palpating its posterior surface. The examination left no doubt as to the carcinomatous nature of the stricture. The mobility of the rectum and the limited regional infection induced me to advise a radical operation.

The patient was prepared in the usual way for the operation, which was performed November 3. The first step in the operation consisted in removing the coccyx and in exposing the rectum below the stricture. At this point the rectum was separated from the vaginal septum. A gauze ligature was applied at least an inch below the tumor, and the bowel divided transversely below the ligature and about $2\frac{1}{2}$ inches above the anus. Eucleation of the rectum was continued from below upward.

Gentle traction upon the ligature facilitated the procedure materially. Before the tumor could be reached the peritoneal cavity was freely opened, when the exact location of the tumor was indicated by a marked retraction of the peritoneal coat of the anterior surface of the tumor well up in the culdesac of Douglas. In isolating the bowel posteriorly the sacral curve was closely followed in order to include in the excision all of the infected glands. As soon as the bowel was sufficiently liberated to bring the tumor within easy reach, the peritoneal opening was tamponed with plain sterile gauze held in the grasp of a large hemostatic forceps. A strip of gauze was tied around the bowel above the proposed line of transverse section and the amputation made through healthy tissue.

The section of rectum removed measured five and a half inches in length and included three or four carcinomatous glands. The peritoneal cavity was closed with a number of catgut sutures, including the seromuscular coat of the rectal wall and the parietal peritoneum. Vessels requiring ligature were next secured when the two ends of the rectum were united with two rows of catgut sutures over the anterior two-thirds of their circumference, after which the gauze ligatures were removed and the remaining portion of the resected ends were sutured to the skin at a point about two inches below the sacrum, thus creating a temporary coccygeal anus. The cavities were packed with iodoform gauze and the incision sutured in the same manner as in the first case.

Sections of the specimens removed were later examined and the clinical diagnosis verified by the use of the microscope. In this case the operation was followed by little or no shock. Not a single untoward symptom appeared during the whole course of after-treatment. The iodoform-gauze tampons remained in place for a week, and at the time they were removed the cav-

ities were found lined with a pavement of vigorous granulations. Four weeks after the operation the lower cavity was completely healed, the upper contracted to a narrow fistulous opening.

For four weeks all of the feces escaped through the artificial anus, after that time progressive contraction of the opening directed the fecal current toward the natural outlet guarded by the intact sphincter muscles. Two months after the operation the entire wound was healed and the artificial anus closed. The functional result in this case was perfect, and the patient left the hospital much improved in her general health. As I have heard nothing from the case since, the result of the operation remains uncertain, but I have reason to hope that no recurrence has occurred to date.

Suturing of the resected ends proved entirely satisfactory in this case, as the sutured part united by primary intention. The experience with these two cases has satisfied me that a radical operation for carcinoma of the rectum can be successfully performed without sacral resection in all cases in which the extent of the disease warrants operative intervention. I am equally convinced that sacral resection greatly adds to the mortality of the operation without furnishing an equivalent in space or without increasing materially the prospects for more lasting results. The combined operation is destined to take the place of sacral resection in all cases in which excision of the coccyx does not afford the required space to reach the proximal limits of the disease with safety.

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