formation and healing, but also that it may be delayed in its healing, or extend, and so form the initial stage of chronic gastric ulcer.

The natural conclusions to which one is driven from a consideration of the above points are that gastrostaxis as an independent disease is not yet indisputably proved to exist; and, on the other hand, that acute gastric ulcer is a most important and very common malady, and one which is worthy of more consideration than appears to be given to it.

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ON IMPIANTATION OF THE URETERS INTO THE RECTUM BY THE SACRAL ROUTE,

ILLUSTRATED BY A CASE OF INVETERATE VESICO-VAGINAL FISTULA IN WHICH THE LEFT URETER WAS IMPLANTED AND THE RIGHT KIDNEY REMOVED.

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SOME years ago the question of implanting the ureters into the rectum by the sacral route was suggested to me by the desire to alleviate the discomforts of a man from whom I had removed the penis with the whole urethra up to the bladder for a carcinoma of the bulbous and membranous portions which had extended to the apex of the prostate. At that time I did not work out the idea to a satisfactory conclusion, as the patient learnt to manage himself, and preferred his condition, with its attendant difficulties, to submitting to an operation with all its uncertainties. But I learnt sufficient to be sure that, in the male at any rate, the operation would be very difficult owing to the depth at which the ureters had to be sought and the contracted area in which the manipulations had to be performed.

When, however, the case which is described in detail below was sent to me by Dr. McAllister, Vice-Master of the Coombe Lying-in Hospital, the suitability of such an operation was so evident that I returned to the attempt to arrange a feasible procedure, with the impression that the greater width of the female pelvis would make it more easy of accomplishment.

Three points suggested themselves for consideration:

The first was the preservation of the sphincteric control of the rectum, for, if the result of the operation was to produce paralysis or even paresis of the sphincteric apparatus, the patient would not be benefited, and might even be made worse.¹

Then there was the question of the uterus. Could the operation be carried out without its removal, or must it be sacrificed?

And, lastly, there was need for clearer knowledge about the ureters. Could they be easily found in this situation? After their separation would it be possible to close the openings made in the bladder?

1. The Preservation of the Sphincteric Control of the Rectum.

The direction usually given in Kraske's operation for removal of the rectum that the section through the sacrum must not extend as high as the fourth sacral foramina, so that the fourth sacral nerves may not be injured, defined the limit of the removal of bone.

The fourth sacral nerves incline upwards after their exit from the foramina, and groove slightly the anterior surface of the sacrum on which they lie. In a horizontal section, if the foramina are left intact, there is no danger of these nerves being injured. The nerves to the levatores ani run from the lower part of the sacral plexus just below the white line, and close to the ischial spine; they are completely out of the way if the knife be kept close to the bone in separating the soft parts from the coccyx and lowest part of the sacrum. The inferior haemorrhoidal nerves which supply the external sphincter, and lie almost entirely within the ischio-rectal fossae, are not likely to be disturbed, and the pudic nerves, of which they are branches, are quite safe.

The internal sphincter is probably innervated by the sympathetic, which reaches the bowel along the superior, middle, and inferior haemorrhoidal arteries. With reasonable care no serious damage to the nerve supply of this muscle was to be expected. Consequently there was no reason to suppose that the patient's power of control over the sphincters would be impaired.

2. The Question of the Removal of the Uterus.

The uterus and upper part of the vagina lay in the direct route to the trigone, and to expose the insertions of the ureters it was almost certain that the former would have to be excised. If this were done the operation would be partly intraperitoneal.

Its removal need cause no feeling of compunction, for the patient had suffered too much in consequence of her last pregnancy to desire another, and if left it was only likely to be a discomfort and an inconvenience.

My first attempt led me to think that the ureters could be dissected out and removed from the bladder without any further interference with the uterus than the division of the uterine arteries, and without opening the peritoneum. I was able to isolate both ureters and by traction to pull up a cone of bladder on either side of the vagina. The closure of the separate openings made in the bladder was commenced before each ureter was completely cut adrift, so that there was no fear of the bladder wound sinking out of sight.

But subsequent attempts showed me that I had met at first with an exceptionally easy case, and that the removal of the uterus in nearly every instance would be essential. In doing this, after the uterus had been freed on either side from the broad ligaments, it was drawn out of the wound and pulled downwards and backwards, whilst the anterior surface of the vagina was stripped off the base of the bladder. The tendency was not to strip the vagina sufficiently low, as, owing to the necessity of preserving the levator ani insertions into the bowel, this was not easy. But a suitable retractor fixed at the inferior angle of the wound gave great help. When the vagina had been separated low enough it was divided transversely, but a sufficient margin was left to permit of its easy closure by sutures.

3. Exposure and Separation of the Ureters.

This was not such a simple matter as I had expected. When the uterus was removed and the vagina stripped down, the ureters were not once exposed, nor were they readily found. At this stage there was to be seen an opening into the peritoneal cavity corresponding to the lowest portion of the pouch of Douglas, through which the uterus had been drawn out, and a quantity of fatty pelvic connective tissue. The position of a ureter was best ascertained by the sense of touch. When tissue which concealed it was grasped between the finger and thumb, it could usually be felt as a somewhat flattened but definite cord. By placing a finger in the peritoneum and grasping the tissues on either side of the opening between the finger and thumb the ureters could usually be detected lying close to the peritoneum, but at some depth in the fat. When located they could easily be exposed with dissecting scissors and separated down to their entry into the bladder wall. At first the tendency was to search for them too far to the sides of the wound, but they were usually found running longitudinally $\frac{1}{2}$ in. to $\frac{3}{4}$ in. from the median line, and tending slightly outwards and upwards to lie on the outer sides of Douglas's pouch. One point that the preliminary observations taught me was to be prepared for ureters of variable size; in one instance the ureters were so small and narrow that even after they had been traced to the bladder some uncertainty still remained until it was found that a probe passed along them from the vesical apertures, which were very difficult to enter. Another was that the separation of the ureters from the bladder required considerable circumspection. Twice at least when I thought I was cutting well wide of the ureter I found that I had divided it in its oblique course through the vesical wall, and had failed to secure its orifice on the mucous membrane. This accident was probably due to putting the ureter on the stretch to steady and define the bladder. A cone of bladder was in this way formed, and the exact situation of the ureter in it no doubt misconceived.

Case of Inveterate Vesico-vaginal Fistula Treated by Implantation of the Left Ureter into the Rectum, and Removal of the Right Kidney.

The case on whose behalf the foregoing investigations were made was that of Mary F., aged 42, who was admitted to the Leeds General Infirmary on February 4th, 1909. She stated that five years ago she had been confined and that forceps were used, the child being stillborn, and that since then she had submitted to thirteen operations. Dr. McAllister wrote that the bladder and vagina had been converted into a single compartment as the result of her first confinement in the country, and that many attempts had been made both in England and Dublin to restore the bladder, without much success.

In the last operation the difficulty was to get the stitches to hold or the tissues to unite when brought into place, even after weeks of preliminary preparation. "The condition of the patient was the deplorable condition of such cases—bad enough in hospital, but unbearable at home, when no one will go near her." When the proposal of transplanting the ureters was suggested to her "the wretched woman simply jumped at the idea of any procedure, no matter how risky, which would offer prospect of improvement, even if short of actual cure."

Her condition on admission was described by the dresser as follows: "The vulva, the buttocks, and the thighs are always wet and the skin is inflamed and eczematous in consequence, and covered with a pustular eruption—more particularly over the buttocks. She gives off an offensive urinous odour, and this, with the pain and discomfort of her condition, makes her very depressed. If she gets up she cannot sit down without pain, and she is only kept fairly comfortable when in bed and receiving careful attention."

On examination it was seen that the perineum was deficient, but the parts were so tender that they could only be satisfactorily investigated under anaesthesia. Then the following condition was found: There was a patent aperture corresponding to the urethra which admitted the index finger. It was only covered with healthy mucous membrane on its upper margin, the rest of the circumference being formed of scar tissue. The floor of the urethra had completely disappeared. On the right side was another aperture leading into the bladder. It was as big as a sixpence, and admitted a finger. It was bounded on one side by the pubic ramus, to which it was firmly attached. The tissue completing the circumference of the fistula and separating it from the urethral opening was very tough, indurated, and fibrous. The uterus was movable backwards and forwards, but was tethered low down in the pelvis, near the cervix, by indurated tissue on the right side. There was an offensive purulent vaginal discharge.

Some time was taken up in preliminary treatment of the vaginal discharge and the unhealthy skin condition, and on March 16th the following operation was performed:

Operation.

After the patient was anaesthetized (ether) and placed lying upon her face with the thighs hanging down over the end of the table, the anal sphincter was well dilated, and the rectum copiously irrigated until it was quite clean. The vagina and the bladder were also thoroughly douched. A median incision down to the bone was then made from the top of the sacrum to one inch from the anus, and the soft parts were dissected off the bone, and sacro-sciatic ligaments for a sufficient distance on either side. Next the coccyx was removed, and three-quarters of an inch sawn off the end of the sacrum. The first difficulty was now encountered. The recto-vesical fascia was only in places capable of separation from the rectum. There seemed to be no perirectal fat, and the fascia was so adherent that the greatest care had to be taken lest the rectum should be inadvertently opened. Between the bowel and the upper part of the vagina the adhesions were very firm, but above this the separation of the anterior surface was easier. Consequently, it was only after a somewhat tedious dissection that a loop of rectum was isolated and cleared upwards as far as the pouch of Douglas, and downwards until the posterior surface of the vagina was laid bare for quite an inch. This loop was then drawn to one side by a gauze retractor.

The second stage of the operation—the removal of the uterus—was now entered upon. The pouch of Douglas was opened, and the fundus of the uterus grasped and drawn out. First on one side and then on the other double ligatures were applied between the ovaries and the uterus, and the upper part of both broad ligaments freed. Next the peritoneum in front of the cervix was incised and pushed and dissected downwards till the anterior wall of the vagina was sufficiently exposed. Both uterine arteries were then divided and ligatured, and the uterus was removed by cutting across the vagina, whose posterior surface had been cleared, it will be remembered, in the first part of the operation. In carrying out these steps there was at one point very considerable difficulty. The vaginal wall on the right side of the cervix and at the base of the broad ligament was drawn up in a cone-shaped recess, and firmly fixed to the pelvic wall by dense fibrous tissue. This was carefully dissected away, fortunately without opening into the ureter. The possibility of such an accident happening was considerable, for the right ureter was almost certainly involved in the inflammatory tissue.

The Third Stage.—After the removal of the uterus the search for the ureters began. The position of the bladder was made clear by passing a pair of curved lithotomy forceps through the urethra and opening the blades. It was necessary to separate the anterior vaginal wall still further down in order to expose the posterior part of the trigone sufficiently. The left ureter

was then felt for in the firm fatty areolar and fibrotic tissue on the left side of the bladder. It was eventually located by feeling it between the fingers, one finger being inside the peritoneum. The tissue overlying it was taken up by two pairs of French vulsella and divided between them until at last the white ureter was exposed. It was hooked up on an aneurysm needle, traced downwards to the bladder, and isolated for about 2½ in. Then it was surrounded by a loop of thick silk and left, whilst the search for the right ureter was prosecuted.

This proved futile. No trace of the second ureter could be found by any of the aids that had been found useful on the other side, and attempts at dissection in the mass of fibrous tissue soon made it evident that it would only be found if it was cut into. As a last resource, it was determined to open the bladder through the trigone, look for the orifice, and pass a catheter as a guide.

Before doing this that portion of the bladder through which the left ureter passed was cut out. Fortunately this was safely accomplished and the orifice surrounded by a good margin of mucous membrane preserved. A sterilized No. 2 black French catheter was passed into the ureter for 3 in. and tied in. The catheter and ureter were wrapped in gauze and held to one side.

The hole thus made in the bladder was enlarged transversely until it was sufficiently large to permit of a good view of a portion of its interior; but no ureteral opening could be seen, and with one finger in the bladder and another outside nothing could be felt that could possibly be imagined to be a ureter.

The search for it was now, perforce, abandoned, with the consoling reflection that it would be possible to deal with the excretion from the right kidney at a later period by nephrectomy.

The peritoneum was closed by uniting the serous covering of the posterior wall of the bladder to the upper edge of the opening in Douglas's pouch. The vaginal opening was sewn up, and a second row of Lembert sutures effectually closed it.

The opening in the base of the bladder was too ragged and too deeply situated to enable its closure to be attempted with any prospect of success, so it was left.

The left ureter was now implanted into the front of the rectum on its left side. Through a small longitudinal incision ½ in. long a pair of artery forceps was passed from within, was made to lay hold of the catheter and draw the end of the ureter into the rectum until a full inch lay within the bowel. A couple of sutures closed the opening round the ureter, and the portion of the ureter just outside the rectum was embedded between two folds of the bowel coats, which were drawn over it by three or four sutures. Some of these took a hold of the wall of the ureter to make sure that it would not slip out of the rectum. When the gut was replaced in its position, the ureter could be just seen entering it about 4 in. from the anus. At this stage the altered position of the bowel seemed to offer a better prospect of finding the right ureter, and a considerable layer of fibrous tissue alongside the pelvic wall suggested its possible position. The search, however, again proved fruitless, and it was at last realized that the sloughing of the pelvic tissues, which had resulted in the bladder becoming adherent to the right pubic ramus, had dragged the ureter very much out of position, and that, if found at all, its safe separation with its orifice intact would be a practical impossibility.

The large wound was, therefore, cleansed and closed. Its mid-part, above the seat of the implantation, was drawn together by continuous deep catgut suturing. The space above, just below the sacral section, was drained by gauze packing, and the space below by a smaller gauze pack, and a tube passed down on the left side of the bowel to the opening in the floor of the bladder. The skin incision was closed, except around the drains.

The bladder was also drained by a strand of gauze passed through the urethra, and another gauze drain was placed in the vagina.

The patient was under the anaesthetic for three hours, and was transfused towards the close of the operation. She suffered severely from shock afterwards.

The subsequent progress of the case was satisfactory. The chief fear lay in the danger of the wound becoming contaminated from the interior of the bladder, but this was prevented by the care with which the Sister of the ward changed all the packing and the gauze drains every four hours, and the wound never gave the least cause for anxiety. The catheter came away on March 21st, and afterwards urine escaped from the rectum as well as from the vagina. By March 24th the rectum would retain the urine for an hour at a time.

By the end of April the patient had sufficient power of control that as much as 30 oz. of urine were collected in twenty-four hours, but this did not represent the whole of that passed by the rectum, for some escaped during sleep. Dr. Gruener's examination of this led to the belief that the functional capacity of the left kidney was good.

On May 8th the patient was sent to the Ida Convalescent Hospital for a month to recuperate, and returned for the second operation on June 9th.

Second Operation.

Dr. Gruener having confirmed his previous investigation as to the functional adequacy of the left kidney, the right kidney, which was quite healthy, was removed on June 25th. During the operation a bougie was passed along the right ureter to the bladder, and could be felt by an assistant with a finger passed through the enlarged urethral aperture to lie against the bone at the side of the pelvis, and to be incapable of being moved

about by his finger. It did not seem to enter the bladder, but when pushed on it was felt to bend.

From the time of this operation the patient's vulval dressing remained quite dry, and no more urine escaped from the vagina. But for some time the rectal control seemed inefficient, probably owing to the neurasthenic state which succeeded the operation. However, she gradually recovered from this condition, and for some time before going to the Ida, on July 23rd, she had been able to keep herself quite dry and to retain urine for one and a half to two hours.

She went home to Ireland on August 19th, and at that time could retain the urine for three and sometimes four hours. There was still a small sinus connected with the nephrectomy wound and another small sinus just below the line of the sacral section. There was hardly any secretion from either. The notes state that she remarked on more than one occasion that "the result of the operations is worth all her pain and trouble several times over."

Subsequent History.

She has reported her satisfactory condition on several occasions. The last time was on March 30th, 1910—just before this was written. She stated that she had never lain a day in bed since she left Leeds, and that she does her work about a farm, her house work, and the washing.

She can retain her urine about three hours, has no need to wear anything, and walks about like anyone else.

She only wets her bed when she happens to sleep unusually soundly. Both sinuses have healed, and her friends say she looks as if there is nothing the matter with her.

It must be evident that the patient owes a very great deal to the experienced skill of the anaesthetist, Dr. Douglas Seaton, as well as to the zealous care of the Sister of the ward, and to them, as well as to Mr. J. A. Coupland and Mr. L. R. Braithwaite, who at various times gave me valuable assistance, I desire to acknowledge my own obligation.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, February 12th, 1910, p. 362.

A CASE OF INTRACRANIAL TUMOUR RELIEVED BY A DECOMPRESSION OPERATION.

By ROBERT KENNEDY, M.A., D.Sc., M.D. GLASG.

THE majority of patients in whom it is found necessary to perform a palliative operation for relief of cerebral compression due to lesions which cannot be radically dealt with, return to their homes after the operation has been recovered from, and therefore it is that few opportunities occur in such cases of obtaining autopsies. It is, perhaps, therefore desirable to publish this case, for the patient, after going home, returned to the hospital to die, and an autopsy was fortunately secured.

The patient who suffered from this growth was a fisherman, aged 26 years. His troubles commenced in December, 1908, with headache and giddiness and some vomiting. In March, 1909, vision in his left eye began to fail, and soon the right eye was equally affected. By the middle of May he was quite blind

Fig. 1.—Hernia of intracranial contents through aperture made in skull to relieve compression due to inoperable growth.

in both eyes. For his defects of vision he became a patient of the late Dr. Meighan, who, upon diagnosing intracranial mischief, sent him to me.

When he came under my care in the Western Infirmary on August 11th he was suffering from three distinct general indications of cerebral compression. First, he was found to be completely blind, and both discs showed advanced optic atrophy. The pupils were both widely dilated and did not react to light. Ocular movements were not affected. Secondly, he suffered from severe pain in the head, which was of a very constant nature and prevented

him from sleeping, and was worst over the vertex. Thirdly, he suffered from attacks of vomiting, although this sign was not so constant as it had been. He also answered questions slowly and showed other signs of intellectual torpor. Beyond

these indications there were no other signs, and therefore localization of the growth was out of the question. The reflexes were present, with the exception of the pupillary reflex already referred to, and were somewhat exaggerated. There was no staggering gait nor history of such, the patient being able to walk about without any difficulty, except that due to his blindness. With the exception of the blindness and a diminution of hearing in the left ear, there were no evidences of cranial nerve affections; also there were no indications in the trunk or limbs of an irritative or destructive central lesion. Urine was normal. Temperature was normal and the pulse was slow. In his past history there was no indication of syphilis.

Operation.

Localization of the tumour being impossible, it was useless to operate with a view to radical treatment. Also, on account of the advanced optic atrophy, it was hopeless to expect recovery of sight by means of relieving intracranial tension. His headache, however, was so severe as to be almost insufferable, and his vomiting was at times very troublesome. To relieve these two distressing symptoms it was decided as palliative treatment to perform a decompression operation. With this in view, on August 25th, 1909, a piece of bone was removed from the right parietal bone close to the lambdoid suture. When the dura was slit the brain bulged forcibly, and showed no pulsation, but the veins were turgid. The soft parts were sutured over the bulging brain.

As the result of this operation headache and vomiting disappeared at once, and do not appear to have troubled him again. He left hospital on October 6th, and on November 17th he writes: "I came home feeling pretty well, but since I came home a large lump has formed on the crown of my head, and I had to call in the services of the local dispensary doctor, who probed the lump and found that it contained only water, which is now flowing out of it for a fortnight past without any diminution of the lump." It would appear that this swelling had been tapped, but in any case the puncture appears to have healed, and on account of the increasing size of the lump, which had now assumed the proportions of a newly born child's head, he was sent back to the infirmary, where the lump burst, and he died of meningitis.

Necropsy.

At the post-mortem examination by Professor Muir, to whom I am indebted for this report, it was found that "to the left side of the pons there is an irregularly rounded tumour measuring about $1\frac{1}{2}$ in. from before backwards and from side to side, and about 1 in. in thickness. The tumour is adherent to the anterior margin of the cerebellum, and has apparently grown from the membrane. The pons has been pushed to the right side, and has been distinctly compressed by the growth. The growth is composed of a comparatively firm tissue which is very vascular in places, and there are yellowish areas which indicate degeneration, and probably previous haemorrhage. The tumour is a fibro-glioma. In some parts there is a dense fibrillated structure, but even here the glial character of the cells can be distinguished. In the looser part there is a delicate reticulum with large glial cells which show numerous branching processes. In places there are numerous wide and thin-walled vessels, some of which show thrombosis, and there is a good deal of haemorrhage around."

The growth was situated under the tentorium, and was in such a position that its effect on the blood stream through the veins of Galen must have been pronounced, and this would account for the enormous intracranial pressure developed. The brain showed very considerable distension of the ventricles. It is not the mere volume of the growth which has given rise to the intracranial pressure but merely its effects on the circulation. I have seen enormous increase of intracranial pressure which caused forcible extrusion of a portion of the cortex through an aperture in the skull, and which on tapping the ventricles and drawing off the fluid, immediately subsided, and permitted free displacement of the brain within the cranium for purposes of exploration.

Coursing over the tumour in this case appear trunks of the glosso-pharyngeal, vagus, auditory, facial, and trigeminal nerves, and yet none of these, with the possible exception of the auditory, showed previous to the operation any sign of being interfered with. Likewise, there was lateral compression of the left lateral hemisphere of the cerebellum of the left middle peduncle of the cerebellum and of the pons, and certainly, at least until near the end, when I had no opportunity of examining his condition, these displacements were not evidenced by any sign.

The site of the cranial opening was carefully chosen. A cranial opening as a decompressive procedure would serve to relieve pressure no matter in what part of the skull it was made. It is necessary, however, to bear in mind that when an opening in the bone and dura is made when there is great pressure, the cerebral substance is usually forced through, and the function of the cortex is therefore apt to be destroyed or damaged. It is no use leaving the dura intact, as this would make the operation quite useless. The bulging of the brain through the aperture, which ought to be of a large size, has the result of causing effects of a more or less serious nature according to the situa-