CONTINUOUS RECTAL ALIMENTATION; AN ARTIFICIAL STOMACH.

By DUNCAN J. MACKENZIE, M.D., Glossop, near Manchester.

THE labours of Sir William Roberts, of Manchester, and others, in the field of artificial alimentation, have undoubtedly made the prospect of supporting life by rectal feeding more bright. There is, however, this difficulty in intermittent administration, that an enema, however small, is apt to cause a desire for defæcation.

It has occurred to me that we may imitate the process of nature more closely by the gradual passage of a fluid from an artificial cavity, in which its digestion takes place, into the rectum for absorption. In this way, supply keeps pace with absorption, and the bowel is not loaded.

The way in which I proceed is as follows. A piece of celluloid catheter (No. 5) is passed into the anus for about two inches; if passed too far, there is a risk of its being closed by the folds of gut. When once introduced, the sphincter closes upon it, and its presence is hardly felt by the patient; and the celluloid, rigid when introduced, becomes rather softer from the heat of the body. Previously to introduction, this piece of catheter is passed through a thick piece of India-rubber, perforated so as to grasp the catheter tightly. To the four corners of the India-rubber are attached tapes, which are tied, two in front and two behind, to a band round the

loins. The India-rubber is passed close up to the anus, and the tapes are tied as tight as convenient. Over the outer end of the catheter is passed one end of a piece of fine India-rubber tubing, such as is used for babies' feeding-bottles. The piece of tubing should be about two yards long, and its other end slipped over a metal tube let in close to the bottom of a moderately tall narrow vessel, made of tin or other material, and capable of holding a pint of fluid. To increase steadiness, the bottom is leaded on the outside. The only other apparatus required, are a milk-strainer to fit the mouth of the vessel, a table about the same height as the bed on which the patient lies, a few small boxes, or some suitable support by which the elevation can be varied, and an ordinary tea-cosy.

A pint of milk is warmed to a temperature suitable for pancreatic digestion; a little bicarbonate of soda, and a proper quantity of some preparation of pancreas, two teaspoonfuls in the case of Mr. Bengers' liquor pancreaticus, are added, and it is allowed to stand in a moderately warm place for half an hour. It is then passed through the strainer into the vessel mentioned above. I find that, after standing half an hour, the milk leaves little or no curd upon the strainer, and, when strained, readily passes through the tubes. If the curdling of the milk, by the pancreatic extract, give trouble, it may be prevented by previously adding one-fourth of its bulk of water to the milk (Roberts).

The milk, having been put into the vessel, which acts as the artificial stomach, it is raised from 2 to 2½ feet above the level of the

patient's bed, the height being altered according to the rapidity with which the milk runs through the tube. The vessel is then covered with the cosy to keep it warm, and, if necessary, a heated plate may be put under it at intervals. The pint of milk should run into the rectum in about three hours, which time fairly corresponds to the average digestion-period of pancreatised milk. If a desire for defæcation be felt, the flow should be made slower, or the apparatus entirely removed for a time.

When the milk has all run out, the apparatus is removed, some clean water passed through the tubes, and the patient allowed to rest for a time before re-introduction.

In this way, a patient of mine, suffering from cancer of the stomach, in whom the colon was obstructed at the junction of the transverse with the descending portions, received an average of three pints of milk per day for a month, with an average daily evacuation of about a pint, consisting chiefly of curd; his nutrition was fairly kept up until vomiting of blood, mucus, and faecal matter became excessive; and, after death, the whole descending colon was found well nourished and containing condensed milk. His evacuations generally took place from two to eight or nine hours after milk had been administered, care being taken not to give any when the rectum felt irritable.

The necessary apparatus may be made by any local tradesman, or it may be obtained from Messrs. W. Wood and Sons, 74, King Street, Manchester.

ON REMOVAL OF TUMOURS OF THE BLADDER; WITH FOUR CASES.

Read before the Bath and Bristol Branch.

By J. GREIG SMITH, M.A., M.B., F.R.S.E.,
Surgeon to the Bristol Royal Infirmary.

THE following remarks are intended to embody the fruits of experience and study, rather than to be a record of cases. As briefly as I can, I will make a plain statement of what, in my belief, are the best modes of removing growths from the bladder.

In females, I believe that the operation is best carried out by incision of the meatus and outer two-thirds of the urethra, and dilatation of the inner third and the neck of the bladder. Dilatation of the urethra I do not regard with favour. I have, on three occasions, dilated the female urethra for purposes other than the removal of tumours; and, though I have found it quite possible to explore the whole of the vesical cavity, I have been conscious that delicate operative proceedings could not be carried out with thoroughness and precision. In a female urethra, the forefinger is so confined and constricted that at least two-thirds of its working capacity is done away with; free manipulation is possible only at the expense of serious traumatic injury to the urethral tissues. One effect of this is seen in the not unfrequent incontinence of urine which is produced, and which may give the patient trouble for weeks, or even for a life-time.

The plan which I recommend is, to lay open the outer two-thirds of the urethra by one stroke of scissors, and to carry out the intravesical operation through the dilated outer third of the urethra and the neck of the bladder. After the operation, the urethral wound is accurately closed by three or four sutures; it will heal by first intention, and no incontinence will be left. Dilatation of the neck of the bladder is extremely easy; while the orifice of the urethra offers considerable resistance. The finger, freed from the coarctation of the urethra, can reach the whole bladder-surface with the greatest ease. Between the finger inside and the hand over the pubes, the anterior vesical wall can be palpated; while, if the middle finger be placed in the vagina, with the forefinger in the bladder, the posterior walls and the fundus may be explored with like precision.

In my first case, operated upon now several years ago, I followed the ordinary mode of dilatation of the urethra, removing a papillomatous growth; and, though there has never been actual incontinence, the patient has not recovered perfect control of the bladder.

In my second case, I incised the outer urethra; and, though Thompson's large bladder-forceps was several times introduced alongside of my finger, the patient had, from the time of the operation, complete control of the bladder. She was dying of hæmorrhage from a growth, which proved to be epithelioma. Removal of the growth, with the portion of bladder-wall in which it lay, was contemplated; but this was found impracticable, on account of the involvement of the ureters. I removed the bulk of the tumour, down to the level of the mucous membrane; and, from the time of the operation to the day of her death, nine months later, there was no hæmaturia. Her strength and

comfort were greatly improved by operation; from being bedridden, she was able to get about almost to the last.

In my third case, I performed the combined operation of incision and dilatation. With my finger-nail specially trimmed, I scraped papillomatous growths from the fundus of the bladder, removed the growths by suction through a Bigelow's large evacuator, and sutured the urethral wound. No catheter was used; the patient was told to pass urine when she desired. This she did six hours after operation, then again eight hours later. Next day, I washed out the bladder, to make sure that no blood-clot had been left behind to undergo decomposition. From this time she was well, and no further interference was necessary beyond the removal of the stitches on the fourth day. At the end of a week, she was up and walking out of doors. Since the time of operation, now ten months ago, the patient has not lost a drop of blood, and the bladder-functions have continued perfectly normal. She has rapidly regained the strength lost during a period of five years' almost constant loss of blood. Her case had been diagnosed as gouty kidney, and she had undergone varied treatment for this disease at several spas.

For the removal of tumours from the male bladder, the suprapubic operation is, in my opinion, by far the best. I have, on several occasions, had to perform the perineal operation for exploration or the removal of a foreign body, and I have four times performed suprapubic cystotomy: three times for calculus, and once for tumour. This experience has convinced me that, in the matters of affording greater facility in diagnosis, more freedom in operating, and fuller potentiality of extending the operation to removal of portions of the bladder, the suprapubic is by far the superior surgical method.

The bladder is first washed out, by means of an irrigator, with warm boracic or boro-glyceride solution; and the catheter, a rubber one, is left *in situ*, with the long rubber tube and irrigator attached. The irrigator is placed on a table, at the level of the patient's bladder. The rectum is now dilated by a rubber bag, in the manner recommended by Petersen and Sir Henry Thompson. It is better to dilate with water than with air, because water can be measured. The suprapubic incisions are now made. Scalpel and catch-forceps are all the instruments necessary. The lower end of the incision ought to be carried at least half an inch over the symphysis; this gives additional room where it is most wanted, just above the bone. If the recti muscles be tense and thick, a little portion of their insertion into the pubic bones may be divided to give more space. The edges of the wound are kept apart by suitable retractors, held by an assistant. The finger of the surgeon is now placed on the bladder over the pubes, and an assistant raises the receptacle of the irrigator two or more feet above the level of the patient. The bladder dilates, and, as it dilates, the surgeon may feel the folded peritoneum gliding upwards, and may estimate the amount of tension put upon the bladder-walls. When the dilatation seems sufficient, the receptacle is again placed on a table at the level of the bladder, and left there. This simple plan does away with the necessity of tying the penis, is perfectly efficient, and occupies only a few seconds. I think it is better to make the preliminary incisions before the bladder is distended, as then there is a gap of cellular tissue between the parietes and the vesical wall, and there is less risk of wounding the peritoneum. After the bladder is distended, the cellular tissue overlying it is teased aside; the peritoneum is pushed upwards, and any vessels are gently pushed out of the way.

For opening the bladder, I would recommend the use of a Lister's sinus-forceps. The closed points are first gently insinuated through the outer coat, then sharply plunged through the inner coats. The blades are separated, and, as they are separated, the bladder-wall is partly dilated, partly torn open, while, at the same time, it is pulled outwards into the wound. In the meantime, most of the lotion in the bladder will have escaped. When the opening is large enough to admit the finger, two tenaculum-forceps are placed on the lips of the wound, and held by the assistant while the finger is inserted. I have used fixation threads, introduced by a curved needle, but they are no better than forceps, and make openings of considerable size in the friable and distensible tissue. I am by no means certain that incision by a curved bistoury, first puncturing and then cutting outwards, would not, in respect of the advantages to be secured when the bladder wound is sutured, be the best mode of opening the bladder. Bleeding is a small objection, easily met by a catch-forceps and a ligature.

Of the removal of the growth, nothing need be said. Suitable instruments will be at hand, and will be selected as the conditions indicate. Sir Henry Thompson's bladder-forceps will be found invaluable in most cases.

If the growth be malignant, and if, from its proximity to the

ureters, or its connection with contiguous structures, it cannot be completely removed, all protuberant granulations which, sodden and macerated in the urine, are the chief source of bleeding, may be taken away. If the growth be well free of the ureters, and if it be confined to the bladder-tissues, an effort ought to be made to resect it. It will very rarely be the case that resection can be performed outside of the peritoneum. And if the tumour lie in a portion of the wall covered by peritoneum, it will rarely be advisable to peel it off that membrane, for the double reason that it might slough, and that it is likely to be infected with the growth. For resection of bladder-growths, I conceive that the most favourable conditions would be—a bladder kept dry by fine catheters placed in the ureters, and carried out through the penis; stuffing of the bladder cavity by dry sponges during the operation; prolongation of the incision upwards, with entrance into the peritoneal cavity; protection of the bowels by a large flat sponge; and suture of the bladder-wound on the principle of apposition of peritoneal surfaces. The operation has little more than passed beyond the stage of conception, and experience alone can show its feasibility.

In every case of epicystotomy, I would suture the wounds in the bladder and the parietes, draining away the urine by a catheter in the urethra. With the plan of separately suturing the bladder and the parietes, I am by no means satisfied. My experience in four cases has been that matters progress most favourably for two or three days; the wound seems healed, and there is no leakage from the drainage-tube placed over the pubes. But, on the third or fourth day, the catheter ceases to act, and urine flows from the wound in small quantity, causing a fistula which may not close for one, two, or even three weeks. The trouble thereby induced may be slight, but its existence is a surgical imperfection.

In my next case, I intend to adopt a plan which, at first sight, may seem to be objectionable. This is to include the bladder-wound in the parietal wound, and to fix both in one series of sutures. The advantages, as preventing urinary infiltration, and supporting the vesical wound by a solid mass of readily healing healthy tissue, are at once apparent; the only disadvantage is the fixation of the bladder too high up by cicatricial tissue. This disadvantage is, in my belief, insignificant. Times out of number the bladder has shown its capacity of acting normally in most abnormal situations; and even if it did not, we may fairly reason that, when the sutures are removed at the end of a week, the adhesive material then developed will stretch, and permit the bladder to fall back into its normal situation.

The only case of bladder-tumour in the male, with which I have had to deal, was a malignant one in the region of the ureters. The patient was in the last stage of exhaustion from anæmia, and the suturing of the bladder could not be satisfactorily performed, on account of his condition on the operating table. The bladder was distended almost to the umbilicus with blood-clot, which could not be removed by syringing through the urethra, and this had to be removed in handfuls, through the bladder-wound, before the tumour was discovered. The granulating surface was removed, and all bleeding at once stopped. Clear urine came away through the catheter in abundance, and the wound seemed to be healed, when a fistula formed, through which urine dribbled. Tenesmus and pain, from which the patient suffered severely before operation, disappeared, but the patient did not gain ground, and he died within the fortnight. His case, however, showed that, even in the most desperate circumstances, the operation offered a very fair chance of recovery.

To recapitulate. For the removal of tumours from the female bladder, the best mode of procedure is by division of the outer urethra, and dilatation of the inner urethra and neck of the bladder. The urethral wound is sutured, and no catheter is left in the bladder.

For the removal of growths from the male bladder, suprapubic cystotomy is the best operation. The proceeding is facilitated by dilating the rectum and the bladder. A rubber bag in the rectum is distended with water by means of a Higginson's syringe; the bladder is dilated after the parietal incisions have been made, and, while the surgeon's finger rests upon it, by the elevation of a receptacle attached by a long rubber tube to a soft catheter in the bladder. Distension is maintained by placing the irrigating receptacle on the same level as the bladder, and it is unnecessary to ligature the penis. Accurate closure of the wounds in the bladder and the parietes is recommended.

For resection of portions of the bladder-wall in the male or the female, abdominal section combined with epicystotomy will, in most cases, offer the best chance of success.

THE annual report of the Gloucester General Infirmary shows a balance due to the Treasurer of £1,637. 10s. 6d.