The after-treatment of cases of suprapubic cystotomy / by G.H. Colt.

RESIDENT STAFF,

ST BARTHOLOMEW'S HOSPITAL,

E.C.

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THE AFTER-TREATMENT OF CASES OF SUPRAPUBIC CYSTOTOMY.

BY G. H. COLT, M.A., M.B.,
Late House Surgeon, St. Bartholomew's Hospital.

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THE AFTER-TREATMENT OF CASES OF SUPRAPUBIC CYSTOTOMY.[1]

By G. H. COLT, M.A., M.B.,

Late House Surgeon, St. Bartholomew's Hospital.

Mr. President and Gentlemen,

The after-treatment of cases of suprapubic cystotomy is a difficult subject and varies, to some extent, with the purpose for which the operation has been performed. At the outset there are two main classes of cases to consider, the first in which the bladder is opened for the purpose of diagnosis or for the removal of disease, and the second in which it is opened for purposes of drainage either as a curative or as a palliative measure. In the first class the object of the after-treatment is primarily to secure the closure of the wound as speedily as is consistent with safety, while in the second class this is not always the case. In this class there may be included cases of persistent cystitis in which the cause is not clear, inoperable cases of carcinoma and cases of tuberculous disease of the urogenital tract, of the bladder and prostate in particular. In the latter cases we know from experience that the edges of the suprapubic fistula sometimes themselves become tuberculous and take many months to unite. The treatment of cases in the second class is best considered as a part of the subject of cystitis and will not be mentioned here except to show how the uncomfortable state of the patient may be further alleviated. In cases in which strangury is frequent, the relief afforded by a permanent urinary fistula is very great indeed.

It is evident that the question of after-treatment really begins at the commencement of the operation with the maintenance of asepsis within the operation area so far as this is possible. If this is done the edges of the skin will, where brought together, have a good chance of healing by first intention and cystitis will be avoided, thereby shortening the

[1] A paper read before the Abernethian Society at St. Bartholomew's Hospital.

period of convalescence. The next point is the method by which the bladder shall be opened, a point which must be dealt with at some length as it bears materially on the after-treatment. An account has been published[1] of a method of opening the bladder in which the incision into it is made, not directly opposite the incision in the abdominal wall, but an inch or more, as retraction and the nature of the operation allow, towards the vesical orifice of the urethra either by an antero-posterior or a lateral route. In nearly all these operations the concluding stage consists in sewing the edges of the bladder above, below, and laterally to the anterior abdominal wall with sutures of catgut which do not pass through the skin. A drainage-tube, the diameter of which is, to some extent, determined by the amount of the hæmorrhage and the quality of the urine, is inserted and the skin incision is closed around it. The best results, as regards the healing of the wound, are obtained when the tube is placed in its lower angle. The tube is fixed to the skin by a suture of silkworm gut, because this facilitates the manipulations later. The suture should only traverse the rubber and should not cross the lumen of the tube. If it crosses the lumen of the tube blood clot lodges against it, access to the bladder is hindered, and air can enter by the stitch holes and prevent siphonage. If the incisions have been made opposite each other there is no sliding of one hole over the other when the drainage-tube is removed; but if they are not opposite each other the tube, if radially situated, actually maintains a state of shearing stress between the holes in the skin and the bladder respectively as it passes from the outside to the centre of the viscus, and when it is removed these holes will slide the one over the other and so help to close the suprapubic exit. The observation which led to this conjecture, and at present it is little else, was this:—A patient had been operated on by Mr. D'Arcy Power for vesical calculus. As the wound was being dressed the patient, whose consciousness was returning, coughed and strained considerably, and it was easy to see that the external part of the drainage-tube was forcibly tilted nearly parallel to the skin and pointing towards the patient's head. I propped the tube back and maintained it in this position with dressings

and bandages until it was removed on the third day. When it was removed no change was immediately visible, but the next day the upper and deeper layers of the wound, namely the wall of the bladder, had slid downwards under the hole in the skin and nearly closed the fistula. This fistula and wound were completely healed in eleven days from the operation and this is an early date in such a case.

The same effect, as regards the method, is of course produced by arranging the position of the hole when suturing the skin so that it is not directly opposite the hole in the bladder. In either case the tube is responsible for keeping the two holes concentric. There is probably more in this principle than meets the eye at first. Although it would be foolish to recommend it on the strength of only one case, yet it would be worth while to give it a fair trial, since no great harm can follow. A glass drainage tube would probably be more efficient than a rubber one, but the force that need be applied is very small. Inasmuch as it is easier to keep the tube straight by bandages from the pelvis than by bandages from the abdomen, the hole in the skin should be higher up than that in the bladder. The tube should also be as low down in the wound in the skin as can be arranged, and if it is actually in the lowermost angle of this wound so much the better, as the skin incision is then less likely to be flooded by urine. Then should the first incision be in the middle line, or should it, as I think advisable, traverse by lateral displacement some of the fibres of the rectus abdominis? When the patient is thin it is often possible to manage this. Again, C. L. Gibson[2] in 1901, published an account of a method of suturing the wound in the bladder around the tube and inverting the walls of the viscus in such a manner that leakage is prevented while the tube is retained, and when it is removed the mucous membrane comes together as a valve across the hole and this leads to its closing speedily. Unfortunately there is, at present, no further account of the results. It is possible that a combination of these methods would be of value and would result in a speedy yet safe closing of the wound when the drainage-tube is removed, thus saving the patient from a very uncomfortable and wearisome period of convalescence.

In cases in which the urine is not septic and in which hæmorrhage is slight, in fact in those cases in which it is considered safe to close the bladder, it is an obvious advantage to do so ; but it may be doubted whether it is ever justifiable to close the wound in the skin in such cases on account of the danger of extravasation of urine should the bladder leak. The incision in the skin is usually partly closed, a drainage-tube left in the space between the pubic rami and the bladder and a catheter tied in and arranged for continuous drainage. As Keyes[4] remarks, it is unfortunate that one is not dealing with a peritoneal surface ; were this the case the results, as regards the absence of leakage, would probably be better. I believe that some surgeons perform a second operation about the sixth day to close the fistula, but I only speak from second-hand information.

The details of the drainage-tube need not be considered at length. It is almost always either a single or a double rubber tube with no lateral holes save in the part inside the bladder. Tubes made for the purpose, with all the edges and corners rounded off and with a permanent curve in them for purposes of siphonage, are probably the best. The choice depends partly on whether an aspiration pump is to be used later on or not. The edges of the wound should fit closely round the tube so as to prevent the entry of air as far as possible.

The wound is dressed and the patient is returned to bed. At this stage surgeons adopt various lines of treatment which differ considerably. While some continue to wash out the bladder twice a day for some weeks, others only do so as long as blood, blood clot and débris appear on the dressings. It seems reasonable to remove all débris as far as possible by this mechanical cleansing, and if cystitis is present the proceeding will also be of value. When the main collection of blood clot and débris has disappeared the tube is connected by a glass union—clear glass is employed in order that the interior of the tube may be seen—to a long rubber tube, which is led to a receptacle beneath the bed. This vessel is generally a transparent glass pail and contains a measured quantity of lotion, beneath the surface of which the tube opens and into which the urine flows. If a two-way tube is used one end is

cut short and the other is left long, though why this is done is not clear. The longer tube is connected with the pail. Some surgeons leave both ends long and connect both with the receptacle. In each case the aim is to establish a siphonage action whereby the urine shall flow over by the tube and shall not leak around it. It is obvious that the slightest leakage of air into the bladder and so into the siphonage system annuls the action completely, unless the bladder remains full of urine or unless the air at the top is at a higher level than the vesical openings of the drainage-tube. These are conditions which are seldom maintained for long, but the arrangement is worth trying because occasionally it works admirably. It has been pointed out to me that siphonage proceeds better if the fall is slight, say two or three inches, and the reason is plain, namely, that this amount of suction is insufficient to draw air past the damp dressings into the bladder and therefore the siphon remains full, a very important matter from the patient's point of view. On the fourth day the edges of the wound no longer fit closely round the tube and air leaks in. The wounds themselves vary, however, and sometimes the growth of granulation tissue which in the one case tends to loosen a previously tightly fitting tube, in the other case actually causes a loosely fitting one to fit better and thereby facilitates the siphonage action. This is, I think, the explanation of the vagaries of the arrangement which are many and various, so that the use of some form of aspiration pump has been found advisable. It is quite impossible to deal with this question at all fully here. There is no connected account, so far as I know, of the best way to employ the aspirator or of the results of its use ; but while some report that the patient's skin is thereby prevented from becoming wet, others say that continuous aspiration is of little use. In this, as in all other matters connected with the surgery of the bladder, attention to detail is essential. Elsworth[3] has stated that "the labour of nursing and the discomfort of the patient were much relieved by the use of Sprengel's pump, which reduced the necessity of changing the bed to one-twelfth of what it had previously been." E. L Keyes[5] says "with the double siphon of Guyon, as well as with the self-retaining catheter of Pezzer, it has been impossible

to prevent a great deal of overflow alongside the tube." I understand that at St. Peter's Hospital for Stone they now let all cases drain into the dressings.

As to the length of time the tube is retained. There seems to be a pretty general opinion among the sisters at the various hospitals—and they have opportunities of noticing these matters year in and year out—that the longer the tube is retained the longer does the fistula take to heal. That the tube should be retained for from three to five days until the fistula is established, the bladder fairly clear of débris and the danger of extravasation of urine slight, seems to be admitted by all. If the siphonage system is working well and the edges of the skin incision are not wetted by urine, let the tube, provided it is not relatively too large, be retained for as long a time as it is efficient up to say nine days, so as to give the edges of the wound every chance to heal where they have been sewn together. When the tube is loose it is not worth while to retain it, for the patient is often more inconvenienced than benefited by the careful dressing which may be necessary to enable the siphonage to continue. Personally I quite fail to see any reason for replacing the tube by a smaller and looser one and decreasing the size regularly, as is done sometimes, until it is omitted entirely, except perhaps when an aspirator pump is being used. This will perform its purpose through a very small, single tube with a rosette of holes at its distal end. Such a tube can follow immediately after the one inserted at the operation and will not at first interfere with healing. It should be changed daily if salts are deposited on it. With the aspirator in use the entry of air into the bladder is necessary. If an aspirator pump is not to be used let the drainage-tube at this stage be removed for good, as soon as the fistula is established, provided the siphonage fails. That is to say, let it be removed on the fourth day. If it is retained it gets in the way of the dressings, and drainage occurs just as readily without it as with it. Some will suggest that aspiration is necessary to keep the bladder empty and at rest, but one does not observe the occurrence of vesical tenesmus so long as the fistula is patent. Seal up the fistula and the patient soon begins to strain. Would not aspiration *per urethram*, as suggested eleven years

ago by Cathcart[6] when describing his apparatus, be a convenient solution of many of these difficulties?

About the fourth day the bladder is clear and washing out is usually unnecessary unless there is a special reason for it. It is readily performed through the two-way tube. Perhaps the best cleansing the bladder can have is that performed by the urine itself and the internal administration of urinary antiseptics may be of value. Some of these drugs cause intestinal disturbance; for instance, magnesium boro-citrate, in large doses, acts as a saline purge. Urotropin, too, if given in concentrated form, has been followed by hæmaturia. All are best given with a relatively large quantity of water so as to promote diuresis. The dressings have to be frequently changed and should, therefore, be the cheapest that can be obtained. One small piece of plain gauze, a slab of wood wool arranged chiefly at the sides, a piece of absorbent cotton wool in each groin with two strands of bandage are ample. Since Domette bandage washes well it is cheaper than one would expect. Double cyanide gauze often causes pustules on the skin around the fistula, probably because the salt is dissolved and the solution remains continually in contact with the skin. Unmedicated gauze is therefore better. Dried moss compressed into sheets is about one-third the bulk of absorbent wool; but weight for weight the former has no advantage over the latter, although it is said to leak less readily when fully saturated. To cover these patients with a large heap of dressings in the hope of absorbing all the urine is futile because it simply flows round between the skin and the dressing without soaking through the latter. For this reason the use of a sheet of grease-paper, or other kind of waterproof, between the dressing and the bandage is not of great value, although it prevents part of the bandage from getting wet. In the hot weather these patients are often very uncomfortable, and they also seem to feel the cold more than the average patient. Starch or boracic powder rubbed into the skin to keep it dry and prevent pustules is found to be saturated almost directly. Pustules are best treated by removing the cause, which is usually either an antiseptic or irritating urine, and covering the skin well with an ointment which has a relatively high melting point. The

proper treatment is preventive and depends on the exercise of care in shaving the skin, the non-abuse of antiseptics and the treatment of the urine so as to dilute it and alter its character. Hæmorrhage is treated by general methods. Irrigation with a solution of adrenalin 1–40,000, or of the tincture of hammamelis, a drachm to a pint, is useful. Serious hæmorrhage from the bladder in these cases can always be stopped by packing the cavity with gauze.

If the granulations become exuberant they are cauterised with fused silver nitrate. It is not advisable to use the ordinary crayon-holder for the caustic. It is seldom possible to fix the caustic firmly in this without soiling the hands, the after-effects of which are extremely inconvenient and unsightly, and there is some danger of the caustic falling out and even into the bladder. One of the best things to use is an ordinary silver probe, the rounded end of which has been dipped into fused silver nitrate which is on the point of solidifying. Such a probe I have here. The caustic adheres and forms a cylinder with a rounded end, and the whole is infinitely more manageable and safer than the crayon-holder, besides being cheaper, more simple, and a great saving of caustic. The caustic probe, which was I believe originally devised by Barnes for uterine work, can be made of any desired thickness or shape and the caustic is readily renewed by re-dipping. In the case of a small fistula one can safely touch the granulation tissue inside it, and I think it will be found that this often leads to speedy healing. If due care is taken not to injure the growing edge of the epithelium, namely by first drying the granulations, a small fistula which, had it been left alone would perhaps have taken ten days to close, will be healed over in forty-eight hours after this proceeding. This point, however, like the therapeutic action of a drug, is not capable of absolute proof. Gentle cauterisation is astringent and promotes healing, for one sees pale, flabby granulations shrink and become red when thus treated. *Apparent* closing of the fistula sometimes occurs when a small slough, or other piece of débris, becomes lodged in and occludes it. The patient passes urine *per urethram*. When the blockage softens, the fistula becomes patent once more. The statement that urine was passed

naturally many days, perhaps, before it was all passed per urethram is often deceptive, and tends to lead anyone who has not observed these matters to the conclusion that the patient's skin was not again wetted by urine from the fistula until the latter was healed permanently.

The skin sutures are generally loose on the sixth day and may be removed except, perhaps, one or two near the fistula or as experience will suggest at the time. They are of course retained for as long a time as they appear to be of use without causing pain. If severe sloughing occurs in the bladder they are all removed immediately. Many surgeons omit them altogether, and much depends on the nature of the case.

It is evident that there comes a day when, either by reason of the failure of siphonage, or by the removal of the tube, the patient is left with a wound that is healing and in some part of which there is a complete urinary fistula. Sometimes he has a catheter permanently in the bladder and urethra; but, if not, one is generally passed from time to time to insure that the natural opening is patent. If he has no catheter tied in, all his urine passes by the fistula. His dressings and bandages are continually soaked and require to be changed every three hours at least, the draw-sheet being changed at the same time. The urine flows round beneath the dressings to his back and down the scrotum. His skin is always wet from about the level of the third lumbar vertebra to a point four inches down the thigh. He has to be continually awakened for the dressings to be changed, though usually the wetness itself wakes him. His position in bed must be frequently altered to relieve any long-continued pressure on any bony prominence and he needs an air-cushion to lie on. Even if he has no cystitis his bed tends to smell offensively, but with the care that is bestowed on him by the sister and nurses in a good hospital or home this is reduced to a minimum. His dressings at hospital price cost about £1 5s. per week; only an approximate estimate is possible. If the patient has a catheter tied in, his soaking condition is mitigated somewhat; but it is not completely relieved. The external opening of the fistula is now closely strapped so that it may heal by third intention, but very often the strapping becomes loosened by

urine, and occasionally leakage occurs outside the catheter. The proceeding seldom hastens recovery as far as can be judged. The condition continues for a variable time. The usual time for the fistula to heal in a simple case is three weeks after the operation; some heal more quickly and some take six weeks or more. A week after the fistula is healed the scar is quite firm and sound. It is better to wait for this before allowing the patient to walk, for if he walks about too soon the fistula sometimes becomes patent again, and this is often accompanied by hæmorrhage.

It is obvious that there is need of some kind of dressing for the patient during the period which elapses between the removal of the tube and the closing of the urinary fistula. This time is at least one week; it is generally about three weeks and often longer still. One naturally hopes that improved technique in the operation may result in so shortening the average period of convalescence that the dressing may hardly ever be required. At present, however, the need of some such device is very great. The requirements are (1) a dressing which shall be applied on the surface of the skin, and which shall not enter the fistula at all—which shall not, therefore, tend to prevent it from closing or cause harm in any way; (2) a dressing which shall collect effectually all the urine flowing by the fistula, and allow it to drain away freely to a receptacle without wetting the patient's skin; (3) a dressing which shall in no way inconvenience the patient either by its bulk, or by causing irritation of the skin, or by its attachment to parts remote from the wound as might very reasonably be necessary; (4) a dressing which shall only need occasional inspection and attention, just so much as may be necessary at the same time for proper attention to the edges of the fistula, when, for instance, the granulations become exuberant; (5) a dressing which shall be transparent and so allow the wound to be easily seen; and last of all, (6) a dressing which shall be easy of application, simple, unlikely to go wrong, and which shall also be cheap, aseptic, and easily cleaned and sterilised. Such a dressing has been devised. I will not weary you with the preliminary trials and experiments which have been detailed elsewhere,[1] but will show you some samples of the devices. In my opinion anything in the nature of a truss

and "apparatus," for several reasons, is not likely to prove satisfactory for the purpose while the patient is lying in bed. The final device adopted is very simple and consists of a small, clear glass vessel of special construction. It can be applied around and over the fistula, and from it the urine is led away by a side tube. The glass is attached to the patient's skin in a water-tight manner by means of a disc of sheet rubber and an aseptic solution of pure rubber in naphtha, in much the same way as a puncture of the inner tube of a bicycle tyre is repaired. The correct strength of the rubber solution was found by trial. The disc has a central, circular hole smaller than the glass, and the two are joined together by springing the edge of the hole over the glass. The total weight is 3 drachms. Every detail of the size of the various parts of the dressing has been the subject of careful inquiry. The hole in the top of the glass is to prevent siphonage by allowing the entry of air. It was found that when there was no hole the siphonage action, however slight, sucked out the edges of the fistula and prevented healing. Three sizes are provided, the largest being oval. The oval form may be applied as soon as the urine is so free from débris that the exit tube will not become stopped up. It is large enough to cover any ordinary wound and has been proved to be satisfactory. A pendulous abdomen with a gaping wound interferes with the arrangement. I think it probable, from various trials, that the best way to manage in such cases will be to use an oval piece of the sheet rubber large enough to cover the wound and to have also a margin of an inch and a half all round, to punch in it a hole of the size required for the smallest glass, and then to apply the dressing when the abdominal wall is as flat as can be arranged. The central portion of the rubber is not covered with solution in this case. The sheet rubber adapts itself so admirably to the wrinkles of the skin that this method is better than increasing the size of the rigid part of the dressing. The glass will be found to remain suspended over the centre of the wound, level with the skin, and will not enter it. The objections are that the glass is apt to become crooked unless the rubber is very carefully adjusted to it, and that the manipulation of a large piece of sheet rubber, which has been moistened with rubber solution, requires

some practice and skill. Messrs. Down Bros., Ltd., now supply this extra piece of sheet rubber in the complete set of dressings which they send out; but, as in the case of nearly all new principles, time and experience alone will settle which is the best way to deal with any particular case. If those who use the device would record their experiences it would help towards the solution of the problem in a more simple and efficient manner than hitherto.

The essential conditions for the efficient application of the dressing are that the skin shall be free from hair, grease, and ulcers, that all the parts coated by the rubber solution shall be quite dry, and that the solution shall be allowed to become sufficiently "tacky" before the application is made. It is not necessary for the sutures to have been removed, provided the free ends are cut short. When carefully applied it is usually efficient for four days. It does not impede drainage in the slightest degree and it causes no harm whatever. At the end of four days, either by reason of epithelial desquamation, the growth of the hair, or the secretions from and movements of the skin, the dressing may become loose and allow leakage of urine. It is then removed and reapplied if necessary. So far the longest period for which the dressing has remained perfectly efficient without needing attention is twelve days. The skin showed no sign of irritation and no other ill-effect was noticeable. By this means, then, a patient, who before was wet and exceedingly uncomfortable, may be kept dry and comfortable. In some cases it will, I venture to think, make the difference between life and death, chiefly because he is enabled to sleep well. The infirm patient liable to bronchitis could be got up. The quantity of urine he is passing can now be accurately measured. This may lead to interesting results in the clinical history and in the pathology of the recovery of cases of hydronephrosis. The bladder can be washed out without disturbing the dressing, which by its presence greatly facilitates the proceeding, since the lotion which has been run in by the catheter flows off by the tube, and, if the head of water is not too great, there is no overflow through the hole in the glass. The lotion can be run in either through a catheter or through a tube introduced through the hole in

the top of the glass. During the lavage, instead of the patient being cold and drenched, the bedclothes and linen soaked and the floor covered with lotion and urine, he remains absolutely dry and warm, and it is not necessary to expose him so much as before or even to place a mackintosh under him. Continuous irrigation of the bladder is also easily arranged. This may prove of great value if severe sloughing occurs, and may prevent septicæmia. Perhaps it may help towards a rational treatment in cases of phosphatic deposition.

There are many other possibilities in the principle; for instance, the walls of a small fistula may be lightly cauterised, and it may then be sealed up by an application of a piece of sheet rubber previously slightly stretched. This is far and away the best means known at present of strapping a suprapubic fistula, and will probably be successful in a large proportion of cases. In some cases a pad and bandage, or a pad with a light spring truss to press on the rubber disc, will make the sealing up more certain, and if at the same time a catheter is tied in and arranged for continuous drainage the chances are that the period of convalescence will be shortened. If it is desired to maintain a permanent fistula, and there are signs that it is likely to close, a piece of rubber tube with lateral holes may be inserted into it and suspended from the hole in the glass by a cross-pin. Mr. Pardoe has very kindly informed me that he has for some years employed for the purpose a flanged rubber disc sprung over a rubber catheter, and he sees no reason why this shield should not be affixed by means of the rubber solution. He, too, has had difficulty in keeping the patient dry.

After enterostomy an application of sheet rubber as protective to the skin prevents soreness around the fistula. The comfort of a patient with a biliary or a renal fistula would be materially increased by the use of the whole dressing in a suitable case. In cases of pneumothorax in which there is an external opening an air-tight joint could be readily made to the skin around it, thereby allowing suction to be applied by means of an aspiration pump or by drawing an attached rubber tube between finger and thumb, as one does to start a siphon, and then securing the tube with a clip. We are not, however, considering these extraneous matters here, and they are

only mentioned for purposes of publication in the hope that those who have the opportunity to try them will do so.

In conclusion, I wish to express my indebtedness to all those who have in any way helped me to investigate this subject, one which is so shortly dismissed in text-books that the student is not helped to appreciate its difficulties or to overcome them.

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