

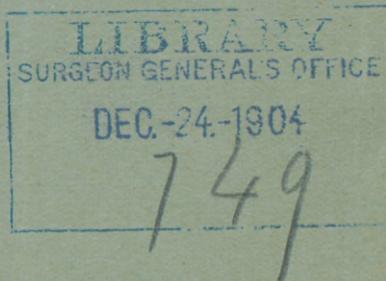
BLOODGOOD (J.C.)

A NEW APPARATUS FOR IMMEDIATE AND PERMANENT  
DRAINAGE OF THE URINARY BLADDER AFTER  
SUPRAPUBIC CYSTOSTOMY.

BY JOS. C. BLOODGOOD, M. D.,

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*(Read before the Johns Hopkins Hospital Medical Society,  
November 4th, 1895.)*





## A NEW APPARATUS FOR IMMEDIATE AND PERMANENT DRAINAGE OF THE URINARY BLADDER AFTER SUPRAPUBIC CYSTOSTOMY.

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The term cystostomy is used because a permanent opening is made into the bladder through the abdominal wall. By immediate drainage I mean that the tube is introduced at the operation and allowed to remain one or two weeks, at the end of which time it is removed and the sinus allowed to close—or in those cases in which the opening must be kept open, the apparatus for permanent drainage is introduced. In both cases the apparatus, to be described, consists of a tube attached to a rubber bag reservoir, the tubes only differing for immediate and permanent drainage.

Until one and one-half years ago the few cases of suprapubic cystostomy in which, for some reason, the sinus had been kept open, the patients have worn a hard rubber tube provided with a stopper, which was removed at frequent intervals to allow the bladder to empty itself. In all these cases there has been constant leakage, wetting both day and night clothes, and making it almost impossible for the patient to keep dry or free from the odor of urine. In those cases in which the bladder became irritable when distended, the stopper could not be used. The condition has been one of such discomfort to patients that surgeons only in very urgent cases resort to this method of drainage. The apparatus which I am about to describe provides such perfect drainage and the patients are so comfortable that I feel confident it will encourage the more frequent use of suprapubic cystostomy.

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It has been perhaps because we have had few such cases that a better apparatus has not been improvised before. We were stimulated to improve our methods by the necessity of a case, that of a young and active business man, in which it was necessary to keep the bladder open for the local treatment of an early tuberculosis, and at the same time it was quite imperative that he should be able to continue his business with some comfort, and especially to be free from the odor of urine and the frequent change of dressings. With the intelligent co-operation of this patient this new apparatus was devised. He has worn the tube and bag for one and one-half years and has been able to conduct his business as usual. (I see him at the theatre now and then.) Since this first case five others have been provided with the apparatus. All are able to keep dry and free from the odor of urine, and to continue their ordinary life with comfort.

Encouraged by the success of the apparatus as permanent drainage in these cases, it occurred to me that it could be used with equal satisfaction for immediate drainage after operation. I devised and had made such an apparatus some four months before the opportunity offered itself for its use.

In July, 1895, suprapubic cystostomy was performed and this method of immediate drainage introduced. The patient, a man aged 63 years and quite feeble, was suffering from acute purulent cystitis. The prostate was only moderately enlarged. There was dribbling of urine with retention. Catheterization was required to prevent over-distension. Catheterization followed by copious irrigation gave no relief and the manipulation was very painful. His daily temperature rose frequently to 103° and never fell below 101°; his pulse ranged between 110 and 130. The patient's relief after the operation was immediate and permanent; the tube was not removed for two weeks, since which time he has worn the apparatus for permanent drainage.

During the two weeks in which the apparatus for immediate drainage was used no urine leaked into the wound. The bag was emptied every three or four hours, and twice daily the bladder was irrigated without a catheter through the tube into the bag. The patient after the third day was allowed to sit up in bed, and on the seventh day to get up in a chair.

Previous to this case the following method of drainage had been employed. A short rubber tube was introduced into the bladder and the suprapubic wound packed with gauze about the tube. The urine was collected in large pads of gauze placed on the abdomen. The care of these patients required a great deal of time; it was almost impossible to keep them dry. The drainage tube and gauze had to be changed on the fifth day, frequently sooner, and the re-introduction was painful. The gauze packing always became saturated with urine.

#### DESCRIPTION OF THE APPARATUS.

The rubber bag reservoir for both immediate and permanent drainage (see Fig. I) is 18x12 cm. in diameter, and holds about 350 cc. of urine. Patients usually empty the bag when about 250 cc. collects—every four or five hours. Sealed to the upper and central portion of the bag is a thicker piece of rubber with a small opening in its center, into which the head of the tube is inserted. The ends of the abdominal belt are also fastened to the center piece. The abdominal belt carries the entire weight of the bag (see photograph), so that there is no dragging on the tube. Two rubber tubes lead from the bag, the lower one being used to draw off the urine, and the upper to wash out the bag. Both are provided with stoppers.

After operation it is not necessary to change the position of the patient to empty the bag, and when the patient is up and dressed the bag can be emptied with no more than the usual unfastening of the clothes.

A longer tube could be attached to this shorter one and carried into a vessel beneath the bed, so that there would be continuous drainage. After operation there would be some danger of this tube being dragged upon, thus disturbing the suprapubic tube in the bladder. One of the six patients using this apparatus for permanent drainage employs this method at night, and is relieved of the call to empty the bag every four or five hours.

The tube used for immediate drainage after operation (Fig. II) is made of hard rubber and consists of three pieces: A, shaped like a bolt, is 2 cm. long. Its head is 1.8 cm. in

diameter and 3 mm. in thickness. The top of the head is grooved (*A'*) to allow free drainage into the bag. The head of the bolt is inserted into the hole of the bag, the elasticity of the rubber making a snug fit. (*B*), the second piece, which is saucer shaped, is screwed on the bolt, so that the rubber bag is held very tightly between the head of the bolt and this piece, and leakage is prevented. The straight portion (*C*) of the tube is 10 to 15 cm. long and 1.5 cm. in diameter; 1.5 cm. from the bladder end is a shoulder (*D*) 5 mm. in width, pierced with four holes. This tube is first fixed into the bladder and then the bag armed with the bolt and second piece is screwed into the end of the tube.

*The method of securing the tube in the bladder.*—After opening the bladder, four silk sutures are passed through the wall, not including the mucous membrane, the inner piece of each suture being passed through the corresponding hole in the shoulder of the tube. The tube is inserted into the bladder and the sutures tied. The shoulder rests on the bladder wall, making a very snug fit, allowing no leakage (Fig. III). Gauze is packed down to the bladder about the tube, filling the suprapubic wound. The sutures are long and are carried out of the wound with the gauze. The object of the gauze is to absorb any leakage which during the first few days might take place. It may not be necessary, yet it is a safeguard against any infection by extravasated urine, and aids in holding the tube in place.

The abdominal wound is partly closed and gauze pads are placed about the projecting portion of the tube and held in place by a binder. On this cushion rests the bag reservoir—Fig. IV.

November 30th, Dr. Halsted kindly allowed me to use this apparatus on a second case. The drainage has been perfect (now two days). I have carefully examined all the gauze and find there is no leakage. There has been no pain or discomfort.

The tube for permanent drainage is not provided with a shoulder. It should be long enough to extend into the bladder at least 1 cm. The bladder end should be slightly bulbous. The tube should be curved or straight according to the

direction of the sinus; as a rule slightly curved. The second piece rests on the abdominal wall. It is smooth and produces no irritation. The abdominal belt holds the weight of the bag. The photograph shows the apparatus in position in a very fat man weighing 250 pounds. This patient has had a suprapubic sinus for three years, the urethra being closed by a very large prostate gland. He has had experience with both methods. This new apparatus he has worn eight months, and he tells me that he has been able to keep dry and free from the odor of urine ever since.

January, 1896. Since the note of November 30th, Dr. Halsted has used the apparatus for immediate drainage in two cases; and these two cases, with the one operated on November 30, are now wearing the apparatus for permanent drainage. Two of the operations were for stone in the bladder, and are wearing the apparatus until the cystitis improves sufficiently to allow the sinus to close; the third operation was for carcinoma of the bladder.

In the last two cases a purse-string suture has been placed in the wall of the bladder about the tube in addition to the four sutures described.

In the first case (November 30) leakage took place on the sixth day, one suture having pulled out, but the sinus was already lined by fissure granulation, so that the tube for permanent drainage could be introduced, and in a few days the sinus contracted about the tube and no leakage took place. In the second and third cases, in which the additional purse-string suture was used, leakage did not take place until the eighth day, the suture having pulled out; the tube for permanent drainage was then introduced, and in a few days no leakage took place.

Judging from these cases, we can feel certain that the apparatus for immediate drainage will work perfectly for eight days, and no doubt in some cases longer; at this time, no leakage having taken place, the sinus leading into the bladder will be lined by firm granulations, the bladder will be fixed by adhesion, and the wound will be in an excellent condition for the introduction of the tube for permanent drainage. For two or three days, until the sinus contracts about the new tube, some little leakage will take place, but

most of the urine will be collected in the rubber bag. The apparatus for permanent drainage should be changed morning and evening, and carefully cleaned. The bladder should be irrigated at the same time. As a rule, the bladder can be irrigated by introducing a glass nozzle 1 or 2 cm. into the urethra, the irrigation flowing out the suprapubic sinus. It is also a good plan to have the patient provide himself with two rubber bags, one for day and one for night use, so that each bag will be dry part of the time—the rubber will last longer.

The problem for immediate drainage after suprapubic cystostomy seems to be solved by this apparatus, for it provides perfect drainage, allowing no leakage, with a tube which can be removed without pain or difficulty, after which the wound will be in an excellent condition for the tube used for permanent drainage, which in turn leaves a sinus which will quickly close as soon as the introduction of the tube is discontinued.

In the last few weeks I have heard from most of the cases wearing the permanent apparatus, none of whom have any complaint.

In three cases of cholecystostomy, in which we did not wish the sinus to close, and from which the discharge was sufficient to annoy the patient by soaking the clothes, this same apparatus is worn with perfect comfort and no leakage.

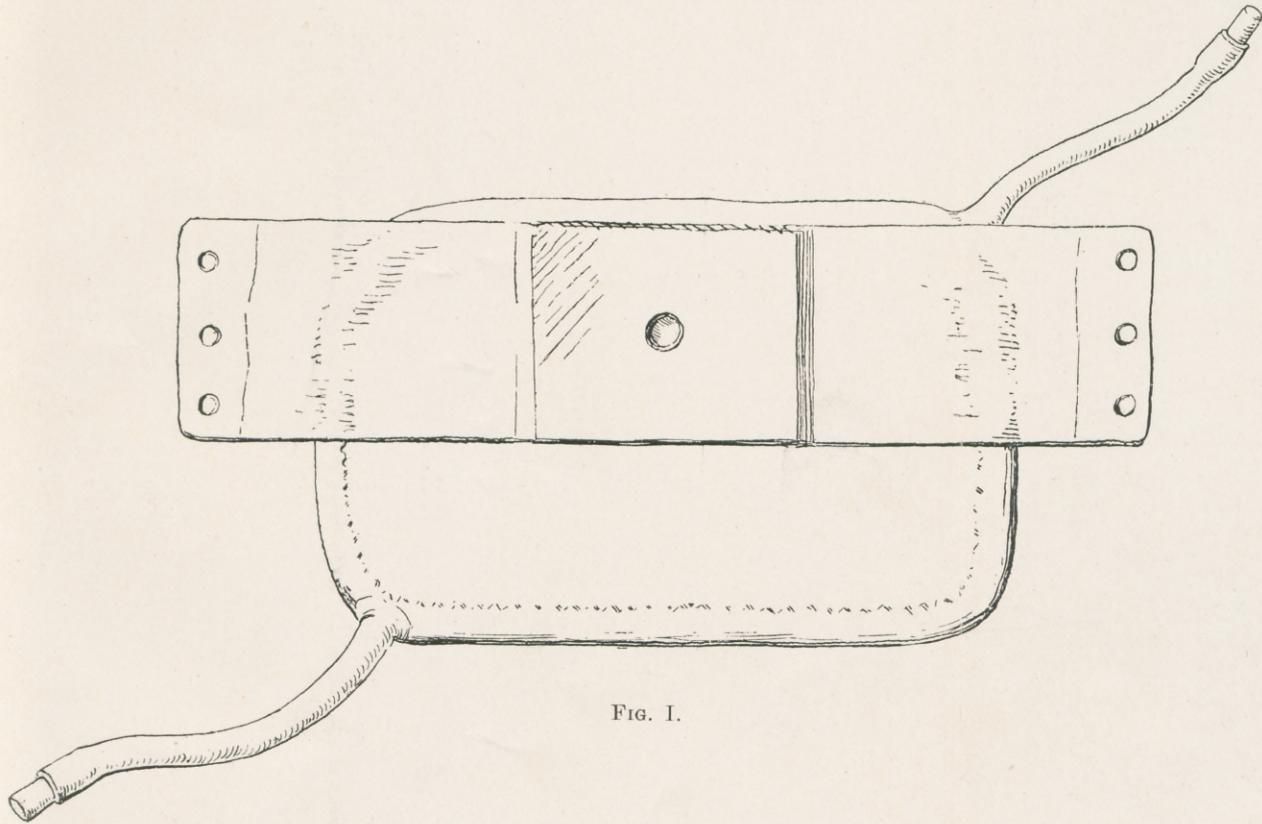


FIG. I.

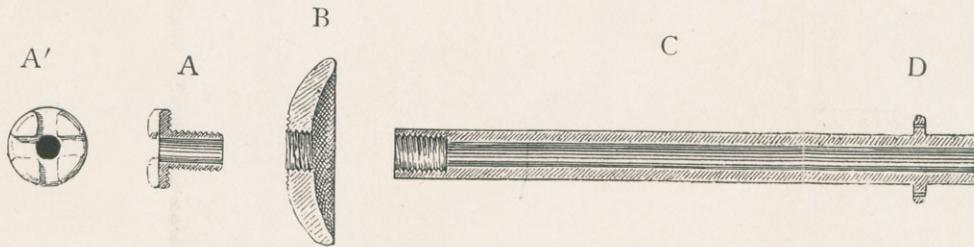
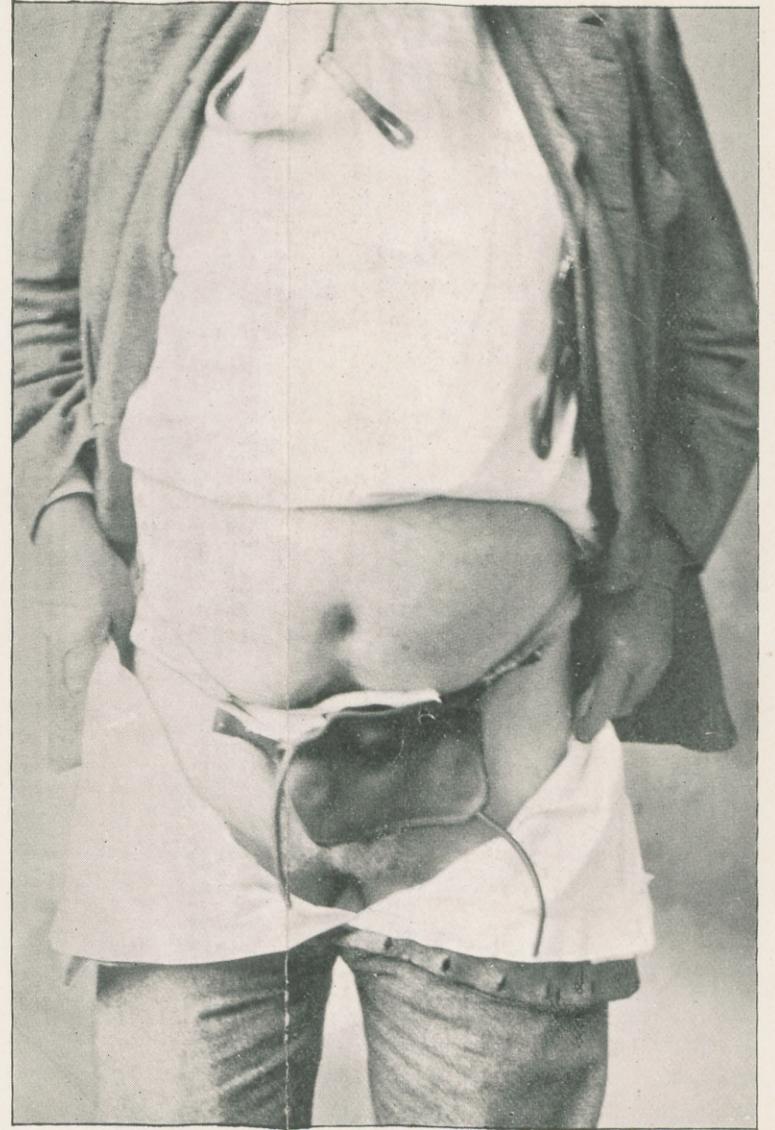


FIG. II.





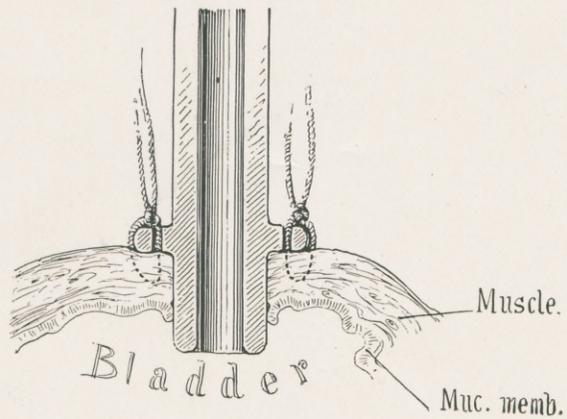


FIG. IIIa.

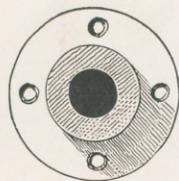


FIG. IIIb.

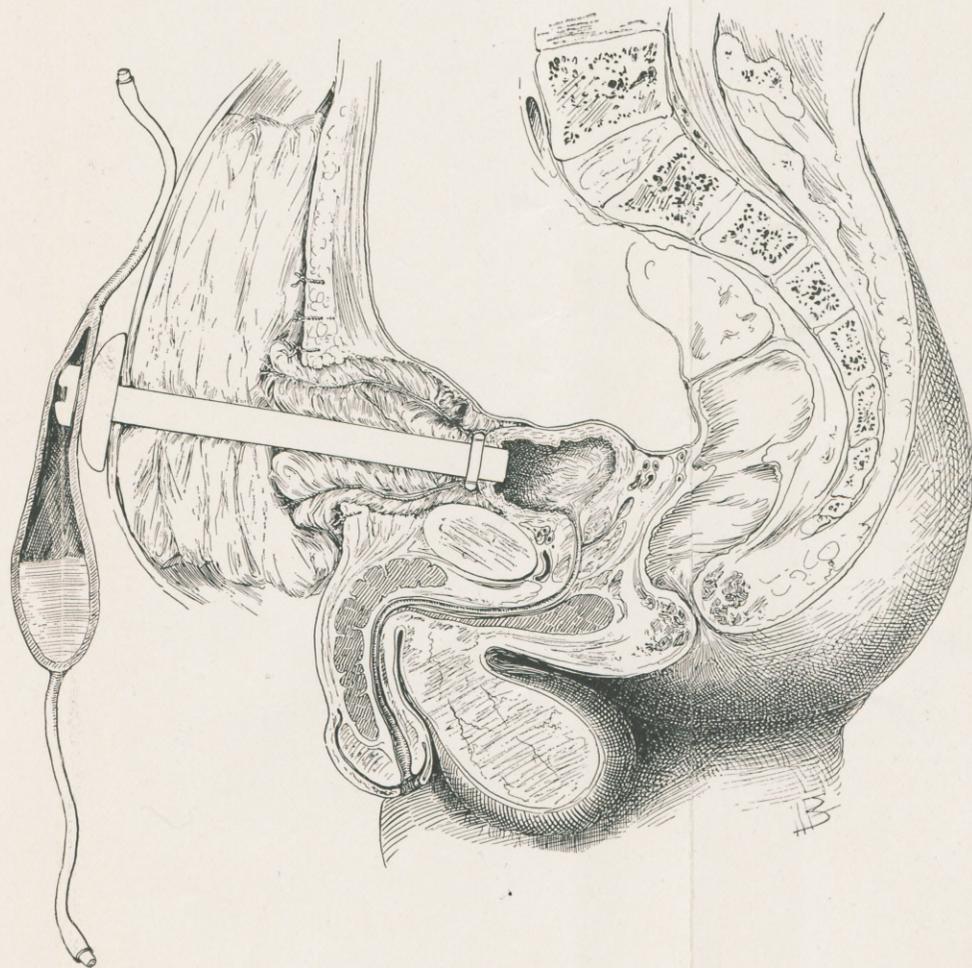


FIG. IV.









