A case of encysted vesical calculus of unusually large size removed by supra-pubic cystotomy / by Walter Rivington.

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SUPRA-PUBIC CYSTOTOMY.

BY

WALTER RIVINGTON, M.S.Lond., F.R.C.S.Eng.,
SURGEON TO THE LONDON HOSPITAL, AND LECTURER ON SURGERY AT THE LONDON HOSPITAL MEDICAL COLLEGE.

Read March 30th, 1886.

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Received March 9th—Read March 30th, 1886.

Thomas K—, æt. 61, soldier, was admitted on the 13th January, 1885, into the London Hospital, suffering ostensibly from stricture and cystitis. While in the army, from which he had retired with a pension, he had served in various parts of the world, including the Crimea. He had been treated for stricture in Ceylon. He had not worked for two years. For sixteen years he had suffered from occasional stoppage of the water, combined with considerable pain in the loins and at the end of the penis. For six years there had been slight hæmorrhages at times. Latterly he had failed in health and lost flesh, and the urinary complaint had become more troublesome. On admission he complained of not being able to hold or pass

his water properly. The bladder was very irritable. Signs of cystitis were present, the urine being ammoniacal and containing pus. There was not more albumen than the pus would account for.

The bladder was washed out, at first with a weak solution of carbolic acid (1 in 400), and afterwards with iodoform in mucilage, and he was ordered some infusion of buchu and tincture of hyoscyamus three times a day, as well as two drachms of confection of senna to be taken every morning. Under this treatment, combined with rest, he improved. The pain diminished in severity, the bowels acted better, and he was able at times to pass his urine more naturally.

On examination per rectum a large round smooth swelling, very firm and hard, was felt anteriorly in the situation of the prostate gland, and suggested either an unusually enlarged prostate or the presence of a prostatic calculus. Nothing could be detected, either in the prostatic urethra or in the bladder, by means of the sound. The patient was asked to make water into a porringer, and the stream was found to drop from the end of the penis, as it does in cases of enlarged prostate. It was decided to advise an examination under an anæsthetic, and a median urethrotomy for the purpose of exploration and subsequent drainage of the bladder, any further procedure being dependent on the result of the examination. The patient gave his consent to any procedure that might be considered desirable.

On the 24th of February he was taken to the operating theatre and anæsthetised. Nothing could be detected with the sound. A grooved staff was then passed into the bladder, and, the patient having been placed in the ordinary lithotomy position, an incision about an inch long was made in the middle of the perineum, and the membranous urethra was opened in front of the prostate. Exploration with the finger failed to detect anything abnormal in the prostate, but it was ascertained that the hard, rounded mass was not connected with the

prostate, and that it was covered by the left wall of the bladder, which was pushed towards and even beyond the median line. It was also found that the mass overlapped the prostate and that the finger placed in the rectum could be pushed between it and the prostate gland, which was not at all enlarged. By supra-pubic examination it was evident that the mass was of considerable size, and not very moveable, and it became a question whether it was an encysted calculus or a growth from the pelvic walls. By further examination with the sound pushed in up to the hilt, a stone was struck far back in the bladder, and with a pair of lithotomy forceps I succeeded in grasping the end of the stone without being able to shift its position. It now seemed evident that I had to deal with a calculus or calculi either in a pouch or in a separate division of the bladder, and I determined to open the bladder above the pubes.

Having released the patient from the lithotomy position I passed a well-curved staff into the bladder, and made an incision in the middle line above the pubes about three inches in length, and carefully divided the structures close to the pubes until I could feel the point of the staff through the bladder wall. My colleagues, Mr. Reeves and Mr. E. H. Fenwick, assisted me. The bladder was reached and opened above the pubes, and the opening cautiously enlarged, chiefly downwards. A vein in front of the bladder, which has been named by Mr. Fenwick the inverted Y vein, was divided and tied. A loop of silk was passed through the bladder wall on each side, to enable my dressers to hold aside the edges of the vesical wound and to steady the bladder. The end of a stone could now be felt and seen to pass out of an aperture towards the back of the bladder. It was grasped with forceps, but very little impression was made on its position, even after passing a lithotomy scoop between the calculus and the wall of the pouch in which it lay. Lithotrites were useless. Under these circumstances there were two alternatives, viz. either to abandon the operation

or to break up the calculus. It occurred to me that division of the calculus might be effected with a chisel and mallet, and I decided to make the attempt. As the calculus below was perfectly smooth and fitted well into the pelvis, I did not think that any injurious bruising of the base of the bladder would result from the concussion of the stone, and I guarded against this by introducing a lithotomy scoop between the calculus and the wall of the pouch, and supporting the calculus during the taps of the mallet by resting the handle of the scoop against the wall of the abdomen and using it as a lever of the first kind. The chisel cut the stone readily enough, and severed it into several large fragments, more or less wedge shaped, which were extracted piecemeal.

There was one circumstance which I had not anticipated, viz. free oozing of blood from the congested mucous membrane of the bladder and its pouch during the manipulations for breaking up, and removing the segments of the calculus. Another event was the escape from the pouch, as soon as the stone had been shifted, of a quantity of most fetid urine. After the removal of the last portion of the calculus the bladder and its pouch were carefully washed out with an antiseptic solution, and all ascertainable fragments were removed. A few chips, however, escaped detection, doubtless having been enveloped in blood-clot. At the suggestion of Mr. Fenwick I sewed up the wound in the bladder, using fine silk introduced with the glover's suture, and a second suture was introduced at the lower angle of the vesical wound. The recti muscles were united with interrupted sutures, and lastly the skin and fascia. In order to guard against urinary infiltration, a drainage-tube was inserted between the lips of the superficial wound, reaching down to the anterior surface of the bladder. A silver tube without a sponge was inserted into the bladder through the perineal wound, the supra-pubic wound was dressed with cotton wool and gauze, and the patient was sent to bed. The operation had lasted an hour and a half. The patient was

not so much exhausted by the operation as was expected, nor did his temperature show any marked rise during the first twenty-four hours. He complained of wind and some pain. A hypodermic injection of morphia was given. The urine passed freely through the tube. He was not sick, and was able to take milk and brandy mixture.

26th.—Patient passed a fairly good night, sleeping for some hours. Very little pain; sensation of fulness in the bladder; forty-five ounces of urine were collected. Pulse 100, temp. 99°. Bladder washed out with solution of thymol.

On February 28th I found an extending red blush at the edges of the wound, and the drainage-tube displaced. Believing that this must be caused by some pent-up discharge, probably mixed with urine, I opened up the wound, and having mopped out some urinous fluid mixed with pus, powdered the surface of the cavity with iodoform, and covered it with cotton wool. There had been a free discharge of urine by the perineal wound through the drainage-tube amounting to forty-two ounces of collected urine during the twenty-four hours. The temperature was 99°, and pulse 96. Milk, beef-tea, and brandy and egg mixture were taken freely. The surface of the wound cavity above the pubes was sloughy, and underwent a gradual process of removal of slough and granulation. It was cleansed daily, irrigated, and powdered with iodoform.

The notes on the 3rd of March, state: "Very restless night, acute pain at times, smell of upper wound very fetid. Thick grey slough on surface, and some surrounding inflammation. Patient wanders slightly and picks at the bedclothes. No vomiting and no sign of peritonitis." During the next few days he improved materially, and the wound began to granulate healthily after the separation of the slough.

On the 9th the silver lithotomy tube was removed from the perineal wound, and a large india-rubber tube was

substituted. Most of the urine came away below, but occasionally some would well up behind the pubes. Patient was no longer delirious. His temperature was normal and his pulse 80. One of the ligatures came away in the silver tube with some thick matter and slough.

16th.—Patient slept seven and a half hours last night; thirty ounces of urine collected in the night, sixty ounces altogether in the twenty-four hours. A long slough in the tube.

19th.—Very restless. Has had very little sleep. Tube got blocked up with slough or membrane, and the urine ran over the pubes. The tube was taken out and cleansed. A soft flexible catheter was introduced above the pubes and withdrew a large quantity of foul urine. Great pain in right lumbar region. Temperature 101·5°. I had to make an opening in the scrotum for drainage as a pouch had formed there containing urine.

20th.—Much better. Temperature normal. Pain abated. Tongue clean. Pulse 80. Being very anxious to be allowed to be out of bed, and confident that he would benefit by the change, he was placed in a chair and wheeled about for half an hour or an hour.

April 1st.—Since the last note he had been going on well, passing a fair amount of water by the tube. The anterior wound was gradually closing, and was syringed out daily with thymol solution. The bladder was also washed out, the solution running freely through the perineal tube. He slept fairly well. His appetite had improved and he took meat and potatoes.

On the 17th the house surgeon, who with Mr. Haynes, the dresser, had been very attentive to the patient, finding that the abdominal wound had closed over the aperture leading to the bladder, withdrew the perineal tube. I had intended retaining the tube till the wound had soundly healed, but when I saw the patient in the afternoon the perineal opening had contracted so much that I could not have reintroduced the tube without placing the patient under an anæsthetic, and, as I thought

that this might possibly do him more harm than the tube would do good, I reluctantly abandoned the tube altogether. The patient was now in very fair condition, able to walk and pass his water with a considerable jet, and he was extremely proud of his capabilities in this matter. Unfortunately a little grit, part of the remaining *débris* of the calculus became impacted in the urethra, and the obstruction caused the passage from the bladder to the wound above the pubes to reopen so as to again admit a small catheter. If the tube had been retained, according to my instructions, this would not have occurred, and the opening would have soundly closed. At this time the patient had practically recovered from the operation. He sat up daily, took his food well, his urine was clear, and on warm days he went into the garden in a chair.

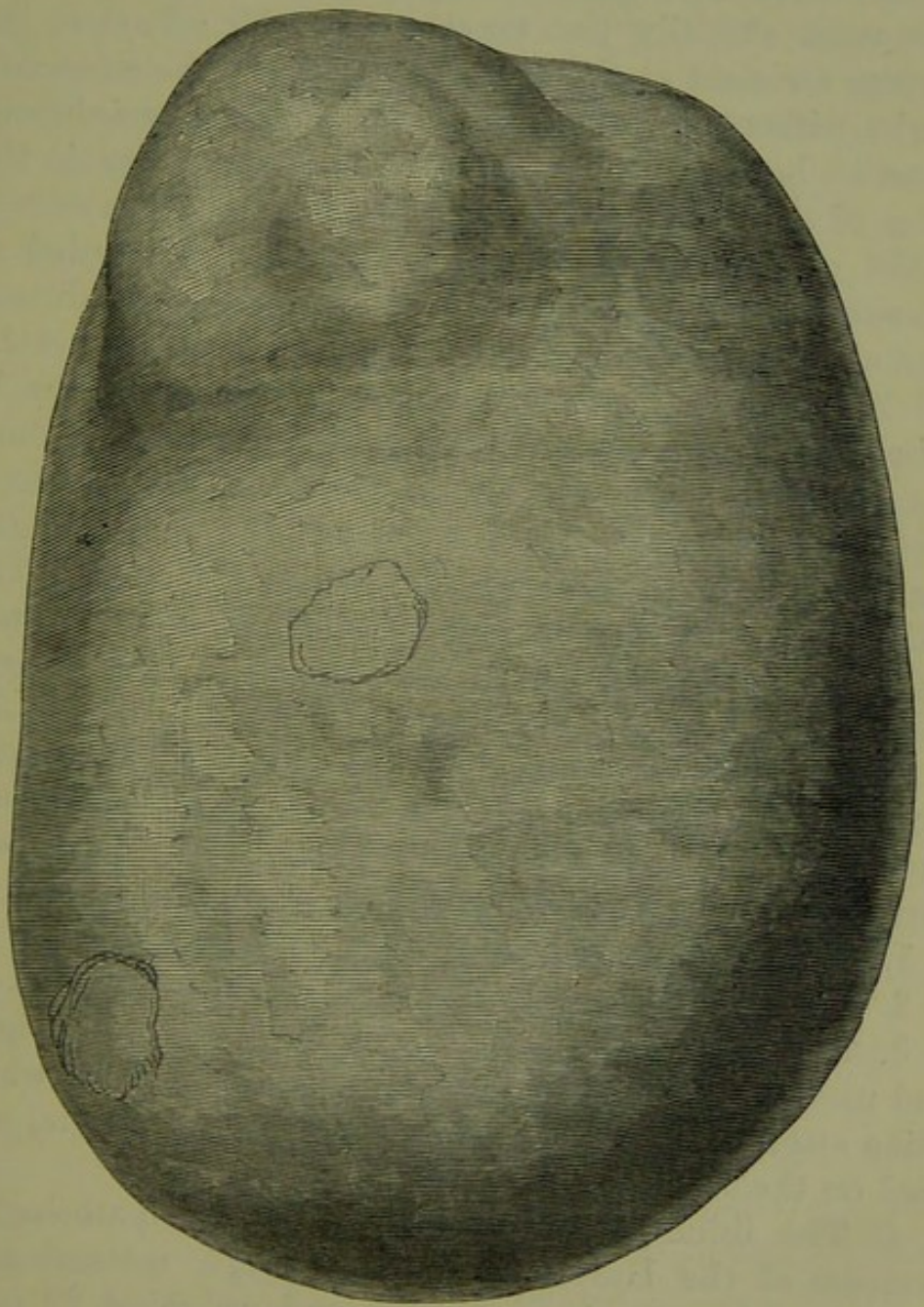
Early in May the supra-pubic wound had nearly healed, leaving only a small fistula. The patient was kept in the hospital because I was anxious to close the opening, and for this purpose his water was drawn off with a flexible catheter two or three times a day.

About the middle of May he fell down in the ward, and, as he felt fatigued with being up so long, and was not gaining strength, I advised him to remain in bed during the greater part of the day, draw off his water, and see if the fistula would close.

At the end of May a fresh attack of cystitis developed. His urine became strongly alkaline, turbid, and ammoniacal, and contained pus. There was a considerable discharge of pus from the opening above the pubes, and an abscess formed and opened over the tendon of the adductor longus in the right thigh. His appetite failed. Diarrhœa set in. Exploration of the region of the wound disclosed some bare bone near the symphysis. He became comatose, and died on June 4th, more than three months from the date of operation. With considerable difficulty I obtained permission to inspect the abdomen only, and this limited post-mortem was performed on the 5th of June.

Post-mortem.—The bladder was fairly capacious, and its walls were thickened from muscular hypertrophy. Coming off from it behind and above the trigone by a rounded opening was the large pouch in which the stone had been contained. This ran first outwards and then forwards, and when distended reached beyond the margin of the prostate gland. Its walls were thick and comprised the mucous, muscular, and fibrous coats of the bladder. The left ureter was closely connected with the pouch, winding round it and externally appearing to terminate in it; but a bent probe passed from above downwards through the left ureter, was seen to emerge by the side of the trigone of the bladder proper. From the lateral position of the pouch parallel to the bladder, from the left wall of the bladder running directly backwards from the middle of the prostate, from the collection of ammoniacal urine in the pouch found at the operation, and from an evident filling of the pouch afterwards, I had thought it not improbable that the pouch was an integral portion of the bladder. The mucous membrane of the bladder and pouch was inflamed, and the ridges were coated with muco-pus mixed with phosphates. The edges of the wound in the bladder were puckered, coated with phosphatic muco-pus, and firmly adherent to the posterior surface of the pubes. An opening which had enlarged slightly by ulceration during the last few days of life led to the surface, and also by means of a branching canal to the perineum and to the opening in the right thigh. The left pubic bone was bare of periosteum and superficially necrosed. There was an abscess deep in the perineum on the right side. Most of these changes occurred at the latter end of May and the beginning of June. The kidneys were of unequal size. The right kidney was larger than the left and larger than a normal kidney. It appeared healthy, but had some cysts on its surface. On cutting into the left kidney some thin purulent matter escaped from a small cavity in the cortex, and there was evidence of interstitial nephritis running on to suppurative nephritis. The cap-

sule did not strip off readily, and the organ was puckered. The pelvis of the left kidney was slightly enlarged as well as the upper part of the left ureter. The right ureter



Calculus extracted; natural size.

was normal. The calculus when removed from the bladder was weighed by Mr. Fenwick. Excluding a considerable quantity of lost *débris* its exact weight in the moist state was 23 oz. 2 drachms and 17½ grains avoirdupois. The

nucleus weighed 65 grains. The fragments being stained of a dark colour the stone appeared to be composed of lithic acid and lithates, but in reality it is composed of fusible phosphates. After the operation the large segments were most skilfully put together by Mr. Taylor, the museum assistant at the Medical College. The stone now weighs, without nucleus and lost *débris*, 22½ oz. avoirdupois. A section has been made and shows a large cavity in the centre of the calculus due to the lost *débris*. The correct weight of the calculus must therefore be regarded as exceeding 23 oz., or 1 lb. 7 oz. avoirdupois. The dimensions are as nearly as possible 4¾ inches long, 3¼ wide, and 3 inches in thickness; its larger circumference 13 inches and its lesser 10 inches. The size of the pouch may be inferred from the size of the stone, which exactly filled it, and the size of the orifice of the pouch from the size of the base of the projection from the stone. The orifice through which the stone had to be extracted was about the size of half a crown.

Remarks.—With regard to the size of the calculus there are a few instances of larger vesical calculi on record, some removed from the bladder after death and some during life. To the post-mortem category belong:

1. The calculus seen by Morand weighing 6 lbs.
2. The calculus seen by Deschamps weighing 51 oz.
3. The well-known phosphatic calculus 44 oz. in weight, and measuring in circumference 16 inches by 14, which Cline attempted to remove from Sir Walter Ogilvie, who died on the tenth day.[1]
4. The lithic acid calculus, now in the pathological museum of the University of Cambridge, measuring 15 by 13½ inches in circumference, and weighing 32 oz. 7 drachms, originally 33 oz. 3 drachms and 36 grains troy. The stone was taken from the wife of Thomas R—, a locksmith in Bury, after her death, by Mr. Gutteridge, a

[1] 'Catalogue of Calculi (Part I, H_2, p. 116) of Museum of Royal College of Surgeons of England.'

surgeon of Norwich, and was presented to Trinity College, Cambridge, by Mr. Samuel Battley, who was M.P. for Bury and had possession of the stone after the woman's death.[1]

5. The uric acid calculus, weighing 25 oz., and measuring 4½ inches in its long axis by 3½ in its short, and in circumference 12½ by 10½ inches, taken from the body of Sir Thomas Adams, who died on February 24th, 1667, at the age of eighty-one. The stone remained in possession of the family for years and was ultimately presented to the museum of St. Thomas's Hospital.[2]

6. A case has been recorded by Mr. Paget, of Leicester, in which a stone weighing 27 oz. was removed after death from the bladder of a woman forty-seven years of age. It was accompanied by innumerable small calculi some as large as peas and others smaller. The large stone was of a light ash colour, rough on its surface, and of a flattened oval shape. It had occasioned prolapse of the bladder, the viscus covered by the vaginal mucous membrane protruding between the labia. The external surface of the calculus was marked by a sulcus occasioned by the pressure of the distended labia pudendi.[3]

To the category of large stones removed during life belong :

7. Uytterhoeven's calculus, the cast of which measures 16½ by 12½ inches in circumference. The patient lived eight days.[4]

8. A calculus reported on the authority of Dr. W. B. Hunter, of Londonderry, as having been removed by Surgeon Joseph Hunter, I.M.S. The patient was a native in the Madras Presidency ; the supra-pubic operation was performed, the stone weighed 25 oz., and the patient lived three days.[5]

[1] Dr. G. M. Humphry, 'Lancet,' July 25, 1885.

[2] Pathological Society's 'Transactions,' vol. xxi, p. 267. A woodcut showing the size of the stone is given.

[3] 'Lond. Med. and Phys. Journ.,' vi, p. 391.

[4] Erichsen, 'Surgery,' vol. ii, p. 986.

[5] 'Lancet,' Jan. 16, 1886.

A calculus has lately been reported to the Northumberland and Durham Medical Society as having been removed by Dr. Morrison from a sailor, æt. 52, and weighing 1lb. 6¾ oz. (whether troy or avoirdupois is not stated). In the report this is euphemistically styled "the largest stone ever removed during life." It is, however, not quite equal in weight to my own. The composition and dimensions of the calculus are not given in the account which I have seen. The patient lived twelve days and then died suddenly. No post-mortem examination was permitted.[1]

Among calculi of smaller size the most noteworthy was one which Sir H. Thompson removed by supra-pubic cystotomy on the 29th April, 1885, from a man æt. 62. It was a uric acid calculus weighing 14 oz. avoirdupois, measuring 4½ inches in length by 3 inches in breath and circumferentially almost 12 inches by 8 inches. The patient made an excellent recovery.

1. It will be observed that the case stands by itself in this particular that the calculus was contained in a pouch from which only a small projecting process protruded. This rendered the operation far more tedious and difficult than any of the other recorded operations for large calculi, as the calculus had to be broken up through a comparatively small aperture and removed piecemeal. Great care had to be exercised not to damage the bladder by contusion or perforation, and there was free oozing of blood from the congested mucous membrane whenever the calculus was disturbed. Extraction of the segments was also not a very easy matter.

2. It may fairly be asked would it have been better to leave the calculus alone when its exact position was made out, or was it better to attempt extraction and carry it through? Against leaving it the following considerations

[1] Since this paper was read Mr. Thomas Smith has presented to the museum of the Royal College of Surgeons a cast of a calculus, weighing 24½ oz., which he successfully removed by the supra-pubic operation from a male patient.

may be adduced. The patient's health was failing from the presence of the calculus and its projection into the bladder proper. He was suffering pain from the calculus whenever he took exercise. He had chronic cystitis with occasional hæmorrhages. The urine had become decomposed and ammoniacal, and ammoniacal urine pent up in the pouch was a constant source of contamination to the freshly secreted urine. He could not pass his water properly, and the left kidney was being damaged by interstitial nephritis. The disadvantages of removing it were that it subjected the patient to a long and difficult operation not free from danger. The difficulties were surmounted satisfactorily, but the main disadvantage of removing the calculus consisted in the fact that the pouch in which the stone was lodged had to be left behind, and would necessarily form a receptacle for urine, and would never, perhaps, be properly emptied. At the time, however, it was not clear whether the compartment containing the stone was a hernial pouch, or whether it was an integral part of the bladder and received the left ureter. Undoubtedly if a patient enjoying good health was known to have a large encysted calculus which gave rise to comparatively little inconvenience or urinary disturbance I should not be inclined to advise interference, but when it has begun to emerge from the pouch and has become the occasion of constant pain, cystitis, and decomposition of urine the question of interference may fairly be entertained. If the pouch could be removed a great advantage would be gained. It did not occur to me to ascertain if this would have been feasible in my own case. If attempted it would, I think, have to be done from inside the bladder by inversion of the pouch and either ligature or excision and suture of the wound.

3. With regard to the details of the operation a few remarks are necessary.

(*a*) The valuable addition to the supra-pubic operation, for which surgeons are indebted to Garson and Petersen, could scarcely have been applied in the present case, owing to the perineal opening and the size and situation of

the stone. By keeping close to the pubes I avoided the risk of wounding the peritoneum.

(*b*) Seeing how readily a calculus may be broken up by means of a chisel and mallet, I think that the same method might be adopted wherever a calculus has attained so large a size that it cannot be extracted entire without risk of tearing the peritoneum, or unduly bruising or lacerating the bladder and enlarging the vesical wound. A very large calculus would almost certainly prove to be phosphatic. It is not difficult to guard against injuring the bladder walls in the process, and the chief objection lies in the risk of leaving some small chips behind to cause irritation or act as the nuclei of future stones. This risk is greater where there is a pouch than where the calculus is free in the bladder itself.

(*c*) Sewing up the bladder wound was done rather tentatively than from absolute conviction of its certain utility. To guard against danger from escape of urine, if the sutures should prove inefficient, a drainage-tube was placed in contact with the sutured opening. Doubtless the necessary contusion of the edges of the wound during the long operation prevented immediate union of any considerable part of the wound. Whether any part of the wound united in consequence of the sutures I cannot say. The sutures themselves separated and were discharged, one through the silver tube, and the other through the external wound, after being for some time adherent. I am inclined to think that the stitches did no good, but rather the reverse, as their retraction determined more sloughing of the edges of the vesical wound, and in another case I should not suture the vesical wound unless I had a clean cut to deal with which had not been subjected to any bruising. I think also that the stitches determined the adhesion of the opening to the posterior surface of the pubes.

There is another method of dealing with the wound in the bladder which might in some cases be advisable, and that is stitching its edges to the edges of the superficial

wound. I am not sure that this might not have been preferable to the course which I actually adopted. It would effectually guard against extravasation of urine and would permit the bladder to be thoroughly washed out.

(*d*) I am convinced that the perineal tube was of primary importance to the patient in this case, and I regret that I did not reinsert it after it had been removed prematurely by my house surgeon. It gave exit to the thick pus and a few pieces of slough which came away from the bladder after the operation. It drew off the major portion of the daily urine, only a little occasionally running off by the upper wound. It allowed the bladder to be washed out, and it prevented accumulation of the urine in the pouch. Hitherto surgeons have regarded infiltration of urine as one of the two chief risks of the supra-pubic operation, and deaths have not unfrequently resulted from this cause. Sir Henry Thompson, who has had marked success with this operation, thinks that there is very little risk of infiltration in ordinary cases, unless there be interference with the cellular connections low down between the anterior surface of the bladder and the pubic arch. In such cases, and in exceptional cases like my own, I believe that the insertion of a large soft tube in the bladder through a median perineal opening will prove more efficient than keeping a catheter in the bladder or inserting a drainage-tube above the pubes, and not only add nothing to the risk of the operation but will contribute materially to ensure the safety of the patient.

(For report of the discussion on this paper, see 'Proceedings of the Royal Medical and Chirurgical Society,' New Series, vol. ii, p. 94.)