Notes on the surgical treatment of haematuria and rupture of the bladder / by Reginald Harrison.

NOTES

ON THE

URGICAL TREATMENT OF HÆMATURIA

AND

RUPTURE OF THE BLADDER.

By REGINALD HARRISON, F.R.C.S.,
SURGEON TO THE LIVERPOOL ROYAL INFIRMARY.

EDINBURGH:
PRINTED BY NEILL AND COMPANY.

1884.

NOTES ON THE SURGICAL TREATMENT OF HÆMATURIA.

By Reginald Harrison, F.R.C.S., *Surgeon to the Liverpool Royal Infirmary.*

This is a wider subject than at first sight appears, as it may be said to include much of what has recently been done in the treatment of tumours and excrescences connected with the interior of the bladder and the prostate gland.

The surgical treatment of hæmaturia can only be said to commence when the resources of medicine—frequently sufficient in themselves—have proved of no further avail, and thus this category of cases is not a large one.

It must be exceedingly rare for any condition of the kidney to occur where for bleeding alone an operation is indicated. I will very briefly refer to the few cases which have come under my notice where anything of this kind, with the view of stopping dangerous bleeding from the kidney, has either been entertained or practised.

In 1870 a patient was in the infirmary who, in addition to a compound fracture of the leg, had sustained an injury to his back by falling across some scaffolding from a great height. He died three weeks afterwards pyæmic, and exhausted from profuse hæmaturia. The expediency of cutting down upon the kidney was then discussed, but was not entertained, by reason of the impossibility of determining which organ was involved. A *post-mortem* examination showed a transverse gash of the right kidney almost dividing the ureter.

Though I have since seen several cases of severe traumatic renal hæmaturia, I have not met with any other example where the bleeding might have been advantageously dealt with by exploration, and possibly further by nephrectomy, either partial or complete. The latter practice I had, by the kindness of Dr Rawdon, the opportunity of seeing tested by him in a case recently published in this *Journal*,[1] and which is deserving of careful study in connection with the treatment of extensive ruptures of the kidney.

[1] January 1884.

Some years ago I saw a case of malignant tumour of the kidney in a young person, which was at intervals attended with profuse hæmaturia. Here, I believe, ligature of the ureter, which was practicable, would have saved the patient from much distress, and was justifiable in the absence of other means for arresting hæmorrhage.

The impaction of calculus within the kidney is sometimes attended with serious and persistent hemorrhage, but not such as to require direct operative interference to remove the cause of it, though bleeding, with other symptoms, has indicated the necessity for nephro-lithotomy, which has been successfully practised. Whether a partial rupture of a ureter is capable of keeping up a hæmorrhage for some time, I am doubtful. It could, however, hardly be of a nature or a degree as to require direct operative interference.

I think we may conclude that, though as a rule renal hæmorrhage can be best treated by medical measures, there yet remain some exceptional instances where, from the profuseness and continuance of the bleeding, operative means may be resorted to; these would include, from the illustrations referred to, nephrectomy for ruptures of the kidney, and ligature of the ureter for hæmorrhagic conditions of the organ unattended with breach of surface, and where the indications were clear as to the kidney at fault.

In the bladder and prostate will be found conditions occasioning hæmorrhage where direct surgical treatment is more generally applicable, as these organs not only can be readily reached with the finger, but are less influenced by hæmostatics than the kidney. The treatment of tumours of the bladder to a large extent resolves itself into the treatment of the hæmorrhage which these growths so frequently occasion; in fact, it may be said that a growth within the bladder, which neither bleeds nor pains, cannot be said to present any adequate reason either for its exploration or removal. Though hæmorrhage from the bladder is an important and tolerably constant symptom of a tumour connected with this viscus, it must not as such be regarded as indicating that less potent measures than those of an opera-

tive kind are unavailing. I now possess two specimens of small portions of villous growth where, after long periods of recurring hæmaturia, complete recovery has, I believe, in both instances taken place; on the other hand, an observation of this kind is encouraging in urging the attempt to remove these growths by operation when further delay becomes obviously dangerous. We must not forget that a very small vascular growth in the bladder may keep up a serious hæmorrhage—a growth which it is impossible to feel until the finger is placed actually in contact with it. That such a cause for bleeding was present in the following case of stone in the bladder I have not the least doubt:—

Joseph S., æt. 28, was operated on by me at the Royal Infirmary on September 26, 1883. A phosphatic stone weighing over 4 oz. was removed by the lateral method. He had profuse secondary hæmorrhage on six occasions, from the 6th to the 25th October. After the last bleeding, which nearly killed him, the nurse found amongst some clots an organised mass, about the size and shape of a small raspberry, which had escaped through the wound, and which my house-surgeon (Dr Lowe) and I examined. It was very like a villous growth, but more fleshy. Unfortunately it was accidentally thrown away before it was submitted to microscopic examination. After the escape of this, no recurrence of the bleeding took place, and the patient made a good recovery. I regretted that I had not searched the bladder with my finger after the first bleeding, when I should probably have discovered the cause and removed it.

The value of operative measures is well illustrated in the two following cases, where both operations were undertaken for severe vesical hæmaturia:—

The first case bears upon the question whether in hæmaturia dependent upon vesical or prostatic malignant growths good is likely to be done by operation. I have repeated this experience under somewhat similar circumstances with advantage to the patients in restraining hæmorrhage, and in permitting the bladder to be easily drained.

Case I.—John B., æt. 64, was admitted into the infirmary under my care on October 20, 1882. His symptoms were pain

in the bladder and hæmaturia, for which various plans of treatment had been ineffectually tried. I detected the presence of a growth connected with the prostate. On October 25 I performed median cystotomy, and enucleated almost the whole of the prostate, which was involved in a hard carcinoma. The bladder appeared healthy on exploration by the finger. The patient made a good recovery, and had no return of the hæmaturia up to the day of his death. He lived comfortably for fourteen months, and partially returned to his occupation as a stevedore. Then the glands in his left groin began to enlarge rapidly, and in two months more he died. The sphincter action of the bladder, which I was afraid had been destroyed by the operation, in time returned sufficiently to enable him to hold his water for two or three hours, and to void it naturally. He frequently came to the infirmary to show himself.

Case II.—Arthur W., æt. 17, came under my notice in October 1883. In January previously he had suddenly passed by the urethra a large quantity of blood, which continued to flow for four days: this has since recurred at intervals of about a fortnight. He has been sounded for stone, with negative results, seven times. His health was failing under the constant hæmorrhage. In December 1883 my report states that the bleeding continues in spite of all remedies, and that he complains much of a severe biting pain at the end of the penis. The latter symptom is only relieved by morphia. In examining his prostate from the rectum about this time, it appeared to me to be lost in a soft mass, which I thought might be a growth; this conclusion determined me to open the bladder. What I then felt, I now believe was a blood clot. On January 3, 1884, I did median cystotomy, but nothing abnormal could be felt either within the bladder or prostate: there seemed to be a considerable depression or pouching of the bladder above the prostate. A fibrinous-looking mass about the size of a small almond was washed out of the bladder, together with some shreds like decolorised blood clots; these were carefully examined under water and reserved for future observation, on the grounds that they might possibly prove to be villous: they did not, however,

present the usual appearance of these growths. Beyond some secondary hæmorrhage from the wound shortly after the operation, this patient has had no return of the bleeding. He is now well and able to go about as usual. The next case I shall select illustrates the sudden death from hæmorrhage of a patient suffering from a vesical tumour.

In May 1883, and some months previously, I saw a gentleman, aged 50, with Dr Adam: he was suffering from hæmaturia, and the conclusion we arrived at was that the bleeding was caused by a tumour within the bladder. By the use of matico we were able very materially to restrict the amount of blood lost in this way, and at times it almost disappeared from the urine. Still, however, there were continuing symptoms, which could not be explained by any other view than that we took, and the necessity for operative interference, at some future time, was discussed.

At 11 P.M. on October 6, 1883, I was hastily summoned by Dr Adam to meet him. When starting for a long railway journey at five that afternoon, the patient suddenly found himself incapable of passing anything but pure blood by the urethra. He returned to his railway carriage, and there remained in the greatest possible agony during the whole of the five hours' journey down. Fortunately a medical man, who happened to be travelling in the same train, was able to give him some relief by a hypodermic injection. The agony, however, of a bladder distended with blood clots was most excruciating. When we saw him on his arrival at home that evening, we found him semi-conscious, and making most frightful struggles to empty his bladder by all natural and imaginary devices. His eyeballs were protruded, and his appearance was very distressing to behold. With some difficulty, by reason of his frantic struggles, we placed him under chloroform, and made out that his bladder contained a mass almost as large as his head. Being provided with a gum-elastic catheter eighteen inches in length, I succeeded in introducing this, and after it had passed through a dense mass of clot some bloody urine escaped, and then we were able to get rid of a certain portion of the fluid blood: still the bladder seemed to fill again just as fast

as its contents were withdrawn. I thought I could distinguish with the point of the catheter something like the unevenness of a growth. We also tried to evacuate the bladder by means of Clover's apparatus for stone fragments, and in the use of this we were to a certain extent successful; the blood, however, welled up within the bladder, and there was little else for us to do. The terrible agony the patient had undergone during the railway journey, added to the loss of blood, which was not inconsiderable, caused death at 2 A.M., that is to say, nine hours after the sudden hæmorrhage into the bladder first took place. We very much regretted that the friends would not permit even a partial examination of the body to be made. This is a case which I regard as illustrating probably the most painful aspect of the natural history of a bladder tumour.

There are several points worthy of comment in connection with the hæmorrhage proceeding from these growths and its treatment. I have had occasion to notice the uniformity with which persons suffering from bleeding tumours of the bladder—especially malignant ones—speak of the sense of relief they experience when slight hæmorrhage, as indicated by the state of the urine, is continually going on, as compared with the entire cessation of this discharge. I have almost learned to regard this symptom as pathognomonic.

Intermitting renal hæmaturia sometimes causes the most severe vesical colic, owing to the sudden discharge of almost pure blood into the bladder. In the case of a gentleman, aged 60, suffering from a renal affection, who I saw in 1883 in reference to some bladder symptoms, intermitting attacks of hæmaturia were immediately preceded by intense vesical colic, which was not relieved until the hæmorrhage which was the cause of it had been carried off by the urine. The recurrence of the kidney bleeding was always heralded in this very painful way.

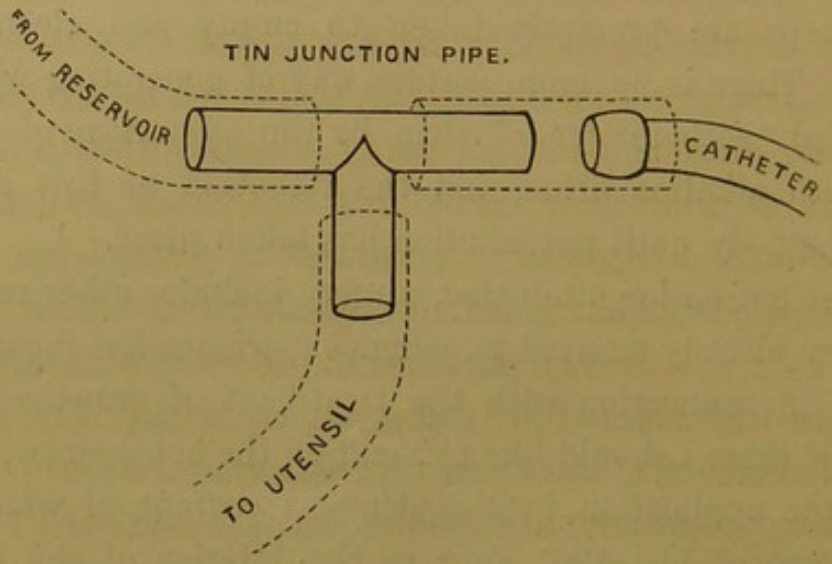
In connection with cases of this nature I have also frequently noticed the long time blood, in certain quantities, will remain in the bladder, provided it is surrounded by certain conditions. I have now a patient under observation who is slowly disintegrating a blood clot, which I believe has been lying in his

bladder for many weeks since the accidental occurrence of a vesical hæmorrhage, which we have reason for believing has not since been repeated. It should be stated that the urine has remained acid throughout, and of a somewhat low specific gravity. A blood clot subjected to the action of alkaline or ammoniacal urine means, I believe, bacterial putrefaction of the whole mixture, and the rapid development of acute cystitis, unless steps are promptly taken to empty and cleanse the bladder. There is no more certain way of generating what has been called "catheter fever" than by the admixture of a little blood with alkaline urine, and the retention of this mixture within the body until putrefaction has taken place.

It must not be forgotten that surgery includes other resources than those already referred to, which experience has shown to be of value in connection with the treatment of growths of this kind. Of these I should like to mention the hot douche; that is to say, the application, in a continuous current, of water at a temperature of 110–120° Fahr. to the interior of the bladder. It is now some years since I advocated this in connection with certain sensitive conditions of the mucous membrane of the bladder after attacks of cystitis. In vascular growths of the bladder I have also seen the greatest benefit follow the persistent adoption of this practice. Where the villi are not large, it may be sufficient to effect their removal. I have found the following to be the simplest plan of effecting bladder irrigation. The apparatus consists in a rubber catheter, a tin vessel capable of holding a quart of water, and some rubber piping: if the connection between the reservoir and the catheter is made with one of Dr Solomon Smith's junction pipes[1] the bladder can be as thoroughly irrigated in this way as by a double current catheter. In conducting this operation it is most desirable not to use anything harsh or likely to occasion bleeding. The rubber or American silk catheters are admirably adapted for purposes of this kind. The association of stone with hæmorrhage, both in children and adults, is sufficiently common and obvious as not to require illustration.

[1] *The Lancet*, March 22, 1884.

Perplexing instances are occasionally met with where hæmorrhage is maintained by the presence of a stone which cannot be discovered. In a case that was recently attended by Dr D. Forbes and myself, a young man suffered for some weeks from hæmaturia and cystitis; he was sounded by both of us carefully, but without positively ascertaining that a stone was present.



After the last sounding he passed an angular oxalate stone, and all his symptoms at once ceased. The further persistence of hæmorrhage of this kind would have justified the exploration of the bladder by the median method.

Hæmaturia is rarely a symptom of well-marked organic stricture. In a case I attended in 1882 with a neighbouring practitioner, I find the following note:—The patient, aged 32, four months previously had gonorrhœa, which he treated himself with mixtures and strong injections. Three months ago sudden and copious hæmorrhage from the urethra came on whilst he was walking, and since he has constantly suffered from hæmaturia. So tight was the stricture—or rather series of strictures—that I could only pass a filiform bougie. This was retained for forty-eight hours, after which dilatation was uninterruptedly and successfully proceeded with by my friend. The case was remarkable, not only for the extensive manner in which the urethra was strictured and indurated, but for the persistence of the hæmaturia; the latter symptom however speedily disappeared, as dilatation by the urethra was proceeded with.

A Case of Ruptured Bladder and Fractured Pelvis where Median Cystotomy was Performed. By REGINALD HARRISON, F.R.C.S., Surgeon to the Liverpool Royal Infirmary.

RUPTURE of the bladder is an injury of so fatal a character that it is desirable to record all instances where attempts have been made to deal with the lesion other than by those means which have hitherto proved of little permanent avail, viz., the introduction and retention of a catheter. With the same desire as prompted Dr Alexander[1] to narrate a case of a somewhat similar nature, where he had opened the abdominal wall down to the peritoneum, I submit the following particulars for the consideration of the profession. It is seldom that an operative measure in surgery is perfected at once or by one man. We have but few illustrations of this; on the contrary, it is by the experience of many that precision eventually has been arrived at. Hence there is no case which has not its bearings upon the issue before us.

On January 12, 1884, G. H.——, aged twenty-nine, was admitted into the Liverpool Royal Infirmary, having tumbled from a railway waggon, a distance of about six feet, with a heavy "set" or stone on the top of his pelvis. He was rendered unconscious for about five minutes. On admission, some blood was found on the front of his shirt, and pelvic crepitus was detected. He was unable to micturate, and had not done so for three hours previously. A catheter was at once introduced, and about eight ounces of urine, mixed with bright-red blood, were drawn off. I saw him six hours after this (at 11 P.M.), and removed with the catheter about five ounces more urine of a similar nature. The catheter passed easily, was not locked in the bladder, and the urine came off in a steady stream. I also localised a fracture of the right pubic bone. The conclusion arrived at was that the bladder was ruptured, but there was

[1] *Liverpool Medico-Chirurgical Journal*, January 1884.

some doubt as to the precise position of the rupture relatively to the peritoneum. I therefore determined to explore the bladder with my finger by a median opening from the perineum, and to shape any subsequent proceeding in accordance with the result. This I accordingly did, and discovered that the rupture was extra-peritoneal, and situated on the anterior wall a little behind the prostate. The opening admitted the index finger, by which a fracture of the pubic arch could be felt. The position of the rupture decided what should be done. A large lithotomy tube was passed into the bladder from the perineum, through which drainage could be carried on.—13th, 10 A.M.: The patient had passed a restless night, but was not in pain; the urine came away freely, slightly tinged with blood. 5 P.M.: Much pain complained of in the lower part of the abdomen: pulse 95; temperature 99°. He vomited everything, and complained intensely of thirst. 8 P.M.: As the pain and vomiting continued, nothing was given but ice and small doses of opium.—14th, 2 A.M.: Complains of much pain over lower part of the abdomen; fomentations applied; pulse increasing in frequency; temperature 101°; urine draining away freely, and natural in appearance. At 2.30 A.M. the flow suddenly ceased; it was thought the tube might be blocked, but this was not the case. At 8.30 A.M. the patient died suddenly, the abdomen remaining soft and compressible to the last. It was subsequently ascertained that the patient had only left his bed a fortnight previously, after an attack of scarlet fever. He lived thirty-two hours after the cystotomy, during twenty-seven hours of which urine was freely passed through the tube. No urine seemed to have been excreted during the last five hours of life. The operation of opening the bladder was performed on a staff; it occupied only a few seconds, and may be said to have been bloodless.

Post-mortem Examination.—On opening the abdomen there were found signs of commencing peritonitis. There was some serous fluid in the pelvis, but no blood. The visceral peritoneum, covering some coils of small intestine in the pelvis, had lost its gloss, and the whole of the pelvic peritoneum was rough and

injected. The space in the lower part of the anterior abdominal wall, between the two layers of the transveralis fascia leading down to the bladder (porta vesicæ of Retzius), contained some bloody urine; this space was found, on passing a finger into the bladder through the perineal wound, to be in communication with a laceration in that viscus, situated on its anterior aspect, a little behind the prostate. There was no laceration of the peritoneum. The bladder was empty. The pelvis and contents, on removal, presented the following injuries:—A lacerated wound of the bladder in the situation before mentioned, about three-quarters of an inch long, and a similar one in the base of the trigone; a laceration of the perineal tissues below the level of the urethra, but communicating with the operation incision; a fracture of the right side of the pubic arch could be detected by the finger, both from this and from the vesical wound; there was much effusion of blood beneath the pubic fascia, in the neighbourhood of the right sacro-iliac synchondrosis, and a similar but rather smaller collection of blood in the sub-peritoneal tissues on the left side around the upper part of the obturator foramen, with complete division of the obturator artery and vein. There were in all six lines of fracture of the pelvic bones. The transverse and descending rami of both pubic bones were broken through about the point of their junction with the ilium and ischium. The left descending pubic ramus was also broken across near its junction with the body of the bone, and on the right side there was a complete vertical fracture of the sacrum running through the anterior sacral foramina.

In this case the ruptures of the bladder were undoubtedly caused by a penetration of the fractured pelvis. Where rupture of the bladder is complicated with fracture of the adjoining pelvic bones, the opening into the viscus is usually extra-peritoneal; where the rupture is not thus complicated it is intra-peritoneal, and is generally found in the base or posterial wall.

In investigating injuries involving the parts constituting the neck of the bladder, in which I include the membranous urethra,

I have experienced difficulty in satisfactorily explaining how it was that the membranous urethra was sometimes ruptured without fracture of the pelvis coexisting, whilst there was no evidence that the perineum had ever been struck. In treating of rupture of the urethra Bryant refers to the point in the following words:—"In not a few instances the injury (ruptured urethra) has been produced by the passage of a cart wheel across the pelvis. It is somewhat difficult to understand how such a result can be produced by such a cause, unless some fracture of the pelvis coexists; but, explain it how we may, in practice we meet with cases of ruptured urethra following upon the passage of a wheel across the pelvis, and unconnected with any other symptom of its fracture."[1]

In some instances of ruptured urethra I have seen in young subjects, where the force has been applied to the sides of the pelvis, as in crushes and squeezes, and not to the perineum, as is more commonly the case, I feel convinced that the tearing of the urethra more or less across is occasioned by the bowing or bending forwards of the circle of the pelvis at the symphysis pubis under pressure applied to the sides. In this way, by the sudden elongation of the antero-posterior diameter of the pelvis the urethra is put on the stretch, and gives way at, or immediately behind, the point where it passes through and is fixed to the deep triangular ligament.

In the case I have narrated the very extensive injuries to the pelvic bone, and possibly the condition of the kidneys, consequent on the attack of scarlet fever, placed the patient in the most unfavourable position for any hope of recovery. I believe he died from shock more than anything else. As a rule, however, cases of ruptured bladder owe their almost unexceptional fatality to the rapid development of acute peritonitis provoked by the retention of blood and urine. Here this symptom, though possibly sufficient time had not elapsed for its full development, seemed to be in check. It is, however, to the management of the urine in this class of cases I wish more especially to direct attention. I do not think the transition-

[1] *The Practice of Surgery.*

contact of healthy urine with any tissue of the body, such as for instance, the peritoneum, is necessarily provocative of inflammation. Menzel's experiments, as well as clinical observations in cases where recovery took place, though there can be no doubt that urine actually passed into the peritoneal cavity, whence it was removed, warrant such a statement. A bruised tissue, or urine rendered morbid either by decomposition or admixture, represent very opposite conditions, where inflammation of the most acute and destructive form is sure to be provoked by contact of this kind. In some cases I have seen, where the bladder has been burst like a paper bag suddenly compressed, pent-up urine which has been left to decompose in the peritoneal cavity has practically been the cause of death.

From a careful consideration of these accidents, and some records relating to their treatment, together with an experience of my own, I have resolved for the future to adopt in principle the following procedures, subject to such modifications as may from time to time be required :—

1. To open the bladder from the perineum, and to carefully explore with the finger. I should prefer this as a preliminary to opening the abdomen, as the latter might prove to be unnecessary by reason of the rupture being extra-peritoneal. If exploration determines the necessity for such a complete examination of the fundus of the bladder as can only be afforded by laparotomy, the perineal opening will still be desirable for the most effectual form of bladder drainage.

2. If the rupture prove by perineal exploration to be extra-peritoneal, the insertion of a bladder tube for drainage similar to what is adopted after lithotomy is indicated. In the case I have recorded the urine escaped readily so long as the kidneys excreted it. The *post-mortem* examination showed no indication either of lodgment of urine or urinary extravasation.

3. If the rupture on exploration prove to be intra-peritoneal, and there is consequently a probability that urine has passed into the peritoneal cavity, the further proceeding of opening the abdomen, with the view of clearing out the peritoneal cavity, will

be determined by two considerations, (1) relating to hemorrhage, and (2) the question of urine drainage. Rivington observes:— "A considerable amount of blood has been found in a few cases in the abdominal cavity. When Mr Heath operated he was surprised at the amount of clots which had to be taken out of the peritoneal cavity; and at the *post-mortem* examination in Dr Dewar's case 3 lbs. of clotted blood were removed. In one of the cases reported by Mr B. Cooper three or four pints of nearly pure, uncoagulated blood were found effused into the cavity of the peritoneum."[1] If the urine be deeply tinged with blood, and clots escape from the bladder through the explorating wound, then I think that laparotomy should be proceeded with, as it is extremely likely, especially if there has been much delay, that clots will be found in the abdominal cavity; these, with a small admixture of urine, will most surely occasion acute peritonitis. If, however, on exploration the urine escapes with only a slight admixture of blood, as frequently has been the case in recorded instances where the catheter has only been used, and which has been verified by *post-mortem* examination, then the question arises—Will a perineal incision and a drainage-tube be sufficient to prevent urine finding its way into and lodging in the peritoneal cavity? Assuming that we are dealing with a case of intra-peritoneal rupture of the bladder, where the laceration is necessarily above a horizontal line drawn between the openings of the two ureters, and that we have a normal bladder and prostate, I undertake to say that if an incision be made from the perineum through the neck of the bladder, such as we employ in the operation of lateral lithotomy, and we then put in a tube as after the latter operation, not one drop of urine will find its way into the peritoneal cavity.

Apart from conclusions drawn from my own observation of wounds made into the bladder for a variety of operative purposes, I would seek to substantiate the assertion I have just made by the *post-mortem* records of ruptured bladder and the structural arrangement of the normal bladder. Mr Rivington observes:—"The records of *post-mortems* on the intra-

[1] *Rupture of the Urinary Bladder*, p. 25, 1884.

peritoneal cases prove the frequency with which the bladder is found contracted. In twenty-seven out of thirty-four the bladder is described as contracted, in two as empty, in one as collapsed, in one as not fully contracted, in one as contracted to one-third its natural size, in one as not much contracted, and one as much enlarged. In some the contraction was very considerable, being described as 'very much contracted and entirely empty' (Cusack), 'firmly contracted,' 'completely shrivelled up around the entrance of the urethra,'"[1] &c. Furthermore, the connections and muscular disposition of the bladder are such as to favour the escape of urine through its neck, provided adequate means are adopted for entirely suspending the sphincter action which controls micturition. The trigone, which we all know is immediately below the orifices of the ureters, is exceedingly smooth, and by reason of its connections and construction is incapable of contraction.

In making the assertion that, if in a case of ruptured bladder an incision be made into the neck, urine will not find its way into the peritoneal cavity, I limit the kind of incision to that which is usually employed in lateral lithotomy, for reasons that must be well known to every practical lithotomist. In the selection of this procedure I have the support of Rivington, who observes:—"In lateral cystotomy the knife would be able to cut freely into the prostate and reach the neck of the bladder, which would be slow to regain its retentive power. This constitutes the great recommendation of the lateral operation, and no other measure appears to me to equal it for efficiency in this important direction."[2]

Six cases, with three recoveries, are briefly referred to by Stein,[3] as illustrating the employment of lateral cystotomy for rupture of the bladder. The greater number of these can hardly be regarded as testing the value of this proceeding under these circumstances, as the operation does not appear to have been performed for considerable periods of time after the injury, and on the development of signs of peritonitis.

[1] *Op. cit.* [2] *Op. cit.*

[3] *On Rupture of the Bladder*, New York, 1882.

Amongst the more recent examples of the treatment of ruptured bladder by operation, is one recorded by Dr Weir of New York,[1] where a successful result followed median perineal urethrotomy and drainage. The rupture was determined, by digital exploration of the viscus, to be extra-peritoneal.

In conclusion, in a case of ruptured bladder, I would say—Don't trust to the catheter except as an aid to diagnosis; perform without delay the lateral operation, as for lithotomy; explore carefully with the finger. If the rupture prove to communicate with the cavity of the peritoneum, and there are reasons for believing that hæmorrhage either has been or is going on, or the bladder is not contracted sufficiently to prevent urine passing into the cavity of the peritoneum, open the abdomen with the view of removing clots and urine from its cavity and close with sutures (as Willet[2] and Heath[3] have done) the rupture in the bladder. If the laceration prove to be extra-peritoneal, be content with the introduction of a tube from the perineum, so as to permit of continuous drainage being carried on.

[1] *New York Medical Record*, March 29, 1884.
[2] *St Bartholomew's Hospital Reports*, 1876.
[3] *Royal Medico-Chir. Trans.*, 1879, vol. lxii.