

+ Prof Spence

Thesis on Injuries to the Wreath



by
J

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Index to Thesis.

page.	
1.	Plan of Thesis
2.	Case of injury to urethra occurring on board ship.
5.	Observations on this case.
8.	On Injuries to the urethra
8.	Internal injuries
9.	External injuries
11.	Injuries with External wound
13.	Retention of urine from injury to urethra
18.	Extravasation of urine 80 80
19.	Stricture 80 80
20.	Symptoms of injury to urethra
23.	Treatment 80 80
28.	Appendix
29.	Cases
65	Index to cases

Injuries to the Urethra.

The Urethra being the canal by which the urine naturally passes out of the body, any injury sustained by it in any part of its course becomes of the utmost importance, and generally demands very energetic treatment.

In February 1874 I was called upon to treat a case of this kind under peculiar and disadvantageous circumstances, namely on board a ship while taking charge of Emigrants to New Zealand. Being a subject that is not dealt with at any great length in Surgical works, I thought it might be of some interest to report the case, and make some observations on the subject generally. Therefore I have referred to what works I could find, written on Injuries to the Urethra, and they are the following, i. S. S. Gross on Diseases, Injuries and Malformations of the Urinary Bladder, Prostate Gland & Urethra.

ii. A paper by Dr. Isaac Hays of Philadelphia, in the American Journal of Medical Sciences Vol. 4. 1837, no. 38.

iii. W. S. Gougey on Diseases of the Urinary Organs.

I propose to divide my Thesis into 3 parts, viz,

1st A Report of the Case above mentioned.

2nd On Injuries to the Urethra generally.

3rd An Appendix, of cases collected from the Journals.

A case of Injury to the Urethra followed by Stricture. The patient, James Hennessy aetat: 28, of strong, muscular development, was an Emigrant to New Zealand by the ship 'Win', and classed as a single man.

On the evening of 14th Feb^r 1874, a week after leaving Queenstown, the ship was pitching heavily owing to rough weather, and Hennessy who was sitting astride on a form was suddenly shot off, and fell with his legs apart against a wooden stanchion, striking his perineum with great force. I was immediately sent for and found the patient suffering from the effects of the shock, which appeared to be very great. He was scarcely able to move, and complained of great desire, though utter inability to pass water; he had micturated shortly before the accident, therefore his bladder was not distended. Blood was oozing from the orifice of the urethra, he had much pain about the neck of the bladder, and about the seat of injury, which was increased on pressure. There was no sign of injury in the perineum, no swelling or discolouration, the parts being perfectly normal in appearance. The only signs of Urethral injury were, Hemorrhage, retention of urine, and shock. I at once had him placed in as suitable a position as possible, and attempted to pass a full-sized silver catheter, but without success, the instrument passed as far as the membranous portion of

the Urethra, and just beneath the os pubis, the point seemed to deviate from the natural course, and communicated a peculiar grating sensation to the touch while manipulating the instrument. On withdrawing the stilet, blood alone flowed through the catheter in a full stream, ^{and} finding I could not pass the catheter into the bladder, I soon gave up the attempt as the motion of the ship was very unfavourable for its use. It was scarcely possible to cut down to the lacerated part as the weather was very rough & the ship rolling too much to admit of such an operation, therefore I determined to try all other means first to empty the bladder, especially as no swelling of the parts had occurred. Hot fomentations were applied but without effect, and about midnight his bladder was greatly distended and he was in intense pain; a hot bath was now ordered, & while in it, he was able to pass urine, this caused great pain at first in the urethra, but as the stream continued he became easier; a few clots came away at first with the urine & afterwards there was slight oozing of blood, which soon stopped.

The next morning I passed a no. 9 silver catheter with ease into the bladder, & retained it for a few hours, but it caused such pain owing partly to the motion of the ship, that I had to withdraw it in the evening. A gum-elastic catheter also caused such great pain that it could not be retained. On Feb 4th 23rd or nine days after the accident

he could pass his urine in a perfectly normal manner, & was in his usual health.

On 18th March or twenty-three days after this, he complained of not being able to pass water freely; he said he had to strain considerably before passing any, and then it only came in a small stream; he had noticed this for the last few days, but had paid no attention to it, until he found it becoming worse. On examining the perineum, I found a hard swelling in the membranous portion of the urethra, about half an inch in length, having a firm, cartilaginous feel, and a distinct outline, seemingly to extend round the whole circumference of the tube. After much trouble a no. 7.5 silver catheter entered the stricture, but could not be made to pass into the bladder, as it was so tightly constricted; and it required considerable force to withdraw it, even after it had been left in for some time; however, immediately after its withdrawal, a no. 4 silver catheter, entered the stricture & by continual pressure on it for a short time, I succeeded in passing it on into the bladder; it caused a peculiar sensation in passing, at first it was tightly constricted & after gradual pressure for a short time, it appeared to overcome some obstacle & pass with a sudden jerk on into the bladder, & this occurred every time a catheter was passed, even with the larger sized. I passed one every other day, increasing in size gradually, & retaining

the instrument for half an hour or more at a time, until the 23rd March, when he remained longer than usual without having the catheter passed; a no. 7 had passed into the bladder. On March 27th only a no. 6 could be passed through the stricture, I then continued catheterism as before, & on 31st March a no. 8 entered the bladder. The patient continued otherwise in good health, though not feeling so strong as before the accident. On April 1st the weather was very rough, and the patient was thrown down on deck with several others by the heavy rolling of the ship, he was accidentally kicked and sustained a fracture of the right tibia in the upper third. He was now compelled to lie up in a bunk, with his leg & whole body firmly fixed, so as to prevent any movement of the fractured ends. His leg united well, and the urethral complaint improved while he was compelled to remain at rest; catheterism was discontinued, but I occasionally passed a no. 9 with ease into the bladder, though each time some slight obstruction was felt. On 27th April he was removed to the hospital in Dunedin, N.Z. and therefore remained no longer under my care; I saw him two or three times afterwards and he was progressing favourably, and in about 5 weeks after his admission I heard that he was discharged as cured.

In this case there are three points worthy of observation:
1st Throughout the whole time of that the case was under my care

there was no discolouration in the perineum, and at first there was no swelling of the parts, though when he complained of the abnormality in the passage of urine, a distinct swelling could be felt. There was free haemorrhage, and retention of urine with great desire to pass it, from the commencement; and this would tend to show that there must be some other cause, besides coagulation of blood in the canal or swelling of the parts to cause retention.

2nd. With regard to the treatment, it was a case in which the operation of cutting down to the lacerated portion of the urethra would have been perfectly justifiable, and it was the treatment I should certainly have adopted, if it had been practicable; but owing to the motion of the ship such an operation would have been hazardous in the extreme. The result was that after a short time, the inevitable consequence in such cases followed, namely, a stricture of the worst kind, and this came on very rapidly; nine days after the accident I could pass a full sized instrument, but in twenty-three days after this I could only succeed with great trouble in passing a no. 5. I had told him to let me know at once if he found any inconvenience in passing water, but he did not complain until the trouble had become very considerable, and having so many other duties to attend to, I was unable to give so much attention to his case as I should otherwise have done. On passing a catheter every other day, the stricture

gradually dilated, but when the catheter was omitted for a day, the part again became rapidly constricted.

3rd. When the patient had to lay up with a fractured leg, there was a marked improvement in the state of the urethra, for the stricture became much more easily dilated, and the swelling in the perineum decreased, it seemed to lose its firm cartilaginous feel and to become softer. Probably the determination of blood to the fractured part would in a great measure cause this; the smaller diseased portion in the urethra not requiring so extensive a healing process as the fracture; hence the diminution in the size of the swelling, from gradual absorption; and the patient was able to pass his urine freely in a full stream. Though during rest and the healing of the fracture there was such a marked improvement in the urethra, yet in all probability, when the leg had healed and he could again get about, the stricture would return and he would subsequently have to undergo an operation.

In these cases it seems that the best treatment is to cut down to the lacerated urethra at once, as it saves the patient a great amount of pain & trouble afterwards; & if not done at once it is almost certain that some operation will be required afterwards, when perhaps the patient may not be in such a favourable condition, owing to other complications having arisen, as diseased bladder & kidneys &c.

On Injuries to the Urethra.

Injuries to the Urethra are not of very frequent occurrence, and they are of the greatest importance owing to the structure involved and the consequences that ensue, often requiring prompt and energetic treatment in order to preserve the life of the patient; or to prevent further mischief to the economy.

The canal may be injured in various parts of its course and in different degrees, from a simple contusion to complete obliteration of a large portion of its structure; the cause may be either external or internal.

Internal Injuries are such as result from, the unskillful use of instruments; or from the passage or lodgement of calculi from the bladder; or, from spicula of bone when the os pubis is fractured, or, from pressure of the urine when the bladder is greatly distended in cases of previous tight organic stricture, causing rupture of the urethra at the vertical end of the stricture.

i. When instruments, such as sounds or catheters or bougies are carelessly introduced along the urethra false passages are frequently made, and often perineal abscesses resulting in fistula or even extravasation of urine. Patients themselves may produce these lesions by using bad instruments or by passing other foreign bodies along the canal.

ii. Sometimes fragments of stone from the bladder after lithotripsy may cause injury to the mucous membrane of the urethra; occasionally

- calculi become lodged in the canal. These cases are rare.
- iii. When the pelvis is fractured, as in military accidents, the urethra frequently becomes torn by spicula of bone, retroversion of urine then occurs; constituting the most dangerous of injuries.
- iv. In cases of previous organic stricture, the mucous membrane of the urethra may be ruptured from violent attempts to empty a distended bladder; the walls of the canal become dilated and attenuated at the vertical end of the stricture, and debilitating causes in the system may tend to weaken this portion, then after drinking freely, perhaps, the bladder becomes greatly distended, & the patient not being able to empty it rapidly, uses great force & thus ruptures the urethra.

External injuries are of far more frequent occurrence and of greater importance than internal. They may cause, i. Simple contusions, ii. Laceration of the urethra without external wound, or iii. the injury may be so great as to produce rupture of the urethra and external parts to a greater or less extent.

i. of Simple contusions, Peyrard says in his *Traité des Rétrécissements du canal Utrinaire* p. 86, "All contusions of the urethra are followed by organic stricture, sooner or later, according to the extent and degree of disorganization." There is however a case recorded in the *Lancet* Feb. 10th 1827 in which a boy had incontinence of urine after an injury

to the perineum. Jouley in his work on diseases of the urinary organs relates a case of stricture with frequent retention of urine for more than 10 years which resulted from a bruise of the perineum when the patient was a child. Such cases however are rare; and as a rule the injury must be sufficient to cause an abrasion or rupture of the mucous membrane for a stricture to result. An existing organic stricture may be aggravated by a blow on the perineum; or it may be the foundation for abscesses in this region and fistulae with subsequent stricture.

ii. Laceration of the urethra without external wound. This is by far the most frequent form of lesion of this part. The amount of force requisite to produce a laceration cannot be estimated with any degree of accuracy, for in some cases a simple blow may cause severe laceration and contusion, whereas in other cases greater force may produce & ~~rather~~ less consequences. Jouley relates some experiments he made on a dead subject, he allowed a weight of five pounds to fall on the perineum, the force tending to crush the perineum against the pubic arch; when falling from a height of four feet the canal sustained a contusion without any solution of continuity, but from a height of six or seven feet it caused the mucous membrane to be cut transversely in its whole circumference. These experiments, however, were made on a dead subject and

therefore cannot indicate with any accuracy the amount of force required to produce the same effects in the living subject, as the parts are in such an utterly different condition.

The external causes producing injury to the urethra without an external wound are usually of the following kind,

- (a) Kicks and blows of all kinds in the perineum.
- (b) Falling with the legs astride and so striking the perineum against some hard body, as a beam of wood, or back of a chair.
- (c) Sudden jerking forwards on to the pommel of a saddle while riding. The urethra may sustain different degrees of damage from such causes; there may be only a slight abrasion of the mucous membrane, or this may be ~~com~~ torn completely through, or it may also involve the textures beyond. The extent of injury is in proportion to the amount of force applied, and whether it is of a sharp and sudden kind as a blow, or dull and prolonged, as by falling on some hard blunt body with the legs astride, this latter would produce a greater amount of injury to the soft parts surrounding the urethra.

iii. Injuries to the urethra with external wound may be produced by (a) Simple longitudinal incision; this is the most favourable kind of wound that can occur in this part, as it heals without leaving further stricture; it is only produced by operation, either for the relief of stricture, or in cutting for stone in the bladder, or to convert other more dangerous lesions into

- Simpler and more favourable wounds. They do not occur from violence.
- (b) Transverse incisions, as injuries are very rare. They are of necessity produced in amputation of the penis. A case is recorded by Heybard, in which a man divided his urethra while in a state of suicidal mania.
 - (c) The urethra may be lacerated with an external wound by a fall with the legs astride on some sharp nail or other hard body, or a puncture may be caused by falling on a spike in this way.
 - (d) Kicks and blows may cause an external wound, but they must be applied with great force. A kick from a horse is liable to cause such an injury.
 - (e) Burns cause very destructive injuries to these parts, as they may produce obliteration of large tracts of the urethra. They are rare, but may occur in iron manufactories, as the case reported in the *Lancet* March 16th 1861.
 - (f) Gun-shot wounds may produce the most terrible consequences.

The seat of the injury is usually the perineum just beneath the arch of the pubis and the laceration is in the membranous portion of the urethra, between the triangular ligament and the bulb, or it may occur between the anterior & posterior layers of the deep perineal fascia, or behind the ^{anterior} ~~posterior~~ layer, which is the most dangerous position. The spongy portion is rarely lacerated. The canal is generally forced against the bony arch of the pubis, & the mucous membrane is either

completely lacerated & divided round the whole circumference of the Tube, so that the two ends become retracted; or it may be only partially ruptured transversely, this generally occurring in the portion nearest the perineum, & furthest from the bone. The direction of the laceration is usually oblique, occasionally it may be circular.

There are three important results of laceration of the urethra which deserve special attention. Two are immediate consequences and when they occur are certain evidence of this lesion, namely Retention of urine, and Extravasation of urine. The third comes on more remotely, namely, Stricture of the urethra. Retention of urine is one of the most frequent and most urgent consequences of injury to the urethra, it occurs in almost every case arising from blows or kicks or falls.

The causes for this deviation do not seem to be satisfactorily explained in most works or writings on the subject. In a treatise on diseases of the urethra by Charles Bell of the Middlesex hospital, published in 1822 there is the following passage at p. 305; "Where the urethra is ruptured by a blow, a consequence of the injury is kept out of view, with singular pertinacity, viz, that the obstruction to the passage of urine does not proceed directly from extravasation, nor is it owing to pressure upon the canal. It is the injury which the wound inflicts and the consequent disorder, and loss of consent among the muscles

of the perineum and neck of the bladder, which prevent the discharge of urine". The explanation still given in the latest works is, that retention of urine in these cases, is owing to infiltration of the ^{urine into} tissues round the urethra, or of blood & the formation of coagula, or from swelling of the soft parts round the urethra from the other causes pressing upon the canal, or from retraction of the divided ends of the urethra, or from a disabled condition of the bladder itself; but there are not sufficient to explain retention in all cases or indeed in most; for there are cases of retention which occur from injury before any swelling has taken place, & in which perhaps there may have been only an abrasion of the mucous membrane; and in most cases the patient is seized at once with a great desire to pass water but utter inability to accomplish it, and this occurs even if the patient had micturated a short time before the accident; it is accompanied too with great pain at the neck of the bladder. In many cases where the urine passes after a time without the aid of instruments clots of blood are washed away with it; the urethra too is capable of dilating, so that if a coagulum blocked up the tube or the swelling of the parts beyond pressed upon it to any extent, the urine by continual pressure would either pass by the side of it, or into the surrounding tissues. It seems scarcely possible that a clot could form in so short a time and with such firmness as to resist a push of urine when the

Coagulum

Bladder is greatly distended; and if infiltration of blood has
 occurred into the surrounding tissues, yet that could scarcely
 attain to such solidity as to resist the continued pressure
 exerted upon it in one point by the urine; the soft parts
 would give to a certain extent, or the urethra would be further
 ruptured probably at the opposing point. Again, in some
 cases where an incision has been made down to the injured
 part and the clots removed, still no urine has passed, the
 retention even then remains until an instrument has been
 introduced into the bladder. If the bladder itself became
 disabled altogether, the urine would not necessarily be retained
 but would pass away involuntarily with continual dribbling.
 The disorder and loss of consent among the muscles of the
 perineum ^{and neck of the bladder}, as stated by Charles Bell in the treatise above referred
 to may be true to a certain extent, though this is rather vague.
 A spasmodic stricture appears to be produced at first by the
 injury, & this may be aggravated & kept up by the above causes.
 In the Practitioner for January 1875 there is a treatise by
 Henry Power M.D. on the physiology of micturition which
 would give an explanation for the retention in these cases.
 The writer explains the real sphincter period, ^{consisting of} as situated longitudinal
 muscular fibres situated in the prostatic portion of the
 urethra, which gradually become more & more marked towards the
 apex of the prostate, where several distinct layers may be seen
 forming Gutierrez's & Wilson's muscles; then he refers to normal

micturition as being influenced by an excito-motory centre situated about the 5th lumbar vertebra; and he then relates some experiments made by Budge, who attempted to show what part of the urinary apparatus required to be stimulated in order to cause contraction of the sphincter vesicae. The bladder was exposed by opening the abdomen, one ureter was tied and a cannula passed into the other, through which a continual stream of water was passed, the pressure being sufficient to overcome the resistance of the sphincter in the normal condition, so that the water flowed out of the urethra. If any part of the bladder was irritated an increased flow was produced; but as soon as the electrodes passed from the bladder to the urethra a sudden interruption of the flow took place, the stoppage being most complete when one electrode was applied to the membranous portion, and after cutting away the whole of the corpus cavernosum this was found to be owing to the sudden approximation of the lips of the orifice. A similar result was produced though more slowly by applying the electrodes above and below the prostate, and the action became less intense as the bladder was approached. By these experiments on animals it appears that when one portion of the membranous urethra was irritated, a greater contraction of the sphincter was caused, than when the part above or below this was similarly treated, and cases of injury to the urethra followed by immediate

retention of urine are capable of being explained in this way. In a case of injury to the urethra with retention, the best explanation seems to be, that the membranous portion becomes suddenly irritated & owing to this the sphincter vesicae is probably contracted; this may be increased and kept up by the infiltration and swelling of the surrounding tissues, which cause a continual pressure upon the membranous portion.

The abnormal irritation in a certain portion of the membranous part of the urethra produces a spasmodic contraction of the sphincter vesicae, and a great desire at the same time to pass water, accompanied with much pain at the neck of the bladder, and a loss of control over the regulating centre; the bladder gradually becomes distended & then through the excito-motory system the sphincter is still more strongly contracted, until either the force of the distended bladder is sufficient to overcome the existing muscular action and the urine dribbles away, or the bladder bursts under some instrument is passed or the bladder is punctured.

In cases where there is no retention, probably the urethra is injured either above or below the most vulnerable portion, and this may occur too in those cases where retention does not come on until some time after the injury, this however maybe also partly owing to irritation produced by the passage of instruments or the gradual pressure on the membranous portion from swelling of the surrounding tissues. The retention can sometimes be

overcome by hot fomentations & the usual remedies for spasmodic stricture, but often it resists all such treatment and requires some further operation.

Extravasation of Urine. This is a complication that does not very frequently arise in ordinary cases of rupture of the urethra. It generally occurs when the laceration is caused by fracture of the pubic bones, or after long-continued and unsuccessful attempts to pass a catheter in simple laceration, & where the injury & damage to the urethra has been of a very severe degree; it may take place either in front of the triangular ligament or behind the anterior layer of the deep perineal fascia; in the former the urine takes the usual course, beneath the superficial perineal fascia into the areolar tissue of the scrotum & penis, & then the areolar tissue of the anterior and lateral parts of the abdomen, being prevented from passing backwards by the attachments of the triangular ligaments. But if the laceration occur behind the anterior layer of the deep perineal fascia, there will be no swelling in the perineum or scrotum from extravasation unless the triangular ligament itself be ruptured; the urine is prevented from passing forwards by the anterior layer of the deep fascia, it pushes back the posterior layer of the deep fascia, separates it from the back of the symphysis & then passes into the abdominal walls in front of the peritoneum and transversalis fascia.

When, therefore, extravasation occurs behind the anterior layer of the deep perineal fascia, no swelling takes place in the scrotum or perineum to indicate the mischief; peritonitis in its worst form will supervene and soon cause death of the patient. This, however, is rare, generally when extravasation of urine occurs, the scrotum becomes greatly distended, & the swelling gradually spreads to the abdomen, the parts soon slough owing to the intensely destructive action of the urine over the tissues; large portions of are destroyed, & often a considerable tract of the urethra becomes obliterated, and even if the patient recovers from the more serious effects, fistulae are liable to remain.

Stricture. This will be certain to follow an injury to the urethra if left to itself, sooner or later. It is the most obstinate form of stricture that can occur owing to its structure. When the mucous membrane of the canal has been lacerated in any part of its course, as the parts heal up, a dense contractile cicatricial tissue is formed, which can easily be felt in the perineum like cartilage, this takes place very quickly after the injury; in fact, the constriction may have become so great in a few weeks as to permit the entrance into it of the smallest instruments. If the mucous membrane be ruptured through the whole circumference of the tube, it is very doubtful whether the two ends can be reunited, though if only the narrowest portion of mucous membrane connects the two ends, the canal may be perfectly restored.

When this form of structure is treated by dilatation, the passage of instruments causes great pain, as it is very sensitive, and if the catheterism be omitted for any time, after the parts are dilated, they soon become again constricted. The only way in which a permanent cure can be effected, is by dividing the cicatrized portion longitudinally, though this sometimes fails. In some ~~instances~~ instances especially after extravasation of urine or where a considerable portion of the urethra has been obliterated fistulous openings are left in the perineum by which the urine is discharged & it may be impossible to restore the canal, so that the patient may have to wear some special apparatus.

Symptoms. Since the urethra may be injured in so many ways and in such different degrees, it is scarcely possible to give a train of symptoms that may be expected to occur in every case; but when it has been injured it is scarcely possible to make a wrong diagnosis, & it becomes of more immediate importance to determine the extent of the injury. The most usual symptoms of injury to the urethra are six in number, namely, Shock, Pain, Hemorrhage, Swelling, Inability to pass urine, Retention. — ~~A shock~~

The shock to the patient varies according to the cause & effect of the injury, it may be slight, so that the patient can walk about immediately afterwards, or there may be complete collapse. In an ordinary case of injury from a blow in the perineum, this

is the first symptom, then there is great pain in the parts, of a sharp & continued character, which gradually extends to the thighs, blood is seen to be oozing from the orifice of the urethra, the pain & hæmorrhage are greatly increased by the passage of instruments; the perineum and scrotum begin to swell & become darker in colour from effusion of blood into the surrounding tissues; soon the patient has an intense desire to pass water, but finds he is utterly unable to pass a drop, blood only coming away; the pain still increases as the bladder becomes distended; & a medical man being sent for, at once attempts to pass a catheter, but this had to be shortly abandoned as the instrument deviates from the canal, and some other treatment must be adopted. If at length the urine passes through the natural channel, it causes very sharp pain while at first passing over the lacerated part, which however soon subsides as the urine continues to flow more freely.

Hæmorrhage varies from a few drops to ounces (according to the laceration); if there be a total solution of continuity in the mucous membrane, bright fluid blood will flow in a stream from the orifice; or it may only come away in drops; being increased on passing a catheter, a full stream being jerked out at every pulsation of the heart. The blood may pass back into the bladder or into the soft parts around & become coagulated, so that large clots are washed away with the urine. After the hæmorrhage has ceased, a straw coloured fluid continues to ooze

from the orifice of the urethra for some time.

Retention of urine does not always occur, though when it is absent, there is instead some other deviation from the natural course of the urine. For in no case of injury to the urethra can the patient micturate with the same freedom as previously to the accident.

Swelling and discoloration may occur at once or not till some time after the injury, & they differ in degree in different cases more than any other symptom or result. In some patients when the haemorrhage is very considerable there may be scarcely any swelling, though an instrument has been clearly ascertained to pass out of the normal canal; this may be due to the formation sometimes of a kind of ~~valvular~~ valvular fold by the ruptured mucous membrane. At other times the scrotum & perineum may be found greatly distended & ecchymosed; this is owing to the infiltration of blood from the lacerated portion of the urethra, which sometimes also is mingled with extravasated urine.

When there is an external wound the symptoms differ to some extent, though at first they may be the same; the haemorrhage however, is often very dangerous, owing to the rupture of some deep seated vessel; and when the urine passes it comes away partly by the wound, acting as an irritant & causing probably a fistula to be left afterwards.

Treatment of injuries to the urethra consists of two distinct methods, namely, that in which the wound is allowed to heal without an operation, and that in which an external incision is resorted to. To these may be added a third subsequent treatment to prevent if possible the formation of stricture.

A careful examination should first be made to ascertain whether there is any extravasation of urine, for if this has occurred free incisions must be made at once into the scrotum, so as to allow the urine to escape & to relieve the tension.

There are some cases in which no hemorrhage or retention of urine has occurred & these may be treated by simple ligation.

1st With regard to the treatment in which the lacerated urethra is allowed to heal without operation, that is, without any external incision, it consists in either leaving the case entirely to nature or else in passing catheters. Hemorrhage has occurred to a greater or less extent & there is retention of urine, something must be done to relieve these symptoms, & a catheter is generally at once attempted to be passed, this enters the urethra easily as far as the membranous portion, where it usually becomes too tight, for here probably it is found to deviate from the canal, & this is known, by a peculiar grating sensation being communicated to the touch, and by the whole instrument seeming suddenly to become as it were bereft of support, the point turning about easily in all directions; the

haemorrhage too is considerably increased in quantity; after patient manipulation for some time the attempt to reach the bladder has to be abandoned; it is unnecessary and indeed there is harm in continuing the attempt too long, if the bladder cannot soon be entered, any further attempt at the time is not likely to be successful, therefore for it causes great irritation & increase of haemorrhage & further laceration of the mucous membrane, besides the pain to the patient, therefore it should be withdrawn, and hot fomentations or hot baths applied, if these measures are successful & the bladder is emptied, another attempt may be made to introduce a catheter, & now it will usually be found to pass with ease into the bladder, it may then be retained for some days, & the patient should be strictly enjoined not to attempt to pass water without the instrument, as if he does, extravasation of urine will be most likely to occur. But if after every thing has been tried, the bladder continues to distend, without a drop of urine being discharged, then it will be necessary to resort to the 2nd mode of treatment, or that of making an incision down to the lacerated part, usually called the operation of 'perineal section'. I think that in every case of injury to the urethra followed by haemorrhage this operation is perfectly justifiable, in fact that it is the best & safest method of treatment that can be adopted. I shall make some further remarks on this part of the subject in the appendix, drawing conclusions from

the histories of the cases reported from the Journals. The operation is usually performed in the following manner; a sound grooved on the convexity, or a catheter having been passed down the urethra to the lacerated portion, an incision is made in the median line, along the raphe, on to the instrument, then the vesical end of the urethra must be searched for, and it is often very difficult to find, when it has been discovered, either a catheter is passed on from the orifice of the urethra in the penis through the wound, into the vesical end, & on into the bladder, this is the most difficult mode; the better & safer operation is, to pass a short catheter at once through the wound into the vesical end of the urethra to the bladder, & keeping this as a guide, to direct a catheter afterwards if necessary by the proper channel. Occasionally it may be found safe & practicable to unite the divided ends of the urethra by a suture as in the case reported in the *Lancet* Decr. 22nd 1868, which terminated successfully.

With regard to the introduction & retention of a catheter in the bladder after perineal section there is great diversity of opinion. Some maintain that a catheter should be passed and retained as long as possible, sometimes it has been kept in the bladder for a very long period without inconvenience to the patient, but usually it has to be removed & replaced at intervals of about ten days or less, as incrustations form on the end of it, sometimes it is difficult to reintroduce it;

the urine too generally passes partly by the side of the instrument as well as through it, & partly by the wound.

Others maintain that it is better not to introduce any instrument at all, but to allow the urine to pass by the wound, the cases reported of this treatment appear on the whole to be as successful as the former method; the parts gradually heal up, & after a time the urine passes by the natural channel, & when the wound has nearly healed a catheter may be introduced.

In those cases in which the injury to the urethra is accompanied by an external wound, this latter should be converted into a simple incised wound by penileal section.

The treatment to be adopted in order to prevent a stricture of the urethra, is the patient & continual use of catheters.

The patient must be instructed how to pass one himself, & if it be introduced into the bladder occasionally, a stricture may be warded off, but if this treatment be omitted a stricture will be sure to follow. When a stricture has formed, it may be treated by dilatation or division or by dividing the cicatrised portion, the latter being the quickest mode.

Appendix.

There are very few cases of Injury to the urethra reported in the medical journals. I have gathered ~~about~~ ^{twenty-eight} ~~thirty~~ from those periodicals to which I had access, they are taken indiscriminately from the works, being the only cases I could find through the different series. Gouley in his work gives reports of 15 cases, & I have extracted one or two from these. I propose to give a condensed history of the cases and to make a few remarks on them afterwards. In order that they may be the more easily referred to I divide them into classes. Two chief divisions are, Those in which the Injury is accompanied with an external wound, and those in which it is not. The latter are further subdivided into those in which there was retention of urine, & those in which extravasation took place. The cases with an external wound are, I. II. III. IV. All the rest were injuries without an external wound. The cases with extravasation of urine are, from V to XII inclusive. Out of the 28 cases there are only 3 deaths, viz, cases IX. ~~XII.~~ ~~XXVII.~~

Cases of Laceration of the urethra with an external wound.

I. *Lancet*, March 1st 1851 p. 236. A case of original injury to the urethra followed by stricture and subsequent formation of calculus. The patient was admitted into Guy's Hospital on Dec^r 11th 1850. Thirty years previously he fell across a pike, a spike of which entered the perineum just below the scrotum. For some weeks all his urine escaped by the opening, but after the introduction of a gun-elastic catheter the wound gradually contracted and closed in three months' time. From this period the patient dated a stricture. Ten years after the injury he had gradually increasing difficulty of micturition ending in total retention; the original wound was reopened, through which the urine passed for 10 weeks. A catheter was again introduced and the wound again healed. After some years he suffered from increasing pain, & irritability of the bladder, with great difficulty in voiding urine. On examination the perineum was found much altered by the original effects of the injury, the distance between the scrotum & anus was considerably shortened. The patient passed a catheter himself after twisting it about in every direction, the urethra having evidently been thrown into curves by the contraction during the healing of the wound. A calculus was discovered in the bladder. After a few days of catheterism the urethra was sufficiently dilated and straightened to allow the introduction of a full-sized straight staff, and lithotomy was performed. The patient was discharged early owing to the prevalence of erysipelas. But subsequent tidings were received of its favourable termination.

II. *Lancet*, March 16th 1861 p. 258. In this case an extensive tract of the urethra and perineum was destroyed by a red hot iron in an iron manufactory. Twice an attempt was made to discover the vesical end of the urethra, without success. At length an operation was performed to carry off the urine by the perineum, as it had previously passed by several fistulous openings in the scrotum & perineum, causing great pain and inconvenience to the patient. Having fully exposed the situation of the membranous portion of the urethra, the operator passed his left forefinger up the rectum to note the position of the prostate and neck of the bladder, as well as to protect the intestine. A long-handled double-edged scalpel was then passed directly onwards towards the bladder, in a course through the centre of the prostate and neck of the bladder for a distance of nearly two inches. At first the textures resisted and cut with a gristly feel, and then suddenly yielded; a full-sized female catheter was introduced, and afterwards a suitable instrument was provided to serve for the control and discharge of his urine. The fistula healed up, and the patient was greatly relieved, and perfectly satisfied with the instrument.

III. Medical Times and Gazette Dec^r: 20th 1851 p. 644.

Case of laceration of the perineum and rupture of the urethra. The patient, aet^a: 20 was admitted to the Bristol Hospital on 29th Jan^y 1851. He had fallen from a shed with his legs astride on to a beam from a height of 10 feet. There was severe laceration of the perineum extending from the anus, and haemorrhage was very profuse. An attempt was made to pass a catheter, this came out at the wound, but the further orifice of the canal could not be found. A compress and T bandage ^{were} applied to the wound to arrest the haemorrhage; the bleeding recurred after some hours & a greater amount of pressure was applied, which at length arrested it. The next day another attempt was made to pass a catheter, but failed; the penis seemed to be torn away from its bony connexion.

On 2nd Feb^y haemorrhage again occurred, the blood coming from the anterior portion of the wound, where the integument was not divided; this however soon ceased. An attempt was again made to introduce a catheter; a fracture of the left os pubis was now discovered, near the junction of the body and ramus. After some trouble, the further orifice of the urethra was found and a director having been introduced, a no: 7 elastic catheter was passed along it into the bladder, and retained.

4th Feb^y Some of the urine passed through the wound. On the 6th the catheter was changed, having been in the bladder nearly 4 days, a no: 10 was introduced instead and retained.

On 17th Feb^y the wound remained very open, and by measurement the orifices of the divided urethra were found to be exactly one inch apart. The catheter was frequently changed until July 21st when it was removed altogether, & the urine came freely by the natural passage, very little through the wound. On 28th Sept^r he was discharged, still having a slight fistulous opening in the perineum through which some urine dribbled while he was micturating, but by keeping his finger on the orifice he could stop this. By the middle of October the fistula had quite healed & the urine came in a full stream naturally.

IV. Lancet, July 21st 1860 p. 57. Case of obliterated urethra from injury. Three fistulae.

The patient, a seaman, aet: 22 was admitted into King's College Hospital on 15th Dec^r 1859. About a year previously he had been wrecked at sea, & struck in the perineum by a large beam, lacerating the urethra & perineum, so that the urine passed by the wound for more than two months. About 3 months after the wound had healed, he noticed three fistulae, which remained up to the time of his admission. An attempt was made to introduce a catheter but failed.

On 21st Jan^y or 37 days after admission, he was narcotized and a no: 5 catheter introduced and retained. In about another month an opening in the urethra was found at the angle of junction of the root of the penis and scrotum. Large-sized

Catheters were now passed without difficulty.

On 6th March the urethra was much less irritable, the fistula nearly healed, except the opening at the root of the penis. On the 31st this was closed by grasping the edges and bringing them together with silver wires. An elastic catheter was introduced and retained. On 3rd April the sutures had ulcerated through the skin, the opening was less and the patient in a satisfactory condition.

Cases of Lacerated Urethra without External wound.

V. *Lancet* 16th Nov^r: 1872 p. 706. A case of lacerated urethra at Charing Cross Hospital.

The patient, a boy aet^r: 16 was admitted on 26th Sept^r: 1872.

Twenty-four hours previously he had fallen astride a parallel bar in a gymnasium and had not passed any urine since. The perineum and left groin below Poupert's ligament were very much bruised and tense with extravasated blood and urine. A No. 11 catheter was passed into the bladder and retained, a large quantity of urine being drawn off. Two incisions were made on either side of the median raphe from which much blood and urine escaped. On the next day an incision was made in the median line down on to a catheter, and the urethra was felt to be lacerated and rent longitudinally for about one and a half inches. Another free incision was also made into a large swelling in the nates, from which came coagulated blood having a strong urinous odour. The catheter was removed and poultices applied. On Oct^r: 3rd hemorrhage occurred from the wound in the

rates, which was stopped by plugging with lint & perchloride of iron. The patient had much vomiting, & was ordered to take champagne, which he kept down; & this seemed to be the turning point of the case, for the next day his appetite was better and the urine passed through the central opening only. A full-sized catheter was passed occasionally, to prevent contraction of the urethra anterior to the seat of injury, and as far as possible to keep the channel continuous with the proximal portion of the urethra. On 16th Oct. or 19 days after the operation he was allowed to get up, the central perineal opening being very small and the other incisions nearly healed, no urine coming from them. On the 24th or 27 days after the operation, the urine came in small degrees by the penis, the greater part, however, by the central perineal opening. He was now sent into the country.

VI. American Journal of Medical Sciences. Nov^r. 1837 p. 133. A case of rupture of the urethra without external wound.

The patient fell from the top of a rail with his legs astride and his perineum was severely bruised. He had not passed urine for about 24 hours since. The scrotum & perineum were somewhat discoloured and swollen and very tender. An attempt was made to pass a catheter, which after entering a little beyond the pubic arch met with some obstruction, this was overcome, a sensation being produced as if the catheter was passing through some soft mass like & coagulated blood, instead of along a free passage.

Near the bladder, another obstruction was met with, but at length the catheter entered the bladder and the urine was drawn off. Four days afterwards, the left side of the scrotum was enormously distended, and gangrenous in one spot at the lower part; an incision was made freely through this, which gave vent to blood and urine. The urine had been regularly drawn off twice in every 24 hours, the patient had also several times attempted to pass water, without voiding any, though it felt as if some was passing from the bladder. On introducing a catheter into the bladder, and a probe through the wound the two came into contact. The catheter was retained in the urethra, and a poultice was applied to the scrotum. In two or three days the slough on the scrotum separated, without having increased in size, and by means of the large opening it, the silver catheter could plainly be seen shining through a ragged opening in the urethra about half an inch long. The edges of this opening were touched with nitrate of silver, introduced through the wound in the scrotum by a quill; in about a fortnight the two ends of the ruptured urethra became firmly united; and in about a week more the opening in the scrotum also closed, and the patient was able to resume his usual work.

VII. American Journal of Medical Sciences. Oct^r: 1842. p. 467

Case of Ruptured Urethra communicated to the Surgical Society of Ireland; without any apparent injury to account for it.

The patient aetat: 54, was admitted into St. Vincent's Hospital on 5th March 1842. Within the last 12 months he had been compelled to pass water more frequently and in a smaller stream than usual; he could give no reason for it, and was a man of regular habits and temperate. Three days previous to admission he was suddenly seized with a fit of shivering, which increased at night, and his urine came away in a smaller stream. The next day these symptoms increased. On admission he could pass a small stream, the shiverings had ceased, there was pain over the pubes, the distended bladder could be felt above it; the scrotum was slightly swollen and there was a little fulness in the perineum. An attempt was made to pass a gum-elastic catheter, but without success, and a hot bath was ordered. On March 7th the scrotum & penis were much swollen and tense, and in trying to pass urine the patient found that it did not come away as before. There was then no doubt that the urethra was ruptured and that extravasation of urine had occurred. An incision was made in the perineum upon the point of a staff, and the urethra being now exposed, it was found to be ruptured; the perical end, however, could not be discovered. Free incisions were made into the penis & scrotum, and the urine allowed to pass by the wound; it soon came by the natural passage; and in three weeks he was discharged cured. No catheter was used in this case.

VIII. American Journal of Medical Sciences, Oct^r: 1854 p. 413.

The patient aetat: 35 of Sound Constitution was engaged on board a steamboat, and fell astride an iron bar across a hatch-way; causing laceration of the urethra and great contusion of the perineum.

The injury occurred in May 1852, he was seen the next day and then complained of great pain, the bladder was greatly distended and he was unable to pass any urine; by forcible attempts to micturate, occasionally a few drops of bloody urine would pass through the urethra. Attempts were made to introduce a catheter, and after persevering for over an hour, a small gum-elastic was at length made to enter the bladder and the urine drawn off. On the second day the instrument was removed and a larger one substituted. In about six days after the injury a large silver catheter was introduced; the patient was ordered never to attempt to pass water except through the catheter. On the 15th day the patient removed the catheter himself, and was unable to reintroduce it when he wished to micturate; he attempted to pass water without it, and extravasation of urine occurred.

The penis, scrotum, perineum, and cellular tissue about the pubes were enormously distended from infiltration of urine. After considerable trouble a catheter was again introduced, & the scrotum was freely incised. In a few days gangrene of the scrotum took place and both testes were left denuded of skin and cellular tissue, about two inches of the urethra ~~too~~ was destroyed, the bulb was not injured, but there was great destruction of the perineum, and under part of the penis and urethra anterior and posterior to the bulb. The patient lay for 10

or 12 days in a state of great prostration. About the latter part of June however, after being kept on rich, nutritious diet and tonics, he began to improve. The putrid mass came away and new tissue was reproduced; in less than six weeks from this the testes were enveloped in new scrotum; the penis, urethra, and perineum were entirely restored. By the latter part of August he was well, and had ceased to ~~use~~ use a catheter, being able to retain and void his urine as well as ever.

IX. American Journal of the Medical Sciences, July 1862 p. 108.

The patient aet. 11, was admitted to the Pennsylvania Hospital on March 1st 1862 with rupture of the urethra and extensive extravasation of urine. Six months before he had fallen astride a fence and injured his perineum; he then suffered from retention, after some difficulty a surgeon passed a catheter which was retained for several days. When this was removed he could pass a small stream, but his urine soon began to dribble and continued to do so until the day before his admission, when it ceased altogether; he soon had urgent desire to pass water and strained violently without any coming away. In the night his abdomen became swollen and tender, the scrotum and penis also were very edematous. On admission the next afternoon, he was in a state of collapse; the scrotum and penis were enormously distended, and there appeared to be a track of gangrene along the hypogastrium and left iliac regions intensely painful to the touch. Free incisions were

made into the scrotum and penis and gangrenous parts. No incision was made in the perineum, in order that this part might be free for perineal Section if the patient rallied; he, however, died the following morning.

On post-mortem examination, a tight-impermeable stricture was found and just behind this a gangrenous point which was plainly the seat of rupture, through which the urine had escaped.

X. *Retrospect of Medicine 1842. Vol. II. p. 150.* A case of loss of some portion of the urethra treated by operation, under Sir Benjamin Brodie. The patient in making a leap on horseback, received a violent blow on the perineum, from the pommel of the saddle; the immediate consequence being hemorrhage from the urethra, followed by extravasation of urine and sloughing of the perineum to a considerable extent. A catheter was first introduced into the bladder but afterwards removed. The sloughs having separated, the sore in the perineum gradually closed, a small fistulous opening only, being left immediately behind the scrotum, through which the urine was discharged. He remained in this state several months, when an incision was at length made in the perineum by Sir Benjamin Brodie, a staff having been introduced in the urethra as a guide, as far as the obstruction. It was evident that not less than three-quarters of an inch of the urethra was deficient below the pubes; its place being occupied by a rigid cicatrix; this was divided longitudinally and the staff was then passed after some difficulty on into the bladder,

through the sound portion, this was soon withdrawn and a gum-elastic catheter substituted for it. On the ninth day this was changed, and afterwards it was changed at intervals. The wound in the perineum healed and in less than ten weeks was reduced to the size of a pea.

XI. London Medical Gazette, August 19th 1837 p. 765.

The patient, a Sawyer by trade, fell aside a plank striking his perineum against the edge. At the time he did not feel much inconvenience, but a little time after found he could not pass water. The scrotum gradually became distended also the penis and perineum, & towards midnight it was of a black colour. An extensive incision was made in the scrotum to allow of an exit for the extravasated blood and urine. The next day as the patient appeared much better and passed water freely by the natural passage no further incision was made. In a week the inflammation in the perineum was subdued, but he remarked that he could not void all his urine, a small quantity seemed to remain behind; on examination it was found that when he passed his urine, a tumour formed in the perineum at first, which disappeared on pressure, evidently being a cyst or pouch which had formed under the rupture. An attempt was made to cure this by compression; after much trouble a very small catheter was introduced into the bladder, but as the urine passed by the side of it, it was withdrawn and a larger one tried; but without success.

As the patient appeared to be getting worse, an incision was made along the raphe down to the laceration, opening the Cyst, from which about an ounce of urine came away. The contracted portion was divided, and seemed as if it were semi-cartilaginous, and a small silver catheter was passed into the bladder. The wound gradually healed and the man recovered, though he could not pass urine in quite so large a stream as before.

XII. American Journal of Medical Sciences Jan^y 1856 p. 229.
 The patient aetat: 29 had fallen through a trap door striking his perineum on the edge of the flap on which it rested. He was seen 15 minutes after the accident, which occurred on 27th Dec^r 1852. He had passed much blood and urine and was still bleeding freely from the urethra; he had some pain in the perineum, but no swelling and no desire to pass urine. A catheter could not be introduced, as it became obstructed near the prostate. In about two hours the bladder was much distended causing great pain and desire to micturate. There was still no swelling in the perineum. A large catheter was now successfully passed into the bladder, and was felt to make its way through a long track of apparently torn membrane. The bleeding continued free; & the catheter was retained. On the next day there was very slight swelling in the perineum, the scrotum being normal in appearance. Some blood passed by the side of the catheter. He was very restless, and in moving displaced the catheter, which caused the bleeding to

return freely, and retention of urine. After considerable difficulty the instrument was again introduced.

On 30th Dec? Urine passed freely by the catheter; but the patient was delirious, had occasional hiccups, anxious countenance, small feeble pulse and a slight rigor. The abdomen was slightly swollen, and in each iliac region there was some puffiness, dull on percussion, and separated by a slight central depression.

The next day, he was much worse the swellings in the iliac regions were increased in size; and on 1st Jan? incisions were made, but no extravasated fluid escaped. He died on the following day; no swelling had appeared in the scrotum or perineum.

On post-mortem examination there was found behind the pecti and other abdominal muscles much thin looking pus mixed with blood, this extended into the sheath of the Pectus muscle on each side, and into between the posterior surfaces of the abdominal muscles in front and the transversalis fascia and peritoneum behind on each side; below, the fluid could be traced as coming from behind the pubes, having the central portion of the transversalis fascia internal to it, and the posterior surface of the symphysis pubis covered only by periosteum in front. On injecting the bladder fluid escaped immediately behind the pubes from the membranous portion of the urethra. On cutting into the perineum the urethra was found to be torn from the bulb to the prostate gland, which latter however was perfectly normal; there was no distinct canal, but a sort of sac bounded by softened cellular tissue infiltrated with blood.

XIII. *Lancet*, Dec^r 16th 1837, p. 439.

The patient aet^r: 43 was admitted into University College Hospital on 22nd Nov^r: 1837. Thirteen years previously he had fallen from the height of about 14 feet into a dung-barrow and injured his perineum, but not feeling much pain he got on horseback within about 20 minutes, and on leaping the horse over a bar, he was thrown against the pommel of the saddle, he then fell backwards, and soon afterwards the perineum became very much swollen; he passed no urine for 48 hours, and did not seek medical assistance, but applied a poultice. On the third day after the accident, the urine dribbled away involuntarily by the urethra, and after a few days the swelling of the perineum & penis had subsided so that he could sit up. For 3 months he remained in a weak state, his urine did not pass in a full stream, he then saw a medical man who passed a sound into his bladder every morning, on the withdrawal of which, his urine passed in a full stream, but in a few hours he again had difficulty. About 12 months after the injury, a swelling in the upper and front part of the scrotum was noticed, his urine now came away by this opening and continued to do so for 12 years, at first incontinently, but after a year he could retain it, & pass a continued stream. After a time abscesses formed in the scrotum, and eventually his urine passed by three different openings.

On admission into the hospital, M^r: Liston incised a large cavity in the perineum in the median line and introduced a catheter per urethram, which passed 2 1/2 inches, & was then obstructed by a dense

Substance. A hydrocele cannula was introduced and subsequently a stylet & the obstruction pierced, the instrument being passed on till it came in contact with the finger introduced through the opening in the perineum. A ~~no.~~ no: 3 catheter was passed into the bladder through a passage which had been obstructed for 12 years. The next day he was better the urine being almost all voided by the catheter. Two days after this, a no: 4 was passed with ease, and in four days a no: 7.

XIV. *Lancet*, Oct. 7th 1826 p. 28. A case of laceration of the urethra from a violent blow in the perineum without external wound. — The patient aet: 16, fell astride some rails on which he was standing injuring his perineum, he immediately felt great pain in that part, & soon desired to pass water, but found himself unable to do so. He was admitted into St. Thomas's hospital two hours afterwards. The perineum and Scrotum were found to be much swollen and discoloured from ecchymosis, there was great tenderness on pressure, and urgent desire to pass urine though the bladder did not appear to be much distended. The patient was placed in a warm bath; attempts were made to pass catheters, but failed; the instruments passed without obstruction beyond the arch of the pubes into the bulbous portion, where a deviation from the natural course took place, causing great pain; the point of an instrument could readily be felt through the rectum. An incision was made in the median line, & several coagula were removed, but not

a drop of urine escaped. A catheter was introduced, the point of which appeared through the wound, showing an extensive laceration of the urethra; great difficulty was experienced in finding the orifice of the vesical portion, which had become retracted, a female catheter was at length introduced; a gum-elastic male catheter was afterwards passed and retained. The patient passed his urine by the catheter for two days, but on the third day it passed by the wound. The catheter was retained for 6 weeks, though the urine passed by the wound & side of the instrument; it was at length removed with difficulty owing to incrustation. The wound soon commenced to heal & in a short time only a small quantity of urine passed by it.

XV. *Lancet*, Feb^r. 10th 1827 p. 123. A case of Incontinence of urine after injury to the urethra.

The patient aet^r. 13 was admitted into Guy's Hospital for incontinence of urine on 29th Nov^r. 1826. About 15 months previously he had fallen aside some railing striking his perineum with force. Immediately afterwards he could not pass urine. An attempt was made the next day to pass a catheter, but without success; hot fomentations were applied & soon afterwards the urine dribbled away involuntarily. This continued more or less till he entered the Hospital. A sound was passed, which met with some obstruction in the membranous portion of the urethra, the point of the instrument seeming to pass into a sacculus. A catheter was then retained 9 days. He gradually recovered.

XVI. *Lancet*, 11th June 1842 p. 368.

The patient had been kicked betwixt the thighs, while fighting, a few hours before he was seen. The perineum and scrotum were discoloured and swollen, and blood was issuing from the urethra. He had emptied his bladder just before the injury. Cold applications were ordered. The next morning the parts were more distended and discoloured, no urine had passed; an attempt was made to introduce a catheter, but without success, arterial blood only being discharged; the catheter was withdrawn and cold applied to the perineum which stopped the hemorrhage; in the afternoon of the same day a catheter was passed into the bladder & the urine withdrawn. An incision was then made along the raphe from the posterior part of the scrotum to near the anus; a large quantity of coagulated blood was removed, and a catheter was fixed in the bladder. No hemorrhage returned; two days after the operation the scrotum had resumed nearly its normal size; the catheter was removed by urgent request of the patient. The membranous portion of the urethra was ruptured to the extent of nearly an inch. In a day or so the catheter was reintroduced. At the expiration of five weeks after the occurrence of the accident he was cured without any bodily inconvenience remaining. During the treatment a catheter was retained in the bladder & removed, cleansed, or exchanged every fourth day.

XVII. Lancet, Feb^y 17th 1855. A clinical lecture by Prof. Syme in Edinburgh on a case of great interest and considerable rarity. The patient was a pointman on a railway; while crossing the line he was struck by an engine on the right side of the pelvis, and was brought to the Infirmary about 2 hours afterwards. There was swelling of the right thigh and groin, & there was a fracture of the ramus of the pubes & ischium on the right side, a small portion of bone being detached and easily ~~movable~~ moveable. An attempt was made to introduce a catheter, but no urine came away, though the instrument was supposed to have entered the bladder. Next morning he complained of retention of urine, as he had not passed any; another attempt was made to pass a catheter, but without success, its point slipping out of the membranous portion of the urethra. A full-sized catheter was passed by Mr. Syme & retained in the bladder for two days. After its removal, retention again occurred with distressing symptoms, & the catheter was reintroduced & retained $3\frac{1}{2}$ days, without inconvenience. But a few hours after its removal a second time it was necessary to reintroduce it again, as he could not pass his urine without it; owing to this condition it became necessary to do something further as the patient could not always wear a metallic instrument. The injury inflicted on the urethra appeared to be such as to produce a stricture condition at the lacerated part, and no extravasation of urine had occurred. The patient was still unable to pass his urine after the catheter was again

48
withdrawn; the parts in the vicinity of the injury were becoming softened and a cavity containing urine had formed around the seat of laceration. The next day an incision was made in the median line on to a grooved staff introduced into the bladder, the knife was then pushed along so as to freely divide the membranous part of the urethra, which could be distinctly felt to be lacerated. There was very slight loss of blood either during or after the operation. The patient was attacked with jaundice soon after which however soon disappeared. He had great loss of appetite before the operation & during this attack, becoming much emaciated, extensive bed-sores also resulted from the escape of urine into the bed. The ~~lute~~ tube which had been introduced into the bladder through the wound was withdrawn 48 hours after the operation; the urine came away freely & passed entirely by the wound for a fortnight. A full-sized bougie was then passed with ease into the bladder, after which a few drops of urine came by the natural channel. During the following month the amount passed by the urethra increased; & the patient gradually improved, though the difficulty of healing the bed-sores was great owing to urine still passing by the opening in the perineum.

XVIII. Lancet. May 17th 1856. p. 542. A case of laceration of the urethra without any wound in the perineum.

The patient was admitted into Guy's Hospital on 2nd Oct^r 1855. He had fallen astride the back of a chair; the perineal region quickly swelled and blood flowed from the urethra. He soon felt great pain in the region of the bladder and perineum, and an urgent desire to pass water, but inability to do so. On admission an attempt was made to pass a catheter but without success; it entered as far as the seat of injury and when withdrawn a copious rush of blood followed. After some time, however, a large flexible catheter was made to enter the bladder ^{was} & retained. In about 65 hours it was removed, and on attempting to pass a new one, it came through the lacerated portion. An incision was then made in the centre of the perineum, from which blood, pus, urine & coagula escaped. On the next day the urine passed freely by the wound. Six days after the operation profuse hemorrhage took place, which was arrested by plugging the wound and applying ice. Fifteen days after the operation a flexible catheter was passed into the bladder and retained. The urine at first passed wholly by the instrument, but soon also by the wound. In about 16 days the catheter was removed and the patient passed urine by the natural channel; in thirty-five days after the operation no urine passed through the perineum, the wound having entirely healed.

XIX. Lancet Oct^r: 27th 1866. p. 468. A case of rupture of the urethra, at the West London Hospital.

The patient - aet: 24, a strong, healthy-looking labourer was knocked down and run over by a cart, and was soon after admitted into the Hospital, on 27th March 1866, he was then in a state of collapse from which he rallied at night. He had retention of urine, not having passed any by the afternoon of the next day; a full-sized catheter was then introduced, but this passed up to the hill through the laceration in the urethra into the left ischio-rectal fossa. The right gluteal region was much bruised & the entire perineum greatly ecchymosed; there was no induration & the skin of the Scrotum and penis was quite natural. Blood was trickling from the urethra and there were several clots on the shirt. The bladder was greatly distended and was punctured per rectum. On April 1st or four days after this operation he passed a little urine by the urethra. The right ischio-rectal fossa was now laid open, as it was very much indurated, & a considerable amount of clear urine came away by it. In about a month the wound had quite healed and he was discharged cured. He came occasionally to the Hospital afterwards to have a catheter passed.

XX. *Lancet*, Dec^r 22nd 1866. Case of complete transverse division of the urethra, at Guy's Hospital.

The patient aetat: 14, was kicked in the perineum by a horse, he did not feel much pain at the time and walked some some distance, and then went to bed. An attempt was made to pass a catheter, by a medical man, but without success, blood only issuing from the urethra. Hot fomentations were applied and the next day he was admitted into the hospital. The perineum was slightly swollen and recharged and the bladder was much distended. The attempts to pass a catheter were unsuccessful, the instrument was inserted just beneath the pubic arch, & considerable haemorrhage followed. A grooved staff was passed down to the perineum and an incision carried along the raphe from the scrotum to the anus. The urethra was found completely divided, the ends being about half an inch apart; & the line of rupture oblique. A flexible catheter was passed along the urethra, out at the wound in the perineum and then on through the posterior division into the bladder. The two ends of the ruptured urethra were brought together on the catheter and tied by one silk suture introduced in the ~~and~~ middle line of the under surface. The catheter was fixed in the bladder; On the 8th day after the operation this was removed & found to be slightly coated at the end with phosphates. The urine passed partly by the urethra & partly by the wound, the latter gradually healed, & in 28 days after admission he left the hospital. The suture was never seen. Three months afterwards he passed a full stream of urine, without any sign of contraction.

2
XXI. Medical Times and Gazette, April 24th 1852 p. 415. A case of ruptured urethra, at the General Hospital, Bristol.

The patient, a lad aet: 9, was admitted August 9th 1851. He had fallen from a ladder pitching with his perineum on a box, the only apparent mischief at the time being edema of the scrotum. On the eleven days after the accident he had retention of urine, and the perineum was of a darker colour. An attempt was made to pass a catheter but without success. An incision was then made down to the injured part, & the urethra was found to be ruptured. The orifice nearest the bladder was seen just in front of the triangular ligament. A gutta-serena catheter was introduced and retained in the bladder; this was changed six days after, & another introduced with a hole in the vesical end, so that Walle's index rod might be used if possible. Fourteen days afterwards it was again changed, but the rod could not be made to reach the bladder through the catheter; another one of gutta-serena was then introduced, & retained for 6 weeks, the urine passing freely through it. The wound gradually healed & he was discharged on 26th Nov^r: or nearly 15 weeks after the accident & was able to pass a good stream.

With regard to the advantage of gutta-serena catheters over other kinds it was remarked, that they are acted on by so few agents; the urine has no effect upon them; acids may be freely injected through them; they do not cause so much irritation of the bladder and urethra, as other silver or gum-elastic catheters; & owing to their durability they require changing much less frequently.

XXII. Medical Times and Gazette Feb^r 11th 1860 p. 141. A case of Fracture of the pelvis and rupture of the urethra followed by stricture and false passages, under M^r. Paget at St. Bart's Hospital. The patient, a miner, of hardy & robust appearance was admitted on Oct^r 5th 1859. Two years previously he had received a severe blow on the pelvis by the falling of a large & heavy piece of rock. He was seen by a Surgeon the next morning, who found paralysis of both legs and loss of control over the sphincters. A catheter was passed, and much blood came away, this was repeated three days, on the fourth day some urine flowed through it, & on the fifth an incision was made in the perineum; he was soon afterwards admitted into the Chertsey Infirmary, the urine then passed through a fistulous opening left during the healing of the perineal wound. He remained in the hospital 12 weeks; 5 weeks after leaving, he was suddenly seized with great pain in the perineum, which was hot & tender; an attempt was made to pass a catheter, this entered two different strictures & had to be withdrawn; a fortnight after, two fistulous openings were united by an incision. He could soon pass water by the natural passage & continued able to do so for 3 months by placing his finger over the fistulous opening; he then had fits of retention again, & on admission to St. Bartholomew's hospital was suffering from inability to relieve his bladder and constant dribbling; this perineum was greatly indurated and swollen & in its centre there was a fistula, which however did not lead directly into the bladder. He had wholly recovered from his paralytic

Symptoms. Mr. Paget introduced a catheter, which he felt sure did not enter the bladder, though some urine was drawn off by it, preceded by a discharge of pus. On 5th Dec^r an incision was made in the middle line on a grooved staff, a hard cartilaginous mass was divided; the vesical end of the urethra was discovered by a large probe, and a catheter passed into the bladder, through which urine flowed freely, a false sac was discovered from which fluid had been previously drawn off. A No. 8 flexible catheter was now passed by the penis out at the wound & then on into the bladder by the side of that before introduced. No haemorrhage or unfavourable symptom occurred, and he was discharged on 21st Dec^r, being ordered to pass a catheter himself occasionally.

XXIII. American Journal of Medical Sciences. Oct^r 1844 p. 545.

A case of closure of the urethra from injury to the perineum. The patient, aetat: 14. was admitted into the New York Hospital; Four months previously he had fallen with his legs astride upon the edge of an empty flour barrel. No external wound was produced, but swelling and ecchymosis of the perineum followed, and slight haemorrhage from the urethra, also complete retention of urine. Thirty-six hours after the accident the bladder was punctured above the pubes. Since the injury no urine had passed & the attempts to restore the passage had been unsuccessful. There was a knotted induration around the membranous portion, the perineum being otherwise sound.

33

The patient had used an instrument of his own to withdraw the urine at least once in every three or four hours often more, this he passed through the fistulous opening above the pubes, the whole of the urine could not be discharged so that the bladder was habitually distended. One month after admission an operation was performed, having been delayed owing to the health of the patient. A full-sized catheter having been passed down to the closed portion of the urethra, an incision was made in the perineum along the raphe, of nearly two inches in length, exposing the end of the instrument; a steel sound was then introduced into the bladder through the fistulous opening above the pubes, and by the aid of the finger in the rectum, its end was brought forward and made to press upon the closed portion of the urethra from behind. The catheter was then withdrawn, & the stricture divided from before backwards, the end of the steel sound serving as a guide to direct the track of the incision. A full-sized catheter was passed into the bladder & retained for two days. On the third day it was withdrawn, inflammation having agglutinated the layers of the divided tissues and shut off the openings in which the end of the instrument might have become engaged in replacing it: An instrument was again passed with ease. In thirty-two days after the operation the wound above the pubes had closed, and that in the perineum ⁱⁿ sixty days. For some time he had worn a catheter at night, & when this was left off, he could retain his urine. On his discharge, he was directed to use the catheter for three or four weeks longer.

26
XXIV. Lancet, Feb^y 10th 1838 p. 725. A case of injury to the perineum, at Charing Cross Hospital.

The patient stat: 19 had fallen the day before admission over a low door, the edge of which had severely contused his perineum. The integuments were not lacerated, & an ineffectual attempt was made to pass a catheter. On admission into the hospital, there was found a soft swelling in the perineum, the bladder was somewhat distended & he had complete retention. Hot fomentations were applied over the pubes, & on attempting to pass a catheter, it did not enter the bladder, & blood only came away. On the next day the bladder was punctured above the pubes; and in about a week an operation was performed to restore the canal. A moderate sized, flexible metallic catheter was passed through the orifice of the urethra to the lacerated portion, an incision was then made in the perineum near the rectum, setting free a large coagulum of blood and exposing the end of the instrument. A second metallic catheter having the extremity open, was then passed through the wound above the pubes into the bladder & along the vesical end of the urethra, to meet the other instrument at the lacerated portion; the point of the first was then fixed into the open extremity of the second catheter & the former by this means passed on into the bladder. The whole operation was conducted with the greatest facility. The catheter was retained in the bladder and the wound above the pubes was kept open; the patient appeared to be doing well in every respect.

XXV. London Medical Gazette, Sept^r 3rd 1836 p. 893.

Ruptured Urethra from accident, at the Gloucester Infirmary. The patient aetat: 15 fell from a height with his legs astride upon a board injuring his perineum. He had much pain in the night and passed a spoonful of urine mixed with blood. The next day he was admitted into the infirmary. The scrotum and perineum were found to be much swollen and discoloured and the bladder was distended; an attempt was made to pass a catheter, but without success, it entered as far as the membranous portion and then could be distinctly felt to deviate from the canal. A hot bath was given, & ultimately a catheter was introduced into the bladder. On the next day, to remove all possibility of extravasation an opening was made in the perineum. Four days afterwards the catheter was removed & not reintroduced in order to see how far the closing of the urethra was expedited by the use of the instrument. The urine passed mainly by the opening and the catheter was again used in a few days. In about a week it was removed with some difficulty owing to incrustation & a larger one was introduced. The patient gradually improved, & in about another week the wound had quite healed, & the urine was passed in a full stream without inconvenience. & A bougie was occasionally passed to prevent any inordinate contraction, & the patient was soon discharged as cured.

38
XXVI. Medical Gazette, (London), 11th May 1849 p. 800. Clinical lecture on a case of Lacerated Urethra by W^r. Adams, London Hospital. The patient aetat: 42 was admitted into the Hospital on March 28th; he had slipped off the curb-stone & fell under a cart, receiving some kicks in the perineum and side from the horse. He was immediately brought to the hospital. Blood was flowing from the urethra and he complained of inability to pass water.

A warm bath was ordered; and a catheter was then introduced with difficulty owing to a laceration of the inferior part of the urethra just anterior to the triangular ligament. The haemorrhage ceased. The catheter was occasionally changed, and in about 10 days it was removed altogether at the patient's request. Soon after this he became worse & after a time some clots of blood passed by the urethra, the scrotum became thickened and slightly corrugated; and on 13th April or a week after the removal of the catheter, two incisions were made into it, from which blood escaped having a urinary smell. The next day, the hardness in the perineum having increased, a free incision was made into it, and a large quantity of coagulated blood removed, after which violent haemorrhage ~~occurred~~ occurred which was stopped by plugging. The urine at first passed by the wound. He gradually improved, & on May 8th, or about a month after the operation nearly all his urine passed by the natural way.

W^r. Adams observed, that it is better to retain the catheter till the cure is complete, as he said he could not help attributing the

Subsequent unfortunate symptoms that occurred, to the removal of the catheter, if not wholly at any rate in a great measure.

He also observed on the uselessness of meddling with the urethra after saturation had taken place, as the use of instruments so often does harm in such cases.

XXVII. Souley on diseases of the Urinary Organs p. 200. A case of injury to the perineum producing subsequent stricture without apparent wound of the urethra.

The patient - aetat: 27, of intemperate habits was admitted into Bellevue Hospital, Jan^y 16th 1869. When a child he fell through a hole in the ice, bruising his perineum. Ever since this accident he suffered more or less trouble in micturition. Ten years previous to admission ~~these~~ ^{his} troubles were greatly aggravated, but were in time relieved. After some time he began to suffer from dysuria followed by dribbling of urine from over distended bladder. He continued in this state for a year without any relief; about this time an abscess formed in the perineum, which opened spontaneously in the urethra while he was straining. For two years after this he felt better, but after some time he gradually became worse again & showed signs of kidney disease; his urine too dribbled away constantly. About 10 days after his admission perineal section was performed & the stricture divided. The patient died on Feb^y 13th about 17 days after the operation. Post mortem examination showed extensive disease of both kidneys, & of other organs, the brain, lungs &c..

60
XXVIII. *Forley on Diseases of the Urinary Organs p. 32.* A case of injury to the urethra from catheterism.

The patient had been catheterised by an irregular practitioner, the operation having caused great pain, & being followed by much bleeding and constitutional disturbance; soon afterwards a large peri-urethral and peri-prostatic abscess formed, producing much bulging in the perineum and rectum. The abscess was freely opened and the patient made a rapid recovery without fistula. The catheter had been driven through the lower wall of the urethra and formed a tubular pent; no infiltration of urine occurred, not even after the incision, though a sound passed through into the abscess cavity when introduced by the urethra.

These few cases give good illustrations of the different results that may occur from injuries to the urethra.

Out of the 28 cases there are 3 deaths; In one, case IX, there was a simple injury, with subsequent stricture, and, at one time when the patient was straining to pass water, the urethra ruptured just above the stricture, mortification occurred and he soon died. In another, case XII, there was only a slight injury to all appearances at first, but the patient died shortly, and at the post mortem examination, there was found a rupture of the urethra, behind the anterior layer of the deep perineal fascia, and the urine had made its way into the pelvis. The last case of death, viz case XXVIII is very interesting, as showing the dire results that may follow a simple injury to the urethra; the patient received the injury when he was a child, he had afterwards for many years great trouble in micturition, and at the age of 27 he died after an operation, & the post mortem examination revealed extensive disease of the kidneys and bladder.

The 4 cases of injury with an external wound terminated satisfactorily; except that in case II a special apparatus had to be worn. In case I lithotomy had to be performed for calculus in the bladder; the patient having been troubled with difficulty of micturition for 30 years, proceeding from an injury.

Cases III & IV were treated by continual introduction of catheters & terminated favourably.

Of the 8 cases of Extravasation of urine, ~~two~~ only died, cases XII, & IX.

Of the remaining 6, Cases VI, VII & VIII are reported as being perfectly cured, the treatment adopted was to make free incisions, & to pass catheters, retaining them for different periods, but in case VIII, no catheter was used at all. The result of Cases V & IX is not given, though they were on the way to total recovery; & case XI recovered, but the stream of urine was not so large as naturally before the injury. Case XII is interesting, because there did not appear to have been any injury to account for the symptoms, a gradual contraction of the canal took place, and Extravasation of urine occurred after violent straining.

Case XIV is the only one reported in which incontinence of urine is said to have resulted from an injury to a lad; it was cured after some time by retaining catheters in the bladder for different periods.

Case XXVIII is an injury from the careless introduction of a catheter. The remaining 14 cases are examples of the symptoms, course, & results of the most frequent kinds of injuries to the urethra.

In most of them the injury was caused by a fall or strike some object; they were all treated by incision in the median line at some time during their course, ^{except case XIV} and in all except two, viz XXII, & XXVII there was at first inability to pass a catheter. There was one case of death viz XXVII before referred to. The result was good in 10, not stated in 3. In two cases, XXII, and XXVII the penis was fractured. Lastly in all of them there was retention of urine.

With regard to the treatment, it is hardly possible to lay down

any exact rules, because it differs so much in different cases. In two of the cases reported viz, VIII and XXVI, a catheter had been introduced and retained for some time, but was discontinued in a few days, and very bad results followed; so that when a catheter has at length been introduced into the bladder it should be retained if possible until the wound in the urethra is healed; but the best better treatment would be to make an incision at once down to the lacerated portion, as when this is done, the cases appear to heal much more rapidly, & a contraction of the canal is not so likely to occur; in case XXV an incision was made after a catheter had been introduced in order to prevent all possibility of extravasation of urine.

A peculiar operation was performed in cases XXIII and XXIV, the bladder in each was punctured above the pubes, and afterwards an incision being made in the median line of the perineum, one instrument was passed by the urethral canal, & another was directed to the lacerated portion through the aperture above the pubes, which served as a guide for the one introduced by the natural orifice.

In all the cases treated by incision a catheter was afterwards introduced and retained for different periods according to the nature of the case, except in case VIII where no catheter was used, this however is the only case of the kind; and it appears to be the better treatment to introduce a catheter so as to favour as much as possible the healing of the

ruptured ends. In some cases where there is a wide division between the two portions, owing to retraction, they may be brought together and united by ligatures or sutures, as in case ~~XX~~. In case ~~XXI~~ a gutta-serena catheter was used and was retained for 6 weeks, a few remarks are made on the advantage of such catheters over the ordinary kinds.

Index of Cases of Injury to the Urethra.

65

page

I.

A case of original injury to the urethra followed by stricture and subsequent formation of calculus.

29

Cause.

A fall astride a pillion, with a wound from one of the spikes.

Symptoms

Urine escaped by the opening, which gradually healed. For 30 years

Course

there was more or less difficulty in voiding urine. At length a calculus formed.

Treatment.

At first by the introduction of a gum-elastic catheter. Lithotomy.

Result

Favourable.

II.

A case of obliteration of a large portion of the urethra & perineum.

Cause

Blow from a red hot iron in an iron manufactory.

30

Symptoms

Urine passed by several fistulous openings causing great pain.

Course

Urethral end of urethra could not be found.

Treatment.

An incision was made in a course through the centre of the prostate, and

a suitable apparatus was provided for the control of the urine.

Result

This apparatus was satisfactory to the patient.

III.

Case of laceration of the perineum, with rupture of the urethra.

Cause.

A fall with the legs astride on to a beam from a height of 15 feet.

31

Symptoms

Profuse hemorrhage. A fracture of the left os pubis was discovered.

Course

Inability to pass a catheter; the further end of the urethra could not be found.

Treatment.

Hemorrhage arrested by a compress. Catheter at length introduced &

retained for some time, then changed occasionally.

Result

Slight fistula at first, which however healed in time.

IV.

A case of obliterated urethra from injury. Fistulous openings.

Cause.

A blow from a beam, the patient being wrecked at sea.

32

Symptoms

The urine passed by the wound in the perineum for more than 2 months,

Course

it healed, & soon afterwards, several fistulae formed.

Treatment.

By catheterism. The fistulous opening was closed by sutures.

Result

Satisfactory.

- V.**
 Cause. A case of lacerated urethra, with extravasation of urine.
 A fall astride a parallel bar.
 Symptoms. Inability to pass urine. Much swelling of perineum & scrotum.
 Treatment. Catheter passed and retained. Incisions into the perineum.
 Result. At first great prostration; gradual improvement; sent into the country in 27 days after operation; urine passing by a central ^{perineal} opening.
 33
- VI.**
 Cause. Rupture of the urethra, & extravasation of urine.
 Fall on the top of a rail with the legs astride.
 Symptoms. No urine passed; swelling & discoloration of perineum & scrotum.
 Treatment. Catheter was passed; free incision; two edges of the wound were afterwards touched with nitrate of silver.
 Result. In about a fortnight, the two ends of the urethra were united; & in a week more he was cured.
 34
- VII.**
 A case of ruptured urethra, without any apparent injury to account for it; extravasation of urine.
 Symptoms. For about 12 months, gradual decrease in the size of the stream of urine took place; & at length the urethra ruptured whilst he strained.
 Treatment. Incision to expose the rupture, & free incisions into the scrotum. No catheter was used, the urine passed by the wound. Cured in 3 weeks.
 35
- VIII.**
 Cause. Laceration of the urethra, with great contusion of the perineum.
 Fall astride an iron bar across a backway.
 Symptoms. At first, retention of urine, inability to pass a catheter, great pain; few drops of blood passed; catheter introduced; on the 15th day patient removed the catheter himself; extravasation of urine then took place; Incisions; gangrene of scrotum; catheter passed again.
 Result. The urine could be retained & voided as well as ever in about 4 months.
 37

IX. Rupture of Urethra and Extravasation of Urine.

Cause. Fall astride a fence.

Symptoms At first, retention, catheter was passed and retained some days; then
Course & removed; a small stream could then be passed, which became less
Treatment and less, at length ceased, & on straining violently, extravasation occurred.
Result Incisions. Gangrene. Death.

38

X. A case of laceration of some portion of the urethra; extravasation of urine.

Cause. From a jerk forward on to the pommel of a saddle.

Symptoms Hemorrhage from urethra; extravasation; Swelling of perineum;
which healed & left a fistulous opening.

39

Treatment. Incision into the perineum; division of cicatrix; catheter retained.

Result. The wound in less than 10 weeks was reduced to the size of a pea.

XI. Rupture of the urethra; extravasation of urine; formation of a cyst.

Cause. Fall astride a plank.

Symptoms At first little inconvenience; soon retention of urine; followed by great swelling,
& Course of the scrotum & perineum.

40

Treatment Incisions; a cyst was opened containing urine.

Result. Recovery, but the stream of urine not quite so large as before.

XII. Rupture of the urethra; extravasation of urine into the pelvis.

Cause. Fall through a trap door striking the perineum against the edge.

41

Symptoms Much hemorrhage from urethra; no swelling; great pain; bladder
distended; inability to pass a catheter at first. Gradual sinking.

Treatment Catheter passed & retained; incisions in the iliac regions.

Result. Death.

- XIII.**
 Cause Nupture of urethra; subsequent stricture & fistula for 13 years.
 Symptoms & Course Fall from a height of 14 feet on to a barrow; & fell on a saddle.
 Treatment Much swelling; retention of urine; no treatment at first; urine dribbled away; in about 12 months fistula began to form.
 Result Incision in the median line, & introduction of catheter.
 Not stated; in about a week after operation, a no. 7 catheter passed.
- XIV.**
 Cause Laceration of the urethra without external wound.
 Symptoms Fall astride some rails.
 Treatment Pain, retention of urine, swelling & discoloration of parts, inability to pass catheter.
 Result Incision in the median line, urine did not escape, catheter was introduced; great difficulty in finding the perical bud.
 After 6 weeks when the catheter was removed the wound healed shortly.
- XV.**
 Cause A case of Incontinence of urine after injury to the urethra.
 Symptoms Fall astride some railing.
 Course & Treatment Retention of urine; inability to pass catheter; hot fomentations; urine dribbled away involuntarily, this continued more or less for 15 months; catheters passed & retained; gradual recovery.
 Result Nupture of urethra.
- XVI.**
 Cause A kick in the perineum while fighting.
 Symptoms Swelling & discoloration; hemorrhage from urethra, retention of urine, inability to pass a catheter.
 Treatment Catheter at length introduced; incision in the median line; continual use of a catheter.
 Result Cured at the expiration of 5 weeks.

XVII

Cause

Laceration of the urethra. A clinical lecture by Prof. Syme.
 Fracture of the rami of the pubes & ischium of the right side, from
 being struck by an engine while crossing the line.

Symptoms

Swelling of the right thigh and groin; retention of urine; inability
 to pass a catheter.

Treatment

Catheter was passed at length; every time it was removed, retention
 again occurred; incision in the median line; the urine allowed to
 pass by the wound; a full-sized bougie passed in a fortnight.

Result

In a month, he passed a considerable amount ^{of urine} by the urethra; there
 were bed sores, which retarded the progress of the case. Further result not given.

XVIII

Cause

A case of Laceration of the urethra without any wound in the perineum.
 Fall astride the back of a chair.

Symptoms

Swelling of the parts; hæmorrhage from the urethra; retention of urine;
 great pain in the perineum & bladder; inability to pass a catheter.

Treatment

A large catheter passed at length, & retained; an incision in the median
 line; urine passed by the wound; 15 days afterwards a catheter was
 passed & retained.

Result

In thirty-five days the wound had entirely healed; urine
 passing freely by the natural channel.

XIX

Cause

Rupture of the urethra.

Symptoms

Run over by a cart.

Collapse; retention of urine; hæmorrhage from the urethra;
 catheter passed through the lacerated portion.

Treatment &

Bladder punctured per rectum; right ischio-rectal fossa incised;

Result

In a month the wound healed, & he was discharged cured; had a catheter
 passed occasionally afterwards.

XX

Cause

Case of complete transverse division of the urethra.

Symptoms

Kick in the perineum by a horse.

Not much pain at the time; retention of urine; swelling of the parts; inability to pass a catheter; blood only followed.

Treatment

Incision in median line; catheter passed; ends of urethra united by a silk ligature.

Result

In 28 days healing was complete; 2 3 months afterwards passed a full stream of urine without any sign of contraction.

51

XXI

Cause

A case of ruptured urethra.

Symptoms

Fall from a ladder outside the edge of a box.

At the time only slight edema of the scrotum; 11 days after the accident, retention of urine; inability to pass a catheter.

Treatment

An incision made down to the injured part; a gutta-serena catheter passed; after being changed in 14 days, was retained 6 weeks.

Result

The wound healed; in 15 weeks after the accident could pass urine naturally.

52

XXII

Cause

Fracture of the pelvis and rupture of the urethra followed by stricture and false passages.

Symptoms

A severe blow on the pelvis by the falling of a rock.

Course &

Paralysis of both legs; retention of urine; catheter was passed and an incision made in the perineum; fistulous opening remained; a false sac formed; an incision was made in the median line, & a catheter passed and retained.

Treatment

Result

Satisfactory; he passed a catheter himself occasionally. The whole case lasted over two years.

53

XXIII.

A case of closure of the urethra from injury to the perineum.

Cause. A fall astride the edge of a barrel.

Symptoms Swelling & discoloration of the parts; hemorrhage; retention of urine.

Treatment Bladder was punctured above the pubes; an incision made in the skin line; catheter guided along the urethra into the bladder, by another instrument passed through the opening above the pubes, & into the urethra from the bladder.

Result Wounds healed, & urine could be retained & passed naturally in 60 days.

XXIV.

A case of injury to the perineum.

Cause A fall over a low door, the edge of which struck the perineum.

Symptoms Swelling in the perineum; retention; inability to pass a catheter.

Treatment Bladder punctured above the pubes; operation very similar to case XXIII.

Result Not stated; but patient appeared to be doing well.

XXV.

Ruptured urethra from accident.

Cause Fall astride a board.

Symptoms Pain; swelling and discoloration of scrotum & perineum; retention of urine; inability to pass a catheter.

Treatment. Ultimately a catheter was introduced; an opening made in the perineum, to prevent all possibility of extravasation.

Result The patient was cured; being able to pass a full stream of urine naturally.

XXVI.

A case of lacerated urethra. Clinical lecture by H. Adams.

Cause Kick by a horse.

Symptoms Hemorrhage from the urethra; retention of urine.

Treatment. Catheter passed with great difficulty; retained 10 days, then removed at patient's request; bad consequences; incisions were made, great

54

56

57

58

to.

Result

XXVII

hemorrhage occurred from the wound

In about a month nearly all the urine passed by the natural channel.

Injury to the perineum producing subsequent stricture without apparent wound of the urethra.

Fall through a hole in the ice.

Cause

Symptoms &

Course

Swelling of the perineum; from this accident was dated trouble in micturition; dribbling of urine; an abscess formed in the perineum, which burst into the urethra; kidney disease.

Treatment

Perineal section & division of the stricture.

Result

Death in 17 days after the operation.

XXVIII

A case of injury to the urethra from catheterism.

Catheter passed by an irregular practitioner.

Great pain; much hemorrhage from the urethra; formation of abscess.

Treatment

Incisions.

Result

Rapid recovery without any fistula.