Observations on lithotomy, and on the formation of urinary calculi / by John Charles Litchfield.

OBSERVATIONS

ON

LITHOTOMY,

AND ON THE

FORMATION OF URINARY CALCULI.

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OBSERVATIONS.

THE operation for the stone has always been regarded as one of the most formidable and serious that the surgeon has to perform, and more has been written on it, and greater pains taken to bring it to perfection, than have been bestowed upon any other operation of surgery. And this labour happily has not been in vain; for it must be allowed that the safety and success attending the operation of the present day is great in comparison with that which attended the practice of the older surgeons. We seldom now hear of the internal pudic artery being wounded, and never of those

dreadful lacerations which were formerly made. The following are the symptoms which usually attend this disease :

Pain in the loins, numbness of the thigh, and oftentimes retraction of the testicle. The patient feels much pain and irritation about the bladder and urethra, and there is a frequent call to make water, which is attended with much pain, especially towards the end of, and just after the evacuation. The urine though flowing freely, oftentimes suddenly stops, although it is clear much remains to be discharged, and may oftentimes be made to flow again by the patient attempting it after having laid in the recumbent position, and changed the place of the calculus. There is much irritation felt at the extremity of the penis, to mitigate which the patient pulls the prepuce which becomes elongated. Oftentimes the urine as well as the fœces is retained with the greatest difficulty. Exercise increases the pain, and aggravates all the symptoms, espe-

cially the jolting of a carriage, after which the urine is generally bloody.

After these symptoms have existed for some time, much alteration takes place in the structure of the bladder, its parietes becoming much thickened and indurated, and its capacity is very remarkably lessened; the symptoms become more urgent, and the ureters and kidneys take on diseased action as well as the bladder, they inflame and suppurate and along with the urine is discharged a great proportion of blood and purulent matter. Sometimes the calculus lacerates the minute ramifications of the bloodvessels, within the bladder, and in that manner bloody urine is produced.

From these local diseases the general health is much disturbed; a slow fever prevails; the nights are sleepless; and the appetite lost. The patient at length becomes quite exhausted, and is relieved by death from all his sufferings.

The causes of the formation of urinary calculi are not at all known.—They have been said to owe their rise to particular kinds of food and drink, to a particular constitution of the atmosphere; as also to a particular diathesis, which opinion perhaps is the most probable, but it has never been explained in what this particular diathesis consists. The attempts therefore at explaining the cause by which the formation of urinary calculi is brought about must be regarded as having altogether failed, and the subject remains still in the greatest obscurity. It is well known that if any foreign body be introduced into the bladder, and remain there, it will collect the salts or principles which constitute urinary calculi, become incrusted by them, and form the nucleus of a calculus.

This invariably takes place, be the constitution or diathesis what it may. It is equally certain that every calculus hitherto examined has been found to have a centre or nucleus

different from the substance by which it is surrounded. A Lady had an obstruction in the urinary passage; she made use of a bodkin (to remove it), which by some accident slipt and remained in the bladder; the stony substance forming itself gradually stratum superstratum round it. A woman made use of a nail for a similar purpose, and the same effect was produced. A bougie has been known to break in the bladder, and produce also the same effect.*

A calculus appears to be an animal substance, for these reasons it is probable that the animal substance was first produced, and that it became the nucleus, and gave rise to the subsequent formation of the calculus. In this way we may conceive the possibility of a calculus being produced altogether, and from the beginning in the bladder, and not like other calculi having been originally formed

* The calculus with the silver needle may be seen in the British Museum.

in the kidney, and conveyed along the ureter into the bladder, where it has received only its ultimate increase. How the animal substance was produced in the bladder, or what is its constitution is not perhaps of easy explanation, but still we may conceive a portion of coagulable lymph or inspissated mucus, or a coagulum of blood, or a matter formed in consequence of diseased secretion, which becomes a nucleus, capable of collecting such of the urinary principles as enter into the formation of a calculus.

My object, in making these observations, is to shew, that independent of the cases where calculi are produced from the introduction of foreign bodies from without, that calculi may be formed originally in the bladder without any connection with the kidney whatever. But still this is only showing the possibility of the thing, and though I believe calculi are sometimes formed in this manner, yet I am ready to admit that in far the greater number of instances they receive their first formation

in the kidney, and their subsequent increase in the bladder; for among the very first symptoms of stone are a dull obscure pain in the lumbar region, numbness of the thigh, and retraction of the testicle, symptoms certainly more to be referred to disorder of the kidneys and ureters, than to the bladder, and post mortem examinations have in a multitude of instances exhibited the stone in the substance of the kidneys. The late lamented Dr. Baillie, whose death the profession have reason to deplore, has observed in his Morbid Anatomy that calculi are formed more frequently in the kidney than in any other part of the body. Small granules of stone are sometimes found in the tubular portion of the kidneys: but it is more common to find a calculus of considerable size lodged either in some part of the substance of the kidney, or in the pelvis of the ureter.*

* Vide Dr. Baillie's Morbid Anatomy.

The formation of biliary calculi seem to me to bear a striking analogy to that of urinary calculi; and every one must be convinced that calculi form in the gall-bladder, and we are hardly to suppose, that they were conveyed there from the liver in the form of calculi.

It is equally certain, that they have been found in the liver; so then with regard to the liver, it is certain that calculi have been formed in the organ which is the receptacle of the fluid, and in the organ which secretes, and I am inclined to hold that the same happens with regard to the kidneys and bladder.

Hitherto I have been detailing the symptoms, and making some remarks on the seat of the calculus at its first formation; and I wish it were in my power now to throw some light upon the nature of that cause, by which calculi are formed; but unfortunately, I have little to offer, the subject as I before observed, is in the greatest obscurity. It appears to me, that

in all cases, excepting those where the disease is occasioned by the introduction of foreign bodies from without, the urine has not its healthy constitution.

There is no fluid perhaps in the human body, in which the elements vary their proportions so much, at different times, as the urine; at all events it is known, that in different persons, and in the same at different times, the proportions vary exceedingly, and there can, I think, be no doubt that there are certain conditions of this fluid, certain degrees of impregnation with calculous principles, which lead more speedily and certainly to the formation of urinary calculi. That this is the case, I think, is proved by the circumstance, that medicines taken into the stomach; viz. the carbonate of soda, and other alkaline substances are known to prevent in a remarkable manner the increase of a calculus, and to take away the disposition to calculous complaints, which we can hardly conceive to be effected in any other way than

by altering the constitution of the urinal fluid, whether this be by operating immediately on the fluid, or correcting the function of the secreting organ. It seems to me not altogether improbable that in many cases the blood itself may be in a morbid condition, abounding too much in those elements of which calculi are constituted, and which passing off by the kidneys, give to the urine the faulty character before alluded to. Calculi have been found in the brain, liver, lungs, stomach, intestines, and joints of the hands and feet. In the Philosophical Transactions, we meet with accounts of stones in the pineal gland, the heart, gall-bladder, womb, &c. all of a variety of shapes. Women are less frequently attacked with stone than our sex, and a little reflection will readily explain the reason, "the female urethra readily allows the materials to escape, which have become the nuclei of the calculi." Sir Astley Cooper has asserted, that he has known women introduce extraneous substances into the vagina to invite the operation for the stone.

A girl, observes that high authority, came to St. Thomas's Hospital, describing herself to suffer all the symptoms of the stone; she was placed upon the operating table, before all the students, and Mr. Cline passed a sound to ascertain the presence of the stone; he struck some solid body, and a person of less caution might have immediately proceeded with the operation; but he said, "I feel a solid body, which has not the hardness of stone;" he then examined by the vagina, and drew from thence a portion of coal, and afterwards several other pieces: she had no disease. "I cut also," says that gentleman, "a woman in Guy's Hospital, for the stone, and found a large piece of a brass nail in her bladder, which is now in the collection at St. Thomas's Hospital." Very large stones have been known to pass through the female urethra. I have seen one as long as a duck's egg, but not quite so broad, which passed through the female urethra without surgical aid.

Unfortunately, the means which have been

employed for the cure of stone, such as Daffy's Elixir, Tipping's Liquor, Roger's Powder, Tulpin's Medicine, Mrs. Stephen's Dissolvent, &c. have all proved unsuccessful. There is no medicine at present known which taken by the mouth, has the power of dissolving a calculus. The term Lithontriptic, therefore, refers at present, to an imaginary effect. The greatest extent of power which this class of bodies possess, in reference to this complaint, is to prevent the increase of a calculus. It is quite true there are substances, which are capable of dissolving urinary calculi out of the body; but they are observed to have no such effect, when administered by the mouth, neither can they even in the most diluted state, be injected into the bladder, with any hope of their being retained, and not proving injurious, by bringing on inflammation of the bladder and peritoneum. We have, therefore, no encouragement at present to look to the physician for the cure of this complaint.

Among surgeons, different methods of cut-

ting into the bladder, and extracting the stone, have prevailed, but at present there are only two which are generally performed; the one from the incision being above the pubis, has been called the high operation, or sectio hypogastrica; the other from the lateral part of the prostate gland, and neck of the bladder being divided laterally, bas been called the lateral operation.

Against the former of these methods, there are several weighty objections and it is seldom employed. The first and most serious objection is, that the urine is found to escape from the incision in the bladder, and to collect in the cellular membrane abou the pubes, producing abscess, mortification and death. After the stone has been extracted, the bladder is suffered to sink down into the pelvis, and then the incision in the bladder no longer corresponds to that in the pariets of the abdomen, and in consequence of this want of apposition in the incisions, the urine which has a remark-

able proneness to escape at the opening made in the bladder, is not allowed to pass through both incisions, but of necessity, collects in the cellular membrane, and produces the consequences just alluded to. And notwithstanding several contrivances have been had recourse to, such as keeping a catheter in the bladder, and placing the patent in different positions; yet these have not at all succeeded in hindering the escape of urine into the cellular membrane.

Another very serious objection is the readiness with which inflammation of the peritoneum follows this operation; and a third objection is, that if the calculus be broken, it is hardly possible to remove the fragments which may be left behind, and thus an opportunity is afforded for the growth of another calculus.

Experience has determined that the mortality which attends this peration is decidedly greater than that, which attends the lateral operation, and in consequene it few advocates, and the

lateral is almost the only operation now resorted to. The only case in which the high operation seems to be admissable is, when the prostate gland is very much diseased, and there can be no doubt, when such is the case, the high operation is to be preferred, notwithstanding the powerful objections I have made gainst it. It is a duty on the part of every surgeon, not only before operating for this disease, but all others, to enquire into the constitutional condition of his patient, and the local diseases which may exist at the time when an operation is called for, a circumstance, which is, in my humble opinion, lamentably overlooked, notwithstanding its importance. The prostate gland is invariably, after the middle period of life, more or less in a state of disease, and scrophula, in the majority of cases, constitutes the disease; that is, as far as my limited experience will enable me to judge.

Now, surgeons must not be misled by the whims and caprices of many who think proper

both to sanction and practice a particular method of operating, merely because the invention is their own, but should think and judge for themselves, for says Isaac Watts: "No man can ever become truly knowing and wise without the labour of his own reason, in surveying, examining, and judging, concerning all subjects, upon the best evidence he can acquire." The late Mr. Wilson found the prostate gland scrophulous, and on cutting into it, out came a quantity of cheesy matter, precisely similar to that found in a scrophulous absorbent gland. Dr. Baillie, has observed in his Morbid Anatomy, "that when scrophulous glands are cut into, they are generally found to contain a white, soft, cheesy matter, mixed with a thick pus; "this" says he "is the most decided mark of scrophulous affection." I beg it to be understood, that I am not so ignorant of my profession, as not to be fully aware that the prostate gland is subject to other diseases independent of scrophula, for I know well

to the contrary: the diseases of the prostate gland have been described by Sir Everard Home, and the late Mr. Wilson; who have done much towards explaining the pathology of this organ.* My principal reason for confining my observations to the scrophulous state of disease, is, because I have had an opportunity of examining the bodies of seven patients, who died after having undergone the performance of the lateral operation, and post-mortem examination most decidedly convinced my mind, that peritoneal inflammation, &c. was not the cause of death, but a scrophulous state of the prostate gland, which had produced, after the wound, its consequent irritative fever, hectic and death.

I am disposed to atttibute the origin of the diseases of this organ, as I do most other diseases, to a morbid diathesis of constitution,

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* See Sir Everard Home, on Diseases of the Prostate Gland. Wilson, on the Male Urinary and Genital Organs.

and not merely to local irritation. Sir Everard Home, when speaking of ulcers of the prostate gland, observes, " that the body of this gland, when a wound is made in it near the verumontanum, does not in general recover itself, and an ulcer is formed. This backwardness to heal most probably arises from the urine getting into the wound, and keeping up an irritation." There can I think, be little doubt, that such may sometimes be the cause, but generally speaking, I should attribute the cause, as I before observed, to a morbid diathesis of the constitution, for I have found this organ in a state of ulceration, when the greatest care imaginable was taken by the surgeon to prevent the escape of urine, after having performed the lateral operation. The experienced surgeon and indefatigable physiologist before alluded to, continuesto observe, " that when once a part of the glandular substance has been destroyed, the ulceration readily spreads to some extent inthe body of the gland. Under other circumstances," he adds, " wounds in

the body of the prostate gland heal as readily as in any of the neighbouring parts, even where the gland has been considerably enlarged, and in a diseased state; of this we have abundant proof in the operation for the stone." I must confess I was a little astonished when I read that passage, as I humbly conceived, that Sir Everard Home strongly advocated the performance of the high operation.* If that gentleman has satisfied his mind on that subject, why advocate the performance of an operation highly dangerous, when the only circumstance which would prevent a surgeon from performing the lateral, would be the fear of injuring the prostate when in a diseased state? and yet we are told, it will heal readily.†

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* See Sir Everard Home, on a new mode of performing the High Operation for the Stone, p. 359.

† Some surgeons deem it prudent to perform the High Operation when the calculus is too large to be extracted by the lateral. If the incision is made sufficiently large it willing

Mr. John Hunter, who was a great observer, and an accurate pathologist, when speaking of union by the first intention, has very justly and truly observed, "that you may excite some susceptibility of the constitution, or of a part, into a disposition for a disease, which may be latent for a considerable time, and then come into action." "If," says he, "a part be hurt, which has a strong tendency to *scrophula*, it will, most probably run into the scrophulous mode of action, in preference to that of restoration." A little attention will convince every surgeon both of the truth and importance of his remarks, evidently the result of careful study and reflection. He continues, by observing,

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eneral admit of the passage of a very large calculus. It is better on all occasions to make a free incision, more particularly if the Surgeon has reason to suspect the existence of a large calculus. It is not a sufficient reason for having recourse to the High operation, although there are cases recorded where the Surgeon was foiled in his endeavour to extract a calculus by the lateral method, and succeeded in removing it by the High, and the patient recovered.

" that we have many joints, when injured, assuming the scrophulous action, called white swelling; or, if a woman beyond thirty years of age, receive a blow on her breast, it is more likely to acquire the cancerous mode of action, than that of restoration, which should be well distinguished from what is immediately consequent, viz. the inflammation; for on this depends a knowledge of disease."

Daily experience convinces us, that patients frequently die after operations of every kind, even when performed by surgeons in the possession of mechanical dexterity and great adroitness, and that they on the contrary often recover, although the surgeon actually produced unnecessary irritation with the knife during the operation. To what are we to attribute the success of the latter? Why I should say simply because the latter, though an indifferent operator, is a judicious man; inasmuch, as he does not merely confine his ideas to the use of the knife, but to the constitution of his patient, and endeavours to ascertain whether there

exists a disposition for a disease which, would if irritated, probably produce death, even if the operation were performed with perfect ease and freedom. There can then be no doubt, in my opinion that an operation of any kind may be performed in a very rude indifferent manner on a healthy individual, and be attended with success, and when performed on a patient, whose constitution is morbidly affected, an opposite effect would be produced, although the surgeon displayed his operative skill, a qualification of little value, unless his mechanical dexterity is combined with theoretical reasoning and careful reflection. How lamentable it is to see a surgeon cooly and deliberately plunge his scalpel into a diseased part; I am assured that when scrophula is the existing disease at the time of the operation, he will find his after-treatment unsuccessful, for scrophula is a disease of a destructive nature, and is one which surgeons have little controul over, when had it been left alone it might have remained latent for a considerable time.—

To the want of attention to the preceding circumstances, particularly a scrophulous state of the prostate gland do I attribute the failure of the lateral operation, though I am fully aware of other causes of death, as hæmorrhage, nervous irritability, peritoneal inflammation.

It appears to me when all things are properly considered, and I think to most others, it is equally obvious that as a general rule the lateral operation, as it is now practiced, deservedly takes place of every other that has been devised, and instances occur almost daily to convince us, that when the surgeon, who performs the operation, is really a man of judgment, skilful, and well informed in anatomy, the number of those who recover is remarkably great and encouraging, and that no other mode of operating can exhibit anything like an equal measure of success. It is stated that Cheselden operated in this manner on fifty-two patients successively at St. Thomas's Hospital, out of whom

fifty recovered.* Sir Astley Cooper has observed, "that the success of one surgeon being greater than that of another, chiefly depends upon his judgment in the selection of favourable cases." There can I think be little doubt that Cheselden's success was owing to his superior judgment, and not to a superior display of mechanical dexterity. The following are the circumstances which should forbid an operation, according to Sir Astley Cooper, and as that gentleman's doctrine, from his great experience, is the best we now possess, I shall quote his words: "Before performing the operation for the stone, it is right to enquire carefully if the functions of the body are well performed in other respects, if the digestion be tolerably good, and the breathing and circulation be free. For if the liver be diseased; if the chest be oppressed; or if the heart have an irregular action, the patient

* That illustrious Surgeon Cheselden had been in the habit of performing the high operation, a fact worth noticing.

does not in general recover from the operation. Pain in the loins, vomiting, or the discharge of matter, indicating disease of the kidneys also form insuperable objections to the operation. A patient came into Guy's Hospital to be cut for the stone; I sounded him, and found a calculus, but he made water almost immediately, and at the time discharged a considerable quantity of matter. I saw that he was emaciated; he complained of pain in his loins, and his stomach was much disordered. I therefore said, 'I will not operate upon this man, for he would die from the operation.' In less than a month he died, and I was happy that I had not operated, as one kidney was found wasted, and the other at least twice its natural size, with its cavities full of purulent secretion."

He continues to observe that the age of the patient does not much influence the result of the operation, with the exception I shall mention. Old age is not to be a bar to it,

if, so far as the stone will permit, the patient be active, and has no other complaints. I generally, therefore, say to a patient, "If the stone were removed, would you be capable of taking exercise? is your digestion good? is your breathing free?" If he answers yes, the operation may be performed.

Mr. Cline operated successfully upon a patient at 82: Mr. Attenborough, of Nottingham at a still more advanced age. I operated upon a gentleman aged 76, who had been near sixty years in the Island of Jamaica. I performed the operation in 1812, and he died about ten years after, having returned to Jamaica, and enjoyed his health there. About sixty years of age is the period at which stone is most frequent in the adult, and then the operation is very successful. In the middle period of life, fever is more violent from the operation, and the patient is often too much loaded with adeps to be submitted to it. Fat persons do not generally

bear operations well, they have little vital power; they should be reduced by diet and medicine, and they must be accustomed to irritation of the bladder, by the frequent introduction of the sound; but still they have more fever and disposition to peritoneal inflammation, than at a later period of life. The age at which there is least danger from the operation is from three to twenty, for death is then a very rare occurrence. Under the age of two years, children often become convulsed and die from the operation, on account of their excessive irritability.* A short time prior to the operation, in addition to the exhibition of purgatives, &c. an enema should be administered, in order to empty the large intestines, and particularly the rectum, which, if distended with fœculent

* I have had, very lately communicated to me, an instance, which occured in Hampshire, where death followed the lateral operation on a subject scarcely three years of age purely the result of nervous irritability.

matter, would be in great danger of being wounded."

Although the greater number of surgeons are agreed as to the excellence of the lateral operation, there prevails much difference of opinion respecting the form of the instrument which is to make the incision into the bladder. Some employ the Lithotome Cachè, some the knife, and some the gorget. Each instrument has had its advocates and enemies, but the truth is that when the surgeon is skilful, the operation may be performed with either of these instruments, almost invariably with success, as far as regards wrong incision, or wounding the internal pudic artery. The Lithotome Cachè* seems to me to be the most uncertain instrument, both with regard to the extent of the incision in the bladder, and the keeping clear of the internal pudic artery.

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* This instrument is often used at the Westminster Hospital.

It is not capable of such exact regulation as the knife or gorget. The gorget when properly constructed* and managed, is the most certain instrument, and the one to be preferred. The extent of the opening into the bladder made by this instrument is regulated, and it is perfectly in the power of the surgeon using this instrument to avoid both the artery of the bulb, and the internal pudic artery. I have seen this instrument used twice in private practice, and often in hospitals with great success. "Mr. Tyrrell, surgeon to St. Thomas's Hospital, is of opinion, (so indeed are many other surgeons), that the knife is a much better instrument to divide the prostate with than the gorget; more violence is necessary to introduce the latter, and the opening made by it, is limited to the width of the instrument: so that if a large stone be found, much force is required to extract it, or the opening must be enlarged with the knife, the surgeon may

* viz. Scarpa's.

at once make a free incision through the prostate, which I consider, observes that gentleman, a great advantage, as laceration or bruising of this part, by violence used in extracting the stone, is the most frequent cause of subsequent inflammation." As a general rule I should recommend the gorget to the young inexperienced surgeon, as being an instrument less calculated to produce mischief than the knife.* Experience will alone enable him to form his own judgment as to the superiority of instruments, as he advances in his profession; for nothing, but practice can decide a point, which up to this very day is a matter of opinion and a subject of dispute among the most eminent of our profession.

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* I think that surgeons of little experence are not so liable to wound the artery pudic with the gorget an advantage incalculably great. Mr. Abernethey has constructed a gorget which resembles that recommendedby Scarpa.

THE OPERATION.

The table, on which the patient is to be placed, observes Sir Astley Cooper, should be two feet six inches high; it is to be covered with two blankets and a sheet, and several pillows are required to support the patient's head and back. Three bandages are required to secure the patient; of these, two are employed to confine each hand and foot of the same side together: a loop, at one extremity, is first passed around the wrist, and the patient then grasps the outer side of the foot; about its middle, having the bandage passing from the wrist, between the two; the bandage is then passed under the foot, brought round on its inner side over the instep, and so round the wrist and ancle: after two or three

turns around these parts, it should be passed over the hand and under the foot; then to the wrist, and ancle again, until the whole is used. The other bandage is to be placed round the back part of the neck, and each extremity being passed under the ham of the same side, from within to without, they are to be carried back and tied behind the neck. These bandages prevent the patient from making any movements likely to impede the operation; or occasion danger during its performance.

The instruments required, are first, a sound, consisting of a solid portion of steel, curved as the urethra, about twelve inches in length; its thickness should be well proportioned to the size of the urethra.

Persons often require to be sounded with their bladder full, and with it empty. I have frequently found a stone directly after the urine has been discharged, which I could not perceive when there was much urine in the

bladder. It is right, therefore, to sound the patient first with his bladder full; and, if the stone cannot be felt, then to have it emptied, and sound again.

On this account, it is often useful to employ a silver catheter; at first, preventing the escape of the urine, and afterwards allowing it to flow through the instrument, at the same time continuing to sound. When the bladder is empty, it frequently happens, however, that the instrument is so confined, that it cannot be moved sufficiently to strike the stone. The patient should be sounded first in the recumbent position, and, if the stone be not then felt, in the erect; as the calculus, by falling upon the urethra in the latter posture, may be easily detected. "I have myself sounded and not detected," observes that distinguished surgeon, "a stone at one time, which I have afterwards felt. I have sounded and not discovered a stone, which another surgeon has afterwards perceived. I cut a patient, and extracted

thirty-seven stones from the bladder, who had been sounded, and declared not to have a stone. Those who have not had experience in this disease, and have not frequently sounded patients afflicted with it, sometimes mistake the extremity of the sacrum, or the os cocygis, for the stone." The next instrument is the staff, which is somewhat similar to the sound, but rather more curved, and having a groove on its convex part; this groove should be as large as possible; first, because it is more easily cut into; secondly, because the gorget or knife passes more readily by it into the bladder. When performing the operation, the staff is to be held by the assistant, perpendicularly, or nearly so; and its extremity should, if possible, rest upon the stone; its groove is to be slightly inclined to the left side of the raphè of the perineum. Nothing can be more unsafe than to incline the handle of the instrument towards the patient's abdomen, as it draws its point out of the bladder into the urethra; and when the gorget or knife is

passed on it towards the bladder, either is likely to slip between it and the rectum. Before commencing the first incision, the surgeon should see that the patient be placed evenly upon the table, so that one side be not higher than the other; and also, that the shoulders be sufficiently raised and well supported.

The knife for commencing the incision in perineo, should have a considerable convex cutting edge, as by it the urethra is more freely opened. The scrotum being elevated, the incision is begun opposite the under part of the arch of the pubis; and is continued on the eft side of the raphè, along the perineum, as far as ordinary, between the tuberosity of the ischium and the anus. The first incision should divide the skin, &c. and expose the accelerator urinæ; the second should be carried between the left crus penis and the bulb; the latter being pressed towards the right side by the lore finger of the surgeon's left hand. A part

of the accelerator urinæ is divided, and the transversus perinei should be freely cut, as it forms a great impediment to the extraction of the stone, if undivided. The next incision should be made into the groove of the staff, by cutting into the membranous portion of the urethra; for this purpose the knife must be directed upwards, and not horizontally, otherwise the rectum is endangered: the opening made to expose the groove of the staff, should be an inch in length. A gorget, or a knife with a probed extremity, is next usually imployed, to complete the opening into the bladder. The gorget may be considered as the director of the prostate gland, and it also serves as a director of the forceps.

It was formerly used with a blunt edge, so that it acted as a wedge: when so formed and employed, the scalpel should be carried along the groove of the staff, so as to divide the prostate gland laterally, after the urethra has been opened, which allows the blunt gorget to

enter the bladder with comparative facility. The operation performed with this instrument is attended with very little bleeding, and has been very successful in its issue.

Hawkins had one of the edges of the blunt gorget made cutting. Mr. Cline made the greatest improvement upon the cutting gorget, in having the left side entirely removed, leaving only the beak and its right blade, which had a sharp anterior edge: this instrument enters with ease.

It should be introduced horizontally, for there is considerable hœmorrhage if it be introduced obliquely, as it then opens a plexus of vessels surrounding the prostate, and which is continued to the vesiculæ seminales, and terminates in the internal iliac veins. It is quite contrary to my experience to say, that persons do not die of hœmorrhage after this operation, for I have known many instances of it; four in particular, in which,

death was the immediate consequence of bleeding, suffered to continue for several hours; and several I have known die from gangrene of the scrotum, occurring after severe hemorrhage. The patient should never be left until the bleeding has ceased; and, if it be very considerable, the surgeon should place his finger within the wound, and compress the bleeding vessel; but he should be careful not to quit his patient whilst any hœmorrhage remains.

It is best to use a small cutting gorget, as it lessens the danger of wounding the blood-vessels; and then, if necessary, on account of the size of the stone to dilate the wound, do it with the blunt gorget. The beak of the cutting gorget is passed into the groove of the staff, where it has been previously opened at the membranous part, and the instrument is then pushed along the groove into the bladder, so as to divide the left half of the prostate gland. It is necessary to press the beak against the groove as it glides along, and occasionally to

move it slightly backwards and forwards, to be certain that no portion of membrane has got between the two: when the gorget enters the bladder, the urine flows out over its superior concave surface. The length of the gorget should be proportioned to the size of the patient. The breadth of its cutting part, when used for an adult, should not exceed one inch; and the blunt gorget should be used, if the first opening be not sufficiently free.

The gorget which I at first used in my own operations was double, and cut upon both edges; but I thought it occasioned too much bleeding, and divided more than was absolutely necessary for the removal of the stone. The knife is now frequently substituted for the gorget, and that which I for some time employed, in various cases, was straight and narrow, with a probed end. After opening the membranous part of the urethra, as before, I passed this knife along the groove of the staff into the bladder. In the young this answers

very well, and also in a thin adult; but in a deep perineum, or enlarged prostate gland, I prefer the gorget, as being more definitive in its cut. Forceps of various sizes are also required to lay hold of the stone; and those employed must depend on the bulk of the patient: the handles should occupy two-thirds and the blades one-third of the length. I have tried many others of different proportions, but think that which I have mentioned the best. Some of the blades must be flat, for small stones, or fragments of stones; some should be curved, to remove calculi from behind the pubes or prostate: one pair should be large, as small forceps will not retain a large stone in their grasp, with sufficient firmness to extract it. The forceps must be passed along the groove of the gorget with great care, and the gorget must be well retained during their passage, I have seen the forceps pass between the bladder and rectum, from the surgeon's pulling back the gorget as he thrust forwards the forceps, which should never be done. The

gorget must not be removed until the surgeon has thrust his finger forwards to feel that the groove of the staff has been freely opened. I frequently, if the perineum be not very deep, remove the gorget after it has entered the bladder, and introduce the forceps by my finger, carried along the groove of the staff. When the forceps has passed into the bladder the gorget and staff are to be removed: and the surgeon before opening the forceps, should sound with them for the stone.

When the situation of the calculus has been thus ascertained, the blades of the forceps are to be separated, and the stone received between them; and this must be done with great gentleness, not only to save the patient pain, but to prevent any injury to the internal surface of the bladder. When the stone is drawn down to the opening in the perineum, wait a little for the cessation of muscular action from the perineal muscles, and introduce the finger by the side of the forceps, to feel if any obstruc-

tion exists, and to press it out of the way of the stone; for the finger is the best instrument for this purpose. It is right to turn one blade of the forceps to the pubes, and the other to the rectum, as the stone cannot then injure the urethra. If the extraction of the stone be violently resisted, disengage, and remove the forceps, then introduce the finger, and feel how the stone is placed, and, if necessary, turn its long axis into the direction of the long axis of the bladder. Having grasped the stone with the forceps, do not be hasty in extracting it, but be gentle in the employment of your power, depending upon the gradual, rather than the sudden exertion of force. The great danger, and the most frequent cause of death, in my opinion, arises from the surgeon's employing excessive violence with the forceps. 1st, bruising the bladder; 2dly, disengaging it from its situation by tearing down its natural adhesions; it injures the peritoneum and brings on peritoneal inflammation; 3dly, it injures the prostate,

sometimes tears the urethra at the membranous portion; and I have known the rectum lacerated where it had not been injured by the incisions, which can only arise, in the use of the knife, from ignorance or negligence. If the stone cannot be grasped with the straight forceps, a curved pair should be employed. The operation for the stone consists, therefore, 1st, in opening the membranous part of the urethra, and dividing the transverse perineal muscles on the left side with the knife, and exposing the groove of the staff; 2dly, in dividing the left half of the prostate gland horizontally, and that portion of the bladder connected with it, by means of the gorget or probed knife: 3dly, in introducing the forceps, by which the stone is seized and extracted.

AFTER-TREATMENT.

When the operation, observes Sir Astley Cooper, is concluded the patient is unbound; but the legs should not be immediately brought together, if any bleeding continue, as the blood is apt to pass back into the bladder, where it coagulates; and producing great urgency to make water, the coagulum is forced out, occasioning a renewal of the hœmorrhage. No dressing is to be applied to the wound,* but a folded sheet or

* If I may presume to offer an opinion, it would be that, a tube should be introduced into the bladder, and a piece of lint dipped in oil, put over the wound, and the bandage

napkin is to be placed under the nates of the patient in bed, and this should be frequently examined, to ascertain if the urine be secreted and pass away: it should be changed for a dry one whenever it becomes wet. Opium may be given, if the patient be very irritable; but as it is apt to check the action of the intestines it should not be administered unless absolutely necessary. The patient should be allowed to take diluents freely at first; such as linseed tea, or barley water with gum acacia in it; and, when the danger of inflammation has passed, beef tea, broth, or gruel, may be given. Saline medicines, with excess of alkali, are useful; if a tendency to fever or inflammation arises, purge the patient with castor oil, and foment the abdomen; if it

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brought round the perineum to which the tube is attached. It keeps the parts moist, and I have always seen it used with great success, the tube may be removed about the third or fourth day, the urine then takes its natural passage, and the wound will rapidly heal.

increase, give calomel and antimony, and occasionally castor oil; if the pain in the abdomen become severe, bleed from the arm of the adult, and apply leeches to the abdomen of a child. When the wound begins to granulate and not before, tie the legs together; as much mischief arises from doing so, soon after the operation; 1st in bleeding, as already mentioned; 2dly, it prevents the free escape of the urine; it is of no use until the wound be disposed to close. It is not necessary that the patient should rest on his back only; there is not any danger in his turning to the side, and great relief is often obtained by it. The urine passes, in some cases, entirely by the urethra in the first few hours, but this is not desirable; the patient suffers less in its discharge, and has less local irritation, if it escapes easily by the wound.

In cases of enlarged prostate gland, it is proper to introduce a flexible catheter by the urethra, to permit the urine instantly to flow

off. When the urine, under the common consequences of the operation, takes its natural course, the patient frequently suffers from a rigor. Children usually recover from the operation in about three weeks, and adults in about a month; sometimes both have the wound healed within a shorter period. I have known two evils arise from the operation; one, a loss of the power of the retention of urine, when the patient is obliged to wear a yoke, or jugum; the other, an interruption to the passage of the semen, from some injury done to the verumontanum, where the united ducts of the vesiculæ seminales, and vasa deferentia terminate. A gentleman, I know, who has undergone this operation, has pain in coitu, but does not pass any semen, although he experiences the orgasm.

I have been induced to insert much of the doctrine of that distinguished surgeon Sir Astley Cooper, feeling convinced of its supe-

riority. All who require information concerning this operation should consult, Mr. Samuel Cooper's Surgical Dictionary, wherein will be found the opinion of our best Lithotomists. Consult also Mr. Carpue's History of the High operation for the Stone. It is necesssary to read all the most approved works, both ancient and modern, which have been written on this formidable disease, for the history of Litholomy is useful and interesting in a degree.

The Profession are greatly indebted to Mr. Samuel Cooper for the great and laudable pains which he has taken in collecting from various sources, many valuable important facts on all surgical diseases :—a complete Herculean task.

FINIS.

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