ful effect in the single experiment above recorded. It is not an intestinal stimulant.

Tannin does not appear to affect the liver.

[To be continued.]

Erratum.—In the JOURNAL for December 14th, page 861, column 2, line 8 from bottom, for “after” read “before”. In the JOURNAL for December 21st, page 909, column 2, line 26 from bottom, for “1069” read “1869”; page 910, Experiment 3, at sixth horizontal line between numbers, insert letter *b*; page 911, col. 1, Table II, for “0.223” read “0.233”; page 912, col. 1, line 2, for “869” read “1869”.

ON THE IMPORTANCE OF AN EARLY DIAGNOSIS OF STONE IN THE BLADDER, AND THE MEANS OF EFFECTING IT.*

By W. F. TEEVAN, B.A., F.R.C.S.,

Surgeon to the West London Hospital, Surgeon to St. Peter's Hospital, etc.

I HAVE been led to the choice of the subject I to-day bring before you by the sad instances I have seen in our profession in which the existence of a stone in the bladder has been overlooked, and the patient's life endangered or sacrificed thereby. I think it will be admitted by all that there are a number of diseases which are largely under our control; and, if patients would only apply early enough, and their doctors were to exercise reasonable skill and patience in interpreting the phenomena presented to them, we might almost exterminate those complaints, or, at all events, greatly diminish their evil effects. Amongst such diseases I would include stone in the bladder. We all know that the operation of cutting out a stone from a man is a very serious affair. It was Sir Benjamin Brodie's opinion that one-half of all the adult males cut for stone died after the operation. All inquiry goes to prove that his opinion was a tolerably correct one, thus showing a terrible mortality. Cannot we do something to improve the results of the operation? I am afraid not. Surgeons have posed before man's perinæum for centuries, and have entered his bladder by every conceivable route; but the results, take them all in all, have not varied very much. Happily, however, for mankind, everything must have a beginning, and stone is no exception to the rule. Unfortunately, the physician can do little or nothing to prevent the formation of a calculus, and it is reserved for the surgeon to wait for the enemy till it has made its descent into the bladder and to there attack it. Luckily, a stone is a long time growing to a considerable size, and it usually gives a good warning of its presence, so that ample time is afforded to attack and crush it while it is yet young, with absolute safety to the patient. Everything, consequently, turns on the diagnosis of the complaint. It may be said that the risk attached to stone in the bladder depends on its size; the larger the calculus, the more disease it occasions, and the greater the risk, therefore, attached to its removal. A big stone means much disease and great risk; whereas, if a small one, it may be affirmed, little disease, small risk. Hence it ought to be our aim to discover a calculus while it is yet young, and to crush it in its infancy. Now, the symptoms which should lead us to suspect the existence of a stone in the bladder are often obscure and ill-defined when taken singly, but, if grouped together and subjected to the crucial test questions which I shall hereafter refer to, we get together a mass of evidence which is usually strong enough to enable us to say whether a patient be the subject of stone in the bladder before we sound him.

1. *Frequency of Micturition.*—So soon as there is a foreign body in the bladder, it gives rise, by the movements impressed on it by changes of position, exercise, and the muscular efforts of micturition, to some irritation; and the earliest expression of that irritation is increased frequency of micturition. The increase in frequency will depend greatly on the character of the stone. A small oxalate of lime calculus, which jumps about the bladder with every change in the patient's position, may give rise to excessive frequency; whereas a large smooth phosphatic stone, lying quietly behind the prostate, may occasion but little increase. This symptom *per se* is not of much value, because nearly every disease of the bladder, prostate, or urethra is accompanied by increased frequency of micturition. Then, again, very few men note how often they urinate in the day; so that the interposition of some half-dozen acts of micturition in the day may pass unnoticed, whereas, if it occurred at night, it would be sure to attract attention. Now, as a stone usually gives rise to but little annoyance at night, you see that frequency of micturition, taken *per se*, carries but little weight.

2. *Difficult Micturition* is a common symptom in the early stage of the complaint. The smaller the stone the greater the chance that the flow of urine will carry it into the neck of the bladder, and even into the urethra. The larger the calculus, the more it tends to settle down behind the prostate, especially if the gland be enlarged, and there to lie quietly. The prostate acts as a barrier when enlarged between the neck of the bladder and the stone. Boys really have no prostates; that is to say, the gland in them is so rudimentary that it may be disregarded. Consequently, boys usually have a great deal of pain in micturition; the stone rolling to the neck of the bladder, and forming an impediment to the escape of the urine. One of the marked effects of this interference is exhibited in the way of priapism, rare in adults, but very common in boys.

3. *Pain.*—This is a very variable symptom, though usually present in some degree or other. Whether it be severe or not will depend on the character of the calculus and the nature of the exercise taken. For instance, a clerk, who walks to and from his office at a quiet pace, and sits on a stool all day, will suffer but little inconvenience; whereas a hunting man will be made aware of the presence of a stone. Ten to one that, when he gallops on horseback, he will experience some disagreeable sensation at the end of the penis, and will be frequently obliged to dismount to pass urine. Although hunting has caused many deaths, yet I am sure that, on the other hand, it has saved many lives. Men who hunt are just the subjects for uric acid calculi; and in them the existence of a stone usually makes itself known at a very early period, so that, by the intervention of lithotomy, they are spared the risk of losing their lives by lithotomy. In children, pain makes itself very evident, for they cry out when passing urine, and rub the penis or squeeze it to mitigate their sufferings.

4. *Blood.*—Whether blood is seen or not will almost entirely depend on the nature of the stone and the character of the exercise taken. A small oxalate of lime calculus in a man who rides will almost certainly cause the escape of a few drops of blood, whereas a large smooth stone in one who leads a sedentary life may not cause any hæmorrhage. It is well to remember that the blood is usually passed in drops at the end of micturition; and that it generally has a florid aspect, different from bleeding from the kidney. The man whose kidney bleeds passes bloody urine, whereas the patient with a stone in his bladder passes urine and then blood.

5. *Altered Condition of Urine.*—This is probably the most untrustworthy symptom. Perfectly clear urine is quite compatible with the presence of a large stone, whereas a little mulberry-calculus may cause great alterations. Remember, I am alluding to the earlier symptoms of stone, not the later ones.

6. *Retention of Urine.*—This very common in boys, but rare in adults. If a boy suffer from retention, and there be no phimosis to account for it, depend upon it a stone is the cause of the stoppage.

7. *Prolapse of the Rectum.*—This is common in boys, but very rare in adults, although they often complain of tenesmus when urinating or defæcating.

8. *Incontinence of Urine.*—This is a symptom but little known or attended to. It was pointed out by Civiale, and a knowledge of the fact has enabled me to suspect, detect, and remove calculi in boys who had been subjected to a course of sea-bathing and tonics. When a stone is impacted in the commencement of the prostatic urethra, it gives rise to retention; for the sphincter of the bladder embraces the foreign body tightly, and accurately fills up the sinuosities in the stone, so that the urine cannot escape. If, however, the calculus advance half an inch further, it acts as a gag and prevents the sphincter vesicæ from closing, so that the urine continually escapes along the sinuosities in the stone.

Lastly, there are a certain number of aches and pains which may be ranked under the head of “Anomalous Symptoms”. I mention them simply as surgical curiosities, such as pain in the scrotum or down the arm or thigh.

So much for the symptoms of stone. We now come to the difficult point. It is very rare that the presence of a calculus gives rise to more than four of the above symptoms; and, inasmuch as the same four symptoms may be presented by other diseases than stone, we are far off from a correct diagnosis. In stricture, for instance, we may have frequent, difficult, painful, and muco-purulent micturition; and in inflammation of the prostate we may have frequent, difficult, painful, and bloody urination; and in children the presence of worms in the rectum, a fistula, phimosis, or contracted meatus, may closely simulate stone. Happily for us, there is a key to the puzzle, and that key is movement. Let us see how it clears up the case. A stone in the bladder is a foreign body lying unattached, and the symptoms of calculus are chiefly the results which would be produced by any foreign body shifting its position every hour through movements impressed on it. Every

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other affection is a fixture, but this one is not; consequently the symptoms are greatly exaggerated by movement and relieved by rest. This cannot be affirmed of the other complaints. If, therefore, you have a certain set of symptoms presented, and if they be aggravated by movement and relieved by rest, depend upon it that you have a stone to deal with. Let me take the case of a man suffering from frequent, difficult, painful, and bloody micturition, all of which symptoms may be caused by an enlarged prostate which has become inflamed. You want to clear up the case. All you have to do is to ask the man whether he is worse at night or in the day. If it be a prostatic case, the man will tell you that he is just as bad at night as in the day, or even worse; whereas, if it be a stone-case, the patient will say to you that he is not so bad at night, for the simple reason that the absence of movement brings relief. Take another case. A man complains of frequent, difficult, painful, and muco-purulent micturition, all of which symptoms may be caused by a bad stricture. Ask him if he is better or worse when he moves about or rides in an omnibus. If he suffer from stone, there will be a great exaggeration in the symptoms; whereas, if it be stricture, there will not be.

I have enumerated so many symptoms that they may possibly be difficult to recollect. If, however, you can remember the words *pain and blood*, and that both are *increased by exercise*, you will rarely ever overlook a case of stone; for, depend upon it, if a man come to you and complain that he suffers pain and passes blood when he passes urine, and says that he is much worse when he rides, you may at once be certain that you have a calculus to deal with.

One word for encysted calculus. Luckily, it is very rare; and, as it is a fixture, the ordinary symptoms would be conspicuous by their absence. The patient would be only troubled by increased frequency of micturition, and his urine would be cloudy.

So much for the occurrence of symptoms which would lead us to suspect the presence of a stone in the bladder. It is, of course, absolutely necessary to confirm our suspicions by sounding the patient, for by that process shall we alone be enabled to declare with certainty whether a patient has a stone. Now, sounding a patient is not a manipulation to be lightly undertaken, or performed at any time under any conditions. Cases are on record of patients who have died after being sounded, apparently from peritonitis set up by inflammation extending from the bladder to the peritoneum. Hence care ought to be taken to see whether the patient be in a fit condition or not; for, if he be at all feverish, the operation had better be deferred. It must, however, be borne in mind that it is much better to examine twenty patients unnecessarily, rather than allow a single case of stone to slip through the surgeon's hands for want of an examination. The patient's bowels ought to have been thoroughly opened, as a loaded rectum interferes with the examination; and care ought to be taken that there is not too much water in the bladder, for, if there be, the urine will be driven out along the sides of the sound as soon as the instrument is introduced. Therefore tell the patient it will suffice to have a couple of hours' urine in the bladder for the purpose. He ought to be laid down on a hard couch, with a good stiff bolster under his buttocks; but the head and shoulders ought not to be supported by any cushion. The surgeon had best stand at the bottom of the couch between the patient's legs, for in this position only can he thoroughly examine the rectum and bladder at the same time, as is absolutely necessary. If the patient be told to draw up his knees, and to place each foot on a chair, he will have placed himself in the most advantageous position for the surgeon. Some of the sounds employed in this country are fitted to do anything except what is required of them—to detect a stone; and, if it has been my good fortune to detect many calculi which had eluded the search of hospital surgeons, I would attribute it to the fact that I have used a better sound than they did, for which I am indebted to M. Mercier, and which is depicted in Fig. 5. It is hollow and has its eye (L) in the right place—the concavity—where it is less likely to be plugged up by mucus or to annoy the patient than if placed in the convexity, as is to be noted with most English sounds. My favourite sound is to be seen at Fig. 6. It differs only from the preceding in having a larger beak and a thinner shaft. The larger the beak the more capable it is of detecting a calculus, and the more slender the shaft the less irritation will be caused the patient by the manipulation of the sound in the urethra. But the peculiarity of Mercier's sound is the shortness of its beak and the sharp angle at which it is fixed to the shaft. The beak is from a quarter to half an inch shorter than that of any other sound in use in this country, and the special advantage gained is that it has a more extended field of exploration allowed it than the longer-beaked sound, and, above all, that it alone can efficiently examine that depression which exists behind an enlarged prostate and is the favourite home of stone. The nearer the angle formed by the beak with the shaft approaches a right angle, the more

efficient will the sound be; but, as such an angle would not permit of the introduction of the instrument, Mercier has fixed his beak at an angle of about 110 degrees. It might at first sight be thought that a sound such as I have described would be difficult to introduce; but it is not so. To pass it easily, the handle must be

made to describe a much greater portion of the circumference of a circle than the ordinary sound; so that, when the introduction is commenced, the handle ought to be laid on the abdomen, and the turning movement delayed as long as possible; that is to say, the sound ought to be allowed to find its own way as far as it will go before the surgeon attempts the turning movement. When, however, he commences that alteration in direction, he will have to continue it for a longer period than with the ordinary sound, and to depress the handle almost to the couch before the instrument enters the bladder.

Another sound of Mercier, quite unknown in this country, is that represented by Fig. 7. It every now and then happens that, although the existence of a stone may be strongly suspected, yet it cannot, on examination, be found, usually on account of its small size. Now, as a rule, the opposed surfaces of a stone and sound are always convex, as seen at Fig. 9, which represents sections of the stone S and the sound U in apposition. It will be observed that they only touch at a single point, and hence the percussion-note produced is extremely feeble, or possibly inaudible. Then, again, inasmuch as the beak of the sound is convex, it tends, when it strikes a small stone, to push it away, and it may not again be found. To remedy these defects, and to facilitate the detection of a very small calculus, Mercier constructed a hollow sound (see Fig. 7), the beak of which is flat and spoon-shaped on each side, so that, when it strikes a small stone (see sections of stone T and sound V, Fig. 10), it overlaps or embraces it; so that, instead of the two bodies being in apposition at one point only, they each present to the other a surface. Thus, therefore, a note which may be inaudible when two bodies are struck, and touch at one point only, becomes very distinct when surfaces meet. However, such a sound is not often required. The female sound ought to be discarded; it is well-nigh useless. The surgeon who uses it cannot carry out any systematic exploration of the bladder, for he can only poke about the viscus with it. The instrument, indeed, resembles a small poker. When the sound, such as I have represented at Fig. 6, has been passed, the surgeon ought, firstly, to explore the right side of the bladder, then the left; next the suprapubic region, then the floor; and, lastly, he ought to reverse the beak, in order to examine the depression behind the prostate, which is the favourite haunt of calculus in middle life and old age. It is well known that, on several occasions, patients have been cut for stone and none found; and it is, therefore, well to bear in mind that there are three separate and distinct bony points which may be struck in sounding, any one of which may give rise to the belief that there is a calculus. The three points are: 1, the sacrum (N, Fig. 8); 2, the spine of the right ischium (O); 3, the spine of the left ischium (P). When an inexperienced surgeon introduces a sound into the bladder and strikes a something, he at once thinks it must be a stone, not reflecting that things *extravesical* as well as *intravesical* may be felt. The bony points to which I have referred are felt through the walls of the bladder, and hence, when struck, give forth a dull indistinct sound, very different from the click from a calculus. No careful surgeon, however, would ever operate on a man without having previously passed a lithotrite into the bladder, which clears up a case and prevents any error from being committed. The operation of sounding cannot be conducted too slowly, even to the withdrawal of the instrument; and the process of "whipping" the sound out of the bladder cannot be too strongly reprobated, as one fraught with much danger to the patient.