longer than three weeks before the medicine was given, this temperature became normal in one on the second day, and in another on the third. Of 45 individuals, including extreme cases, the mean duration of fever after giving iron was eleven days; and this was so in each of two groups, one of 25 in whom the treatment was commenced before the seventh day, and in the other, of 20 cases who had undergone no treatment until after that date. The point of importance lies in the fact that although, when treated within the first week, 43 per cent. presented a normal temperature within seven days; and that when the treatment was not commenced until the second week, 33 per cent. lost their fever during the same period, it is not warrantable to conclude that the date at which the case was taken into hand alone determined the duration of the malady, for in two cases which had resisted other treatment for a period of three weeks, relief followed the administration of iron, and the temperature became normal within three days.

7. The relation between the number of attacks which the patients have suffered, and the duration of abnormal temperature may be thus shown in 55 cases: 29 were in their first attack, and, of these, 13 lost all fever within the first week; 9 within the first five days; 19 were in their second attack, and of these 7 were of normal heat within six days; 6 were in their third attack, and of these 3 presented a normal temperature within five days. Or, putting it another way, of those who were in their first attack, 44 per cent. were convalescent within the first week, while of those who suffered in their second, third, or fourth attack, 42 per cent. recovered within the same period.

It is obvious from these facts that so far as iron treatment is concerned, it is a matter of indifference whether the patient be suffering in a first, second, or third attack.

In several cases I have observed a remarkable diminution in the frequency of the pulse at and after the time at which the temperature has become normal; thus it has been as low as 40, 30, and even 28, but regular in rhythm and force, and the patients have made no complaint of pain or faintness.

I have purposely stated the facts already in my possession, in a bald manner, and have avoided all theory with regard to the treating, that at some future meeting of this Association I may be able so to increase their number as to be able positively to answer the question as to the utility of treating acute rheumatism in the manner I have described.

SACCULATION OF, AND STONE IN, THE BLADDER.*

By W. CADGE, F.R.C.S.,

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I DESIRE in this communication, as briefly as I can, to direct the attention of the meeting to the combination—I may say the unhappy combination—of stone in and sacculation of the bladder, chiefly with reference to operations for the removal of the stone, and especially to the risks of lithotripsy in such cases. I do not allude to ordinary cases of encysted stone—cases which may occur in the young as well as in the aged—in which probably there is a single cyst, which may, and very likely have, been caused by the presence of the stone itself. These cases are fully described in surgical works; they are happily rare in practice, and each one must be dealt with, or left alone, according to the judgment and skill of individual surgeons. I allude rather to those cases of sacculation of the bladder which occur chiefly in the aged, or in those who have experienced continued obstruction to the outflow of the urine, whether from stricture of the urethra, from enlargement of the prostate gland, or from other causes. The mode of formation of these sacculi is well understood and easily explained. The impediment to the escape of urine necessitates increased expelling power on the part of the bladder; this leads to hypertrophy of the muscular walls and interlacing columns; the equal pressure of the fluid in all directions forces the mucous membrane, which is capable of great distension, into the spaces between the interlacing muscular columns; and in this way sacculi of every size, shape, and character are accounted for, from the simple recess between the muscular columns to the perfect hernial protrusion through the entire muscular wall, in which there is no covering to the sac except the peritoneum. Muscular hypertrophy of the bladder, as of the heart, may exist under two conditions, simple hypertrophy, or hypertrophy with dilatation. The former is seen most frequently in cases where the obstruction is due to stricture, where the patients are of middle age, and in the possession of fair vital power; the latter, in the aged, whose enlarged prostate is the

impediment, whose vital power is on the wane, and in whom the bladder is apt to exhibit atony or even paralysis. In simple hypertrophy, the result of stricture, sacculation is far less frequently met with than where there is a dilated bladder from prostatic obstruction. In the latter case, judging from my own observation in *post mortem* examinations and of specimens in museums, sacculation of the mucous membrane exists in the majority of cases.

Given, then, such a sacculated condition of bladder, let us inquire what may happen when a calculus passes into it from the kidney. From the impediment to the escape of urine which always exists in these cases, the stone is very likely to remain in the bladder and increase in size. It may pass at once into one of the sacs, remain and grow there, and cause the symptoms characteristic of encysted stone; or it may not, and I believe, as a rule, does not, at first enter a sac, but remains free in the bladder, and causes the usual symptoms of stone with which we are all familiar.

Then comes the question of operation. The patient either submits to lithotomy, in which case he would probably recover as if no sacculation existed; or to lithotripsy, in which case some of the small fragments of *d.bris* will be very likely to find entrance into one or more of the sacs, and lead either to immediate fatal inflammation extending to the peritoneal membrane, or to prolonged incurable cystitis, recurring stone, and ultimate death. These chronic and deplorable results, however, do not manifest themselves at once; the present and immediate effects of the operation are satisfactory. The mass of the stone, excepting only a few imprisoned pieces, being well removed, the bladder is for the time happy and comfortable; the symptoms almost disappear; only a slight irritability remains, which is attributed either to the enlarged prostate or to the effects of the frequent recent use of instruments; the patient goes home; and the case swells the lists of triumphant successes of lithotripsy which now and then appear in the medical journals. If you scrutinise these lists of successful cases, you will find a not inconsiderable number described somewhat in this way: "A gentleman, aged 70; six sittings; all the stone removed, but some irritability of the bladder remaining." Now, in many of these cases—these so-called "successful" cases—I believe that some fragment has entered one or more of the numerous sacculi, and keeps up the irritability; that by degrees it increases in size, and projects into the cavity of the bladder, and is again met with by the sound, and is probably reduced in size by the lithotrite, and the patient's condition is for a time improved. But the imprisoned stone can never be removed (or but very seldom) from the cyst; it soon sprouts up again into the cavity of the bladder, to be again attacked by the lithotrite; and so the process goes on, until the patient is worn out by continued suffering and repeated operations. No one, I apprehend, will deny the truth of this picture; but it is said that such cases are very rarely met with. Is it so? I have looked closely through my own cases, and, finding half a dozen at least in which this accident (if I may call it so) has occurred, the conviction is strong in my mind that it is of more frequent occurrence than writers on lithotripsy have been willing to allow. It is probable that provincial surgeons, who draw their cases mainly from their own neighbourhood, are better able to trace the subsequent history of their patients than those who practise in London; and to them, therefore, we must look for a note of warning, such as that which I am now attempting to give.

Permit me to illustrate these points by briefly narrating a few cases.

CASE 1.—In 1868, a Jewish gentleman, aged 64, from Yarmouth, consulted me for stone in the bladder. For four or five years, he had had chronic prostatic retention, and passed all his urine by the catheter. For some months, he had experienced sharp symptoms of stone, in addition to those of enlarged prostate, with cystitis. I examined him with a lithotrite, and found that there was more than one stone, the largest of which measured seven lines. After four or five sittings, in which the stone was well broken, and the fragments removed partly by repeated introduction of the screw-scoop, and partly by Clover's exhausting syringe, all the stone appeared to be gone, and the symptoms were greatly improved. Very soon, however, the cystitis returned; small atoms of phosphatic stone began to escape through the large eye of a large catheter; and in a month or two I was enabled, after several vain explorations, to detect a stone, which then, and always afterwards, appeared to be fixed and encysted at the lower and right side of the bladder. At first, it was very difficult to find this stone, or rather the small point of it which projected through the mouth of the sac; but by degrees it grew up into the bladder, and was from time to time attacked by the lithotrite; that is to say, it was broken off level with the aperture leading into the sac, and the loose pieces removed. For nearly two years I did this for him at frequent intervals, and his condition was one of persistent cystitis. He is still living; and his surgeon, Mr. Meadows, I believe, carries on the same

* Read at the annual meeting of the East Anglian, Cambridge and Huntingdon, and South Midland Branches, at Cambridge.

treatment, though at longer intervals, and with less cystitis. The future of this patient must be one of recurring stone and persistent misery. Could I have told that his bladder was sacculated, and had subjected him to lithotomy, he would probably have recovered and remained well afterwards.

CASE II.—In August 1868, I admitted a man aged 63 into the Norfolk and Norwich Hospital, who had undergone five or six sittings of lithotripsy by a surgeon in the country; the last, six weeks before admission. He had voided a good deal of calculous debris; but he had still acute vesical pain and tenesmus, with foetid alkaline urine and mucopurulent deposit. I found, on examination, a very tender, hard, distended bladder, having a few small pieces of stone lying loose in it. I gently crushed these pieces once or twice, and ordered the bladder to be emptied by a flexible catheter occasionally; but his sufferings continued unabated, and he died worn out by pain in a month or so. *Post mortem* examination showed a thickened bladder, having numerous sacculi, one large enough to hold a walnut, in which were found two considerable pieces of stone. The mucous membrane was everywhere rather dark-coloured, and covered with pale tenacious mucus; but the inflammation was most acute, and the colour darkest, in and around this sac. There were several small fragments of stone still in the bladder; some of these appeared to be fixed, as it were, in little recesses or commencing sacs of the mucous membrane, and retained there partly by the hypertrophied muscular columns, and partly by the tenacious mucus, which seemed to glue them to the membrane. In this case, it is clear that, even had the cystitis not proved fatal, he would ever after have suffered from encysted stone; and it is equally clear that his best chance of recovery would have been from lithotomy. One other similar case deserves mention.

CASE III.—Captain B., aged 70, came to Norwich in July 1868, from Brighton, for treatment, under the following circumstances. In August 1865, a lithic acid stone was crushed repeatedly by an eminent lithotritist in London. Recovery was nearly complete; he was supposed to be cured, and returned home to Brighton. In a month or two, however, the symptoms returned, and he consulted another distinguished lithotritist, who examined him, and could find no fragment. I mention this because, although these two distinguished surgeons could find no stone remaining, he not unfrequently passed pieces of lithic calculus then and for some time after, showing that, in all probability, these pieces occupied pouches or small sacs of the mucous membrane, and so eluded their practised touch; and yet, under favourable circumstances, they were occasionally discharged. After a time, cystitis came on, with severe suffering; the urine became foetid and alkaline; the bladder lost its tone; and the catheter became necessary three or four times a day. This was his condition when he came under my care. For months he had been treated by homœopaths, who attributed all his distress to enlarged prostate. I examined, and found a phosphatic stone of no great size, fixed and apparently embedded in the lower and right side of the bladder. It seemed very improbable that a permanent cure would result from a repetition of lithotripsy. It had already failed in very skilful hands, and when the bladder was fairly healthy. Now, when the bladder was unable to empty itself, and was chronically inflamed, there seemed less chance of a good result. Moreover, the patient was tired of the plan, and there was clearly either an embedded or an encysted stone. I therefore performed lithotomy. Owing to the large size of the prostate gland, the forefinger could barely reach the bladder. After some trouble, several portions of rough phosphatic stone were removed. I then became aware that there was still an encysted stone on the right side of the floor of the bladder, behind the prostate. I could just reach it with the finger-nail; but by no device could I dislodge it by a scoop, or seize it with forceps. By pushing a stick-sponge, well oiled, far into the rectum, and hooking the bladder forcibly towards the perinæum, I have once or twice been enabled to remove an encysted stone, but could not in this case. Sometimes the searcher would not touch it, and the bladder would feel empty; then again it became evident; but finally I was obliged to desist, as it was not prudent to do too much to his diseased bladder, and in his enfeebled state. He slowly recovered from the operation; and slowly too, but very surely, came back the symptoms of stone. This gentleman lived nearly four years after the operation I have just described; and these years were years of continual distress, of the constant sprouting up of stone from the encysted portion, and the frequent use of the lithotrite to break off and remove that which was removable. But at length he yielded, and died from exhaustion; and again the only remark I can offer is that, had his stone been fortunately removed at first by lithotomy, he would in all likelihood have been spared all his after-misery, and enjoyed a longer term of life and health.

I said at the outset of my remarks, that sometimes fragments of

stone passed into the sacculi, and produced rapid fatal peritonitis. Let me mention two cases in point.

CASE IV.—In October 1866, a feeble white-haired man of 76 was admitted into hospital with severe symptoms of stone. His prostate was large; he could retain water about two hours; the urine was alkaline, specific gravity 1008; no albumen; some mucus and phosphates. I measured the stone, and found it one and a quarter by three-quarters of an inch. This examination, short and gentle as it was, caused a rigor; which, however, passed off and did no harm. In a few days, I crushed the stone. The operation was simple enough, and did not occupy two minutes. Cystitis, however, followed in a day or two, with much pain and vesical tenesmus, and with the deposit of much pus in the urine. There were also abdominal pain and tenderness, but no tympanitic distension. His strength gradually failed, and he died fourteen days after the operation. After death, I found signs of general peritonitis, and a large effusion of lymph, particularly in the pelvis. The bladder was rather small, with thick muscular walls. The mucous membrane was deeply injected. A large sac existed at the lower and right side, larger than the bladder itself; the aperture of communication would just admit the tip of the forefinger; its walls consisted simply of mucous membrane and peritoneum, and were dark-coloured and almost sloughy. It was from this part that the fatal peritonitis commenced; some fragments of stone were found in it. An oval stone, partially broken, was lying free in the bladder. The prostate was enlarged to four times its usual size. The ureters were dilated and inflamed; and the kidneys were coarse in structure, and unhealthy.

CASE V.—The other case was very similar, and occurred almost at the same time. The patient was a feeble pale-faced man, aged 75, admitted November 1866, with symptoms of stone, increasing in severity. He voided water every hour or hour and a half, with much straining and pain. There were proofs of the presence of more than one stone; but they were small. The prostate gland was not much enlarged. I broke one of the stones. The bladder was quiet; and the operation was easy, and apparently satisfactory. Cystitis, however, ensued, and was followed by abdominal pain and fulness. He became gradually exhausted, and died fifteen days after the operation. Peritonitis was found, chiefly on the right side of the abdomen. The bladder held about half a pint. There was hypertrophy of its muscular wall, with prominent interlacing columns. The mucous membrane was much injected and inflamed. Sacculi were present everywhere; some large enough to hold a walnut; others, a horse-bean. In one or two of the larger ones, the mucous membrane was almost sloughy, and formed the starting-point of the peritonitis which caused death. Three small stones were found in the bladder, one of which was thoroughly broken, while some of the fragments had passed into the inflamed sacculi.

These two cases exhibit the disastrous results of lithotripsy where sacculi exist. Beyond question, these patients would have had a better chance of recovery if lithotomy had been performed; but, as I have said, they were feeble old men, not well fitted to undergo so serious an operation for the removal of stones which, so far as regards their size, were confessedly within the reach of lithotripsy.

I could easily report other similar cases, were it necessary, and did time permit; but when five such instances occur in the practice of one surgeon in the space of two years, it shows, I maintain, that such cases are not so rare as they have been supposed to be, and that the risks of lithotripsy from this cause in old men with prostatic obstruction are real and positive.

I hope it will not be thought that I am seeking to throw a stone at lithotripsy—an operation which I deem to be one of the most splendid contributions of modern surgery, and which I find myself adopting in practice more and more. By overstating the merits and advantages, and understating the drawbacks and risks, of any mode of practice, we retard rather than advance its progress, and tend to bring it into ultimate discredit.

It will naturally be asked, How can this state of sacculi of the bladder, with or without stone, be recognised during life? It must, I fear, be admitted that the indications are few and unreliable. By noting that a man, having an enlarged prostate, makes water slowly and with considerable exertion; that, when a catheter is used, and after the bladder is apparently emptied, there is still a further flow; and particularly if the appearance of the urine during this double flow vary considerably,—we may infer that cysts or sacculi do exist, although we cannot surely know it. What I desire is to show that sacculi do frequently occur; that it is a real danger and drawback to lithotripsy; and that, by remembering this, we may, in those doubtful cases in which a difficulty is felt which operation to select, feel inclined to give the preference to the old rather than to the new practice.