Lithotrity, and statistics of lithotomy / by George Buchanan.

LITHOTRITY,

AND

STATISTICS OF LITHOTOMY.

BY

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G. B.

LITHOTRITY, &c.

THIS paper contains little that is new except the statistics of the Glasgow hospitals. The arguments in favour of lithotrity have been presented in nearly identical terms in many papers and treatises which have appeared in recent years; nevertheless, I think that this is one of the subjects which should be brought before the profession periodically, as experience increases, say at intervals of ten or twenty years.

In 1859 I compiled, for the late Professor Lawrie, a statistical table of the lithotomy operations in the Glasgow Royal Infirmary. The statistics were published in the *Glasgow Medical Journal* for April, 1859. In 1868 I read before this Society a paper on lithotrity, and in it gave the results of lithotomy contained in the records of the Royal Infirmary till that date. In the present paper I shall give the statistics of all the operations for stone performed in the hospitals of Glasgow, from the opening of the Royal Infirmary in 1795, and the Western Infirmary in 1874, till 1st January, 1880.

The bringing forward of these figures, however, I intend to make the occasion for a few remarks on the operations for calculus; which indeed are but the reiteration of what has been said by Civiale, Sir B. Brodie, Sir W. Fergusson, Dr. Prout, Sir Henry Thompson, Mr. Coulson, and others, and in the various Systems of Surgery. Still, a profession constantly changing as ours does, by the addition of junior members, ought to have brought before it, from time to

time, subjects admitting of discussion as this does, especially when the experience of later years is gradually substituting one operation for another which was universal at a comparatively recent period.

The most recent conclusions arrived at may be best expressed in two propositions.

1. It is of the utmost importance that the presence of a calculus in the bladder should be ascertained before it has reached any considerable size; and, as a corollary, the bladder should always be explored with a sound on the occurrence of the earliest symptom.

2. All small and moderate-sized calculi may be removed by the lithotrite; and, as a consequence, when this doctrine is accepted and carried into practice, lithotomy will gradually be abandoned, unless in cases of an exceptional nature as regards the stone and patient.

On each of these propositions I shall make a few remarks.

First: the early detection of the stone. This is the key to the whole position. Of course it is true of all diseases, that the sooner they are detected and their nature proved the better both for patient and surgeon. But it is true in a different sense for calculus, because it may make the difference between a nearly perfectly safe operation of lithotrity, and a very dangerous one of lithotomy or of lithotrity.

Let me recall for a moment the prominent symptoms.

(*a*) Pain in the perineum or the region of the base of the bladder, often accompanied by pain in the point of the penis. But pain is often altogether absent in the early stages of calculus, and frequently present in cases of bladder disease in which there is no calculus; as in two cases under my care just now, in which the patients describe the suffering at the orifice of the urethra as most acute.

(*b*) Frequent desire to pass urine. This is an accompaniment of irritation of the bladder from whatever cause, but being present, is a sufficient reason of itself to warrant a careful search for a stone.

(*c*) The presence of blood, either in the urine or coming in a few drops after urine has been passed. This also is

present in many bladder and urethral affections, even in the second form mentioned.

(*d*) Interference with the continuity of the flow of urine —*i.e.*, either partial or total interruption of the stream, which recommences after a short interval or by change of position.

(*e*) Easily observable changes in the urine, as in colour, clearness, thickness, viscidity, odour, &c., which are often remarked by the patient himself, and are the cause of his consulting his medical attendant, without any of the other symptoms referred to. These are the evidences of chronic cystitis, which is more often idiopathic than the consequence of stone, but in many cases they are the only symptoms to indicate the presence of a stone.

Now, with regard to these five symptoms which I have enumerated, I presume that if any patient came under medical treatment with them all present, there are few if any medical men who would not at once suggest that an exploration of the bladder should be made at the very first. But I am not so sure that it would be recognised as a general principle, that so soon as a patient presents any one or even two of them, the exploration should be made.

It is generally believed that stone in the bladder is not so common in this country as it was fifty years ago, and if that is true the necessity of searching for it is, numerically, not so imperative as formerly; still stone is sufficiently common to make it important to have it in view, in presence of the symptoms referred to. I shall have something to say in a subsequent part of this paper with regard to statistics of stone, but with reference to its frequency I may here state that since 1858, the date of my first lithotomy, I have had eighty-four cases of calculus in the bladder, besides a few in the urethra.

Now I can assert that while, in most of the cases which have come under my notice, two or more of the symptoms were present, yet in several instances only one of them attracted notice and continued the sole evidence, for a considerable period, till the introduction of the sound proved

the presence of a stone. And what I think ought to be recognised as a principle in all urinary disorders is, that as soon as one of the known symptoms of stone is discovered, the bladder should be explored by a sound. The manipulation scarcely ever gives any annoyance if performed with a properly constructed sound and a gentle hand, and the information obtained, positive or negative, is of the utmost importance. If the calculus is very small it may elude detection at a first examination, so that if the symptoms either continue or recur the sounding should be repeated. By this means a stone could be discovered before it has grown larger than a bean, and if the practice referred to were generally adopted, few stones would ever come to be dealt with, of a size to be seen in all collections at the present day; except where from gross neglect on the part of the patient the symptoms were concealed and endured till increasing suffering drove the patient for relief.

I think the importance of searching for stone on the occurrence of *one* of the first four symptoms alluded to—that is, before there are any symptoms of cystitis, which is almost always accompanied by alkalinity of the urine—is rendered evident by a knowledge of the intimate structure of calculi; for an examination of any considerable collection of calculi shows that in the vast majority of examples, the nucleus of a calculus is uric acid or oxalate of lime, and that a phosphatic nucleus is a very rare thing. When a phosphatic stone does exist, it consists in almost every instance of an aggregation of smaller pieces held together by inspissated mucus, or which have become adherent to one another first by mutual pressure and then by consolidation of the intervening substance. Such calculi are somewhat porous, like pumice-stone. When in 1874 I removed my pathological collection to a room provided for me in the Western Infirmary, Dr. Foulis (at that time my house-surgeon), undertook to arrange and catalogue the preparations; and before arranging the calculi I got every one of them divided through the centre, and this exposed the internal as well as the external structure. And the examination

of these sections convinced me of the almost universal prevalence of a nucleus of oxalates or urates, whatever the external shell of the stone might be. Dr. Foulis informs me that since he has been appointed the pathologist of the Royal Infirmary, he has examined the specimens there in a similar way with the same results. This corresponds with what has been found in the examination of all collections in which the calculi have been divided, so as to expose their internal structure. But in many collections this has not been done so uniformly as to make the observations complete.

Now, as oxalate and urate calculi are hard and presumably of slow growth compared with phosphatic, it follows that in the history of all calculi or nearly all, there is a time, and a considerable time, when they are small, hard, and of slow growth; and that is just the time when their presence may be indicated by the symptoms—pain, frequent desire to micturate, blood, interference with the flow—occurring either singly, or at considerable intervals with intervening periods of total cessation of these symptoms, so as to throw the patient and even the medical adviser off his guard. And this is true to some degree even of the small number of calculi which are phosphatic from their first origin.

I think, then, we may conclude that if only the patient would apply on the first occurrence of anything unusual connected with his urine or with the region of the bladder, and the medical attendant would have the bladder at once explored, calculi would be detected when of very small size, in almost all instances.

2. The second proposition I would bring forward is that all small and moderate-sized calculi may be removed with almost perfect certainty of a favourable result by lithotrity. This general statement must indeed be modified by the circumstances of each case, involving the condition of the patient and the nature of the stone. But I may state the case as follows: Given an adult in fair health, with a normal urethra, the bladder not too irritable and containing a calculus not larger than a filbert,—any surgeon using the

lithotrite with ordinary care, may with confidence undertake to remove the stone by lithotrity, with very little anxiety as to the result. But in the case of lithotomy it is different, as all practical surgeons know. There is anxiety as to the result, even after an operation performed with dexterity and success so far as the manipulation is concerned. Sir William Fergusson's words on this subject cannot be too thoughtfully considered—"There seems to me to be a mystery associated with lithotomy which has not yet been solved. For palpable errors there is an explanation; but when to all appearance there has been perfection in the operation, and yet death has been the issue, I confess I have been puzzled beyond measure." Again: "Working on inanimate material, no doubt precise manipulation must be of the most perfect effect; but when the phenomena of life are involved, the result seems in most instances beyond human control." I think every one who has had much experience of lithotomy will corroborate Sir William Fergusson's words.

I do not think that numerical results founded on the experience of any one in Scotland, as yet, will do much to help my argument; nor are the aggregate results as obtained from statistics of the Scottish hospitals sufficiently extensive to authorise any valid conclusion; still the experience of individual cases will often bias an operator in a way which is both intelligible and justifiable.

My first intimate connection with lithotrity was in the case of a gentleman who in 1861, when sixty-four years of age, was cut for stone by Mr. Syme, who extracted two uric acid calculi. In 1864 a recurrence took place, so that in 1865 he had a stone removed by lithotrity by Sir Henry Thompson. In 1867 it again recurred, and I removed it by lithotrity in a fortnight, and from that time till his death in 1873 he continued perfectly free from all trouble in connexion with urination. Now a comparison of the pain and discomfort which he suffered after lithotomy, with the relatively little annoyance while undergoing lithotrity, made a most powerful impression on me in favour of the latter.

Previous to this operation I had done my first lithotrity

on a patient in the Royal Infirmary, in July, 1866, with success. My bias to prefer lithotrity when possible, is strengthened by the fact that there are several gentlemen, now well up in years, from whom I have removed calculi by lithotrity with very little trouble or annoyance to them, who are at present in perfect health; but on whom, I confess, I would have performed lithotomy with very great anxiety and fear for the result. So that my own opinion is strongly in favour of lithotrity in favourable cases, and certainly always in the case of stones of small size.

Numerically stated, my experience is far too limited to be of much value; still I give it as a contribution. I have performed lithotomy fifty-six times, with eight deaths, or one in seven operated on, a proportion very similar to that obtained by examining tables of lithotomy at all ages, and involving large numbers of operations. But when we separate cases under, from those over, puberty, the contrast is striking. Of the whole number, thirty were over fifteen years of age, and the mortality after lithotomy in them was six, or one in five. There were twenty-six cases under fifteen years of age, and the mortality was two, or one in thirteen. On the other hand, I have had twenty-five cases of lithotrity, most of them in private practice, with three deaths or one in eight. Of these three, one died of apoplexy in twelve hours, some days after the stone was removed. The other two were, I confess, cases which should not have been operated on at all, either by one way or the other; the state of the patient and bladder being very unfavourable for any operative interference. This is just one of the difficulties a surgeon often meets with. His patient has arrived at a stage of suffering when life is insupportable without relief, and he prefers to accept the remotest chance of success, rather than to endure any longer the agony he is undergoing. In such circumstances lithotomy is very likely to be fatal, but if any operation is to be done, it ought to be selected. But these are just some of the cases which in the future will be the subjects of lithotomy, so that in proportion as lithotrity gains ground, and the suitable cases are chosen for it, in the same

proportion lithotomy will become less frequent, and being only reserved for cases unsuitable for lithotrity, will become more fatal.

It is clear, therefore, that the statistics of lithotrity ought yearly to become more favourable, in consequence of being restricted to selected cases; while lithotomy will show a higher mortality than heretofore, in consequence of being performed only in cases unsuitable for the other. This must of course, even now, be taken into account in comparing extensive tables of lithotrity and lithotomy. But the concurrent testimony of all who have had large experience of both operations, as Civiale, Sir B. Brodie, Sir W. Fergusson, Sir Henry Thompson, &c., is decidedly in favour of the crushing operation.

Sir B. Brodie performed lithotrity 115 times, with a mortality of 1 in 12. Sir Wm. Fergusson had 109 cases of lithotrity, with a mortality of 1 in 9. His mortality in adult lithotomy in 110 cases was 1 in $3\frac{1}{3}$. Sir Henry Thompson, in 1878, reported 500 cases of stone operated on the adult male—the total number of his operations up to that date. The total mortality was 1 in $8\frac{1}{2}$. Of these, 78 were lithotomy, with a mortality of 1 in $2\frac{3}{4}$; the rest were lithotrity, 422, with a mortality of 1 in 13. The total of these three operators is 646 cases of lithotrity, with a mortality of 53, or 1 in $12\frac{1}{5}$. The late Dr. Keith, of Aberdeen, performed 129 lithotrities, with 7 deaths.

As a contrast, I quote Sir Henry Thompson's table showing the results of lithotomy as performed in a number of hospitals taken together. This table was compiled with the most scrupulous accuracy, all returns being rejected which did not specify the ages of the patients. The table contains 1827 cases of lateral lithotomy of all ages. The total mortality is 1 in 8. But when the cases under puberty are separated from those over that age the result is: under fifteen, mortality 1 in $15\frac{1}{2}$; over fifteen, mortality 1 in 5.

I think that it may be accepted as established that lithotrity is a very safe operation for all suitable cases; and that therefore it is of the utmost importance to detect the

presence of stone at a stage when lithotrity is admissible—lithotomy being reserved for most cases under puberty, and for stones which have by negligence been allowed to escape notice, till they are too large to be safely dealt with by the lithotrite. Like all general propositions, this admits of some exceptions. In the case of very young boys with very small calculi the lithotrite may be used with safety, even though it be necessary to reduce the size by crushing before extraction. Again, in the adult the size of the calculus to be dealt with by the lithotrite must be decided by the composition of the concretion and the manual dexterity of the operator. But the details of these exceptions are too extensive for the scope of this paper.

I shall now illustrate some of the points in the two propositions by a few of the cases which have come under my care.

1. A stone may remain in the bladder for years without causing symptoms demanding an examination of the bladder, if that has not been done on the occurrence of the first symptoms.

In November, 1861, I removed by lithotomy two stones, together weighing 1¼ oz., from a boy aged eleven. Three years before, he had for a few days very acute pain with passing of blood, but that passed off. Since then he had remained perfectly well till a few weeks before I saw him, when, after a long walk, the former symptoms came on.

2. A stone may be in the bladder for a long time, single symptoms recurring at long intervals, while during the intervening periods it may cause no annoyance at all.

Mr. —— while in London in the summer of 1871 noticed accidentally on one or two occasions a few drops of blood after passing water. He consulted his medical attendant, who took Dr. —— in consultation. They agreed that it was something accidental which did not require treatment. In a few days Mr. —— was quite well. In the summer of 1872 Mr. —— was again in London. One evening he suddenly experienced a desire to pass water with a sharp pain shooting to the point of the urethra. On relieving himself he observed some blood as formerly. This occurred

two or three times during the evening, but next morning he was better. He consulted another physician, who took a light view of his case, told Mr. —— to rest a few days, and have no anxiety. The symptoms passed off, and, as before, Mr. —— was quite well. In the summer of 1873 the same thing occurred in precisely similar circumstances. Mr. —— being a little alarmed this time, went to a third physician, who hearing of what had happened formerly, gave the same advice—rest for a few days before going back to Scotland, rest for a few days after the journey home. Again the symptoms passed off, and Mr. —— was as well as ever. In October, 1873, Mr. —— was out shooting, when the old occurrence took place—a sudden pain at the point of the urethra, intense desire to pass urine, some drops of blood at the end and after the flow. Mr. —— went to Dr. P. A. Simpson, whom he was in the habit of consulting, who at once suggested the probability of a stone, and asked me to sound him. I detected a stone the size of a Spanish nut. In November I removed it by lithotrity in three weeks, since which Mr. —— has continued in perfect health, and free from all urinary symptoms.

3. Symptoms of chronic cystitis may predominate to such an extent as to withdraw the attention from the necessity of examining the bladder, to ascertain if the symptoms are not caused or aggravated by the presence of a stone.

Mr. ——, aged thirty-five, had suffered for several years from renal calculi, which caused pain in their passage to and from the bladder. For more than a year he was free from his complaint, but in the spring of 1872 the old suffering returned, and the urine was muddy. He took no account of it until he was on the eve of a visit to London, when he mentioned it to Dr. Fergus, his ordinary medical attendant, who warned him against delay in undergoing medical treatment, and advised him as soon as he got to London, to put himself under the care of a medical practitioner whom he had consulted on former visits to London. He was treated for what he was told was inflammation and irritation of the bladder. His symptoms continued to get worse, and there

was added occasional obstruction to the flow of urine. He was told that most probably there was a small calculus in his urethra, which would come away as the former had done. He was advised to go to Harrogate and use the chalybeate waters before he returned to Scotland. But his symptoms getting worse, he came away at once, and on his arrival sent for Dr. Fergus, who expressed his opinion that there must be a stone retained in the bladder. I visited him with Dr. Fergus, and we detected the presence of a stone. This I removed by lithotrity in three weeks, and the urinary symptoms rapidly improved. In a month Mr. —— was walking about, free from pain and trouble. The stone was about the size of an almond.

4. An examination of the bladder on the first occurrence of the symptoms detects the stone, when it can be removed with the greatest facility and safety.

Mr. ——, aged sixty-five, suffered from the passage of a renal calculus in 1867. Some time after there was difficulty and pain in passing urine. Now he consulted his medical attendant, Dr. Alexander of Dundonald, who sent him to me. I detected a small hard calculus. A few days after I went to his residence with Dr. Alexander to operate. With a thin-bladed lithotrite I grasped a stone, which I extracted entire, the urethra yielding to the steadily-applied traction. The stone was oxalate, about the size and shape of a damson stone.

W. G——, aged fifty-five, after a few months of inconvenience in passing urine, consulted Dr. James Adams, who detected a stone and sent him to my wards in the Royal Infirmary. On Feb. 21st, 1868, I performed lithotrity, and again on three other occasions. He was dismissed cured on March 8th. Weight of débris of calculus collected, thirty-five grains.

5. Postponement of sounding allows the stone to grow to a size difficult and troublesome for lithotrity.

A. W——, aged twenty-seven, had urinary symptoms for more than a year before he mentioned his state to his medical attendant: pain, blood, muddiness of the urine.

He was treated for many months with internal remedies, for what he was told was irritation of the bladder. Failing to obtain relief, he applied elsewhere, and he was recommended to go to Bridge of Allan and use the saline waters. Before going he consulted Dr. James Adams, who, suspecting stone, sounded him, detected the stone, and sent him to me. As the stone was larger than medium, it took from the 4th June till the 2nd July to remove it entirely. The débris collected weighed five drachms twenty-five grains.

6. When the bladder is fairly healthy and the urethra capacious, lithotrity is available for the removal of even large stones.

Mr. ——, aged sixty-five, suffered for many years from symptoms of stone before he consulted the late Dr. Fleming, who sent him to me. The stone was large and smooth, but I determined to crush it, as the urethra was large and not irritable. It took a month's time and repeated applications of the lithotrite to remove it, but it was successfully ended. The weight of the calculous matter collected, was one ounce and one drachm.

7. When a very small stone is detected in the bladder of a child, it can be removed with ease and safety by a thin-bladed lithotrite.

In November, 1879, Dr. Crawford, of Uddingston, brought to my house a little patient aged nine years, who had formerly passed uric-acid calculi. Now he was continually crying, and could not retain his urine. On sounding him, I found a small stone retained in the bladder. I put him under chloroform, and grasped the little stone in a thin-bladed lithotrite, and endeavoured to pull it through the urethra; but it was too large to leave the bladder. I therefore crushed it in pieces, some of which came away in the scoop, the rest were washed out with the first and second flow of urine.

The foregoing cases are ordinary examples of what are common occurrences; they are introduced, not as presenting

anything new, but as good illustrations of the various points referred to in the two propositions with which I commenced this paper.

Statistics of the Operations for Stone, in the Hospitals of Glasgow.

The following *résumé*, though stated in a very few figures, represents an amount of labour which I had no idea of, when I began, and which I could not have accomplished without the kind assistance of the house-surgeons in the Royal and Western Infirmaries.

The figures till 1859 are copied from a paper which I laboriously compiled, and published in the *Glasgow Medical Journal* for April, 1859.

From that date till 1870 the figures are taken from the printed annual reports of the Glasgow Royal Infirmary, the tables of which contain the numbers, sexes, and results, but not the ages. The ward journals and operation books during the period referred to are most imperfect; many have been lost; in others, cases are omitted or not completed.

From 1870 to 1880 I have been able to make an accurate table. I first got all the cases collected from the hospital records, and then submitted them to the surgeons themselves (except one who died in 1875), so that we have a clear starting-point for future statistics from Jan. 1st, 1870.

From the opening of the Royal Infirmary in 1795 till 1859 accurate records have been found of 159 cases of lithotomy in the male, with 23 deaths, or 1 in about 7 operations. Of these, 95 were under fifteen years of age, with 6 deaths, or 1 in $15\frac{3}{4}$ operations. There were 64 above fifteen years of age of these 13 died, or about 1 in 5 operations.

From 1859 till Jan. 1st, 1870, there were 84 cases of lithotomy in the male, but the ages cannot be accurately ascertained; of these 8 died, or 1 in every $10\frac{1}{2}$ operations.

From Jan. 1st, 1870, till Jan. 1st, 1880, the records of the two hospitals of Glasgow contain 95 cases of lithotomy in the male; of these 15 died—a mortality of 1 in every $6\frac{1}{3}$ operations. Of these, 33 were under fifteen years of age, with 2 deaths, or 1 in $16\frac{1}{2}$; while 62 were over fifteen years of age, with 13 deaths, or 1 in $4\frac{5}{6}$.

The total number of lithotomies in the male, without reference to age, in hospital practice in Glasgow, is 338, with 46 deaths, or 1 death in $7\frac{1}{3}$ operations.

Lithotrity.—The total number of cases of lithotrity in the male which have been performed in the hospitals is so small, and the particulars up to 1875 have been so carelessly recorded, that it is unnecessary to give the meagre information which the records afford. My individual experience is given at page 9.

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