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OPERATION FOR STONE IN THE FEMALE BLADDER.

BY

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OPERATION FOR STONE IN THE FEMALE BLADDER.

Simon, of Heidelberg,[1] has made dilatation of the female urethra a proceeding applicable with scientific accuracy. The urethra can be dilated to a diameter of 1·9 to 2 centimetres or $\frac{3}{4}$ inch, in women over twenty years of age; to 1·8 centimetres or rather more than $\frac{11}{16}$ inch in those between 15 to 20; and to 1·5 centimetres or $\frac{5}{8}$ inch in those between 5 and 11. Under twenty years of age these measurements may, in case of need, be exceeded by 2 or 3 millimetres, that is $\frac{1}{8}$ inch. In no case does incontinence of urine result.

Simon's statements have now been verified by general experience. Hence, since the average diameter of a man's right index finger at its thickest point is about $\frac{3}{4}$ inch (1·8 cm.), and of his little finger $\frac{5}{8}$ inch (1·5 cm.), it may be stated that we can safely dilate the adult urethra so as to admit the index finger, and the child's so as to admit the little finger.

These facts bear on the removal of stone from the female bladder, and allow more precise rules regarding it to be laid down. Cutting for stone will, in future, be rarely if ever used, being reserved for the rare instances where the calculus is of great volume, or of hardness so excessive as to preclude crushing.

The most recent work on operating for stone in the female is by Mr Bryant in *The Medico-Chirurgical Transactions* for 1864.[2] He advocates rapid dilatation by Weiss's urethral dilator, and in that way has successfully removed stones of $1\frac{1}{4}$ inches[3] and 2 inches[4] (2·8 cm. and 4·5 cm.) in diameter.

Poland,[5] Coulson,[6] Williams,[7] and Hartshorne[8] have recorded

[1] Volkmann's *Sammlung Klinischer Vorträge*, No. 88, 1875.

[2] Vol. xlvii.

[3] $1\frac{1}{4}$ inches × 1 inch.

[4] 2 in. × $1\frac{1}{2}$ inches; or $5\frac{1}{4}$ in. × $4\frac{1}{2}$ in. in circumference; weight, 2 oz. 2 drachms.

[5] Holmes' *Surgery*, vol. iv. p. 1088; stone $1\frac{1}{2}$ in. or 2 in. including the forceps.

[6] *Lancet*, 1864, vol. i.; stone size of walnut.

[7] *Lancet*, 1864, vol. i.; stone size of pigeon's egg.

[8] *Brit. Med. Jour.*, 1863, vol. ii.; stone 2 in. long, $3\frac{3}{4}$ in. in circumference, weight 10 drachms.

similar successful results in equally large stones. But experience is far from being unanimously in favour of either rapid dilatation or incision being always reliable, several series of cases resulting in incontinence of urine, blackening the otherwise good results. Personally I have one bad result to record, in a patient of Dr Mitchell of Rayne, who had a uric acid stone, weighing 236 grains, measuring $1\frac{1}{16}$ inches (2·7 cm.) in the largest diameter that bore on the extraction, and 3 inches in smallest circumference.

According to the experience of Bryant and Poland, it was proper to attempt the removal of such a calculus by rapid dilatation and extraction by the forceps, since the joint maximum diameter that had to traverse the urethra, including both the forceps and the stone, was $1\frac{1}{16}$ inch, or, reckoning the most unfavourable grasp, $1\frac{5}{16}$ inches (3·3 cm.) At the time of that operation, June 1877, I had heard of Simon's work, but did not possess his specula-dilators. I therefore selected rapid dilatation, and, to avoid the unequal stretching of Weiss's three-bladed dilator, well known to and remarked on by many surgeons, dilatation was accomplished by the rapid successive introduction of rectum bougies after the meatus urinarius had been notched—an almost exact copying of Simon's method.

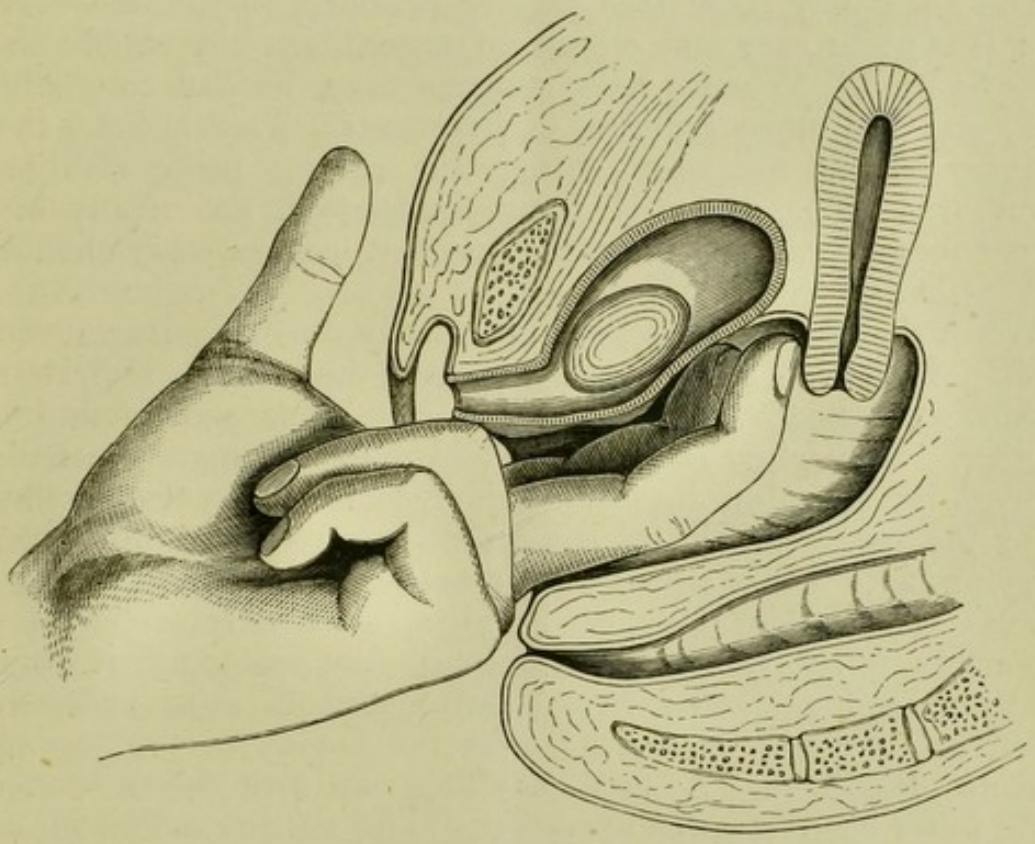
The urethra was dilated to the diameter of $\frac{13}{16}$ inch (2 cm.), that is $2\frac{1}{2}$ inches (6·3 cm.) in circumference, and the stone, whose circumference was 3 inches (7·7 cm.), or plus the forceps $3\frac{3}{16}$ inches (82 cm.), was extracted by carefully delivering it with the forceps. That is to say, the urethra was compelled to transmit a body measuring in circumference $3\frac{3}{16}$ inches, instead of the $2\frac{1}{4}$ inches (5·8 cm.) that can, according to Simon, be safely transmitted. Or, to put it otherwise, the diameter to which the urethra was dilated was 1 inch (2·5 cm.) instead of $\frac{3}{4}$ inch (1·8 cm.), as it should have been. That extra quarter of an inch, which Simon declared unsafe, but which, according to others, should have been harmless, decided the fate of our patient. To this day she has incontinence of urine, I am sorry to say. That was the smallest dilatation that I have heard of producing permanent incontinence, and it was the last case that I operated by the old method.

I have since operated on four patients, two with calculi formed upon foreign bodies in the bladder, and two with ordinary calculi. From information gained in these cases it seems to me that it would be wise in future to adopt for calculus in the female some such plan of operation as the following:—

When the patient is under chloroform, placed in the lithotomy position, and the presence of the stone has been confirmed by the sound in the bladder, and its size and form roughly estimated by the bimanual exploration of one hand above the pubes and one or two fingers of the other in the vagina, the urethra should be dilated by Simon's specula-dilators to its full size. Simon effects this by the following steps:—He notches the meatus urinarius at

four places by the scissors, one notch $\frac{1}{2}$ centimetre ($\frac{1}{5}$ inch) deep, being at its lower part, and three others $\frac{1}{4}$ centimetre ($\frac{1}{10}$ inch) deep at its upper part. Three notches, each $\frac{1}{5}$ inch in depth, in the meatus urinarius are, however, quite sufficient, one below at the vaginal side, and the other two at such points of the edge as will allow all three to be equi-distant.

Simon's specula should then be introduced, beginning with No. 1, pushing it well home, withdrawing it, and substituting No. 2, and so on till No. 6 is reached for adult females, or No. 5 for children. Each instrument is simply pushed well home, overcoming a little resistance in doing so, and is then at once withdrawn.



The urethra is by this means dilated so as to admit a forefinger in the adult, or the little finger in the child, and no urine has escaped during the dilatation unless intentionally drained off by removing the core which plugs the dilators.

The finger introduced into the bladder recognises the number, shape, and size of the calculi. If large, they are to be dealt with by the lithotrite; if small, they should be treated as follows:—By the finger they can be brought down to the neck of the bladder, so as to lie beside the upper opening of the dilated urethra. The fore and middle fingers of the left hand introduced into the vagina, with their pulps forward, and resting against the floor of the bladder, easily retain the calculi in that situation, and, by gentle pressure, force them (if their size permits) one by one into the urethra, and along it until they appear at the meatus urinarius, and can be lifted out of it by the finger and thumb of the right hand, or even

delivered by the hand in the vagina, without a forceps of any sort being necessary at all.

I have thus delivered from a patient, aged 48, three stones weighing respectively 44, 90, and 103 grains, and having a maximum diameter to pass at right angles to the urethra of $\frac{1}{2}$ inch (1·3 cm.), $\frac{9}{16}$ inch (1·5 cm.), and $\frac{5}{8}$ inch (1·6 cm.) Their longest diameters were $\frac{13}{16}$ inch (2 cm.), $1\frac{1}{16}$ inch (2·6 cm.), and $1\frac{7}{16}$ inch (3·7 cm.) They were, as may be seen from these measurements, rod-shaped, and they consisted of a mixture of carbonate and oxalate of lime and fusible calculus.

In all stones that will safely pass this manœuvre is effectual. It gauges accurately those that require crushing from those that do not; it is quite easy and simple of execution, and should in all cases be tried. When it fails, recourse must be had to the lithotrite, and the stone reduced to fragments. This is done in the ordinary way at the same sitting, the patient being still under chloroform. The finger is then reintroduced, and if any of the fragments feel still too large to pass the urethra, they should be still further crushed.

When the crushing has been sufficiently done, the largest size of speculum that had been passed is again introduced, and its core withdrawn, allowing a free exit to the urine remaining in the bladder. The vaginal nozzle of a Higginson's syringe is introduced through the speculum into the bladder, and tepid water is thrown in by the syringe. When the nozzle is withdrawn this escapes, carrying with it the *débris* of the calculus, and by repeating the process the bladder may easily be washed clean. Should any fragments refuse to come out through the speculum, it may be removed, and a slender forceps introduced to seize and extract them, or they may be extruded by the fingers in the vagina as already described. A final washing out with 5 per cent. carbolic water completes the operation. The patient suffers for some hours from a straining desire to pass water, and for three or four days at most from incontinence, after which all troubles are at an end, and the bladder speedily loses any irritability.

By crushing and washing I have removed a fusible calculus weighing 285 grains from a patient 69 years of age. She recovered perfectly.

Where a wire or similar foreign body forms the nucleus of the calculus, the course of the operation is somewhat different. The case is usually mistaken for a common calculus, since the sound gives no hint of the difference, unless the occasional occurrence of incontinence give rise to the suspicion of an unusual foreign body. Calculus alone seldom causes incontinence. Wires and similar foreign bodies more frequently do so. This is because they usually lie transversely in the bladder, with their points towards the acetabula, and often have their ends penetrating, embedded in, or even perforating the bladder. At their embedded ends they give rise

to a patch of induration, which serves as a protection against the escape of urine into the tissues, but which sometimes, if extensive enough to reach the vicinity of the neck of the bladder, may cause incontinence.

It is, however, usually only after the dilatation of the urethra has been accomplished that the forefinger, in examining the size and shape of the calculus, discovers that it is deposited on the centre of a wire, and that the wire projecting beyond it by its extremities extends from side to side of the bladder. It is vain to attempt to dislodge the embedded ends, and turn the wire so as to extract it by its extremity; it is wiser to crush the calculous matter deposited on it, and then hook its middle portion down. In the female the finger is the best instrument for extracting such bodies. It is simply hooked over the middle of the wire far enough to obtain a hold that will not slip, and the wire is drawn down by it, as if the object were to double it by bending it at its centre, and extract it with the bend foremost. This is indeed one of the objects of the manœuvre, although it is seldom successful, since the wire usually breaks at the bend ere its extraction is complete, and thus leaves the two ends lying in the proper position for being separately seized by a dressing forceps and removed. But another important end is served by drawing down the middle of the wire, viz., the extraction of its ends from the places where they are embedded in the bladder wall. As the wire bends in the centre its extremities are approximated to each other, and as the bending proceeds, the longest measurement of the wire becomes so small that it lies free in the bladder, and may be pulled by its bend through the urethra, should it not have previously given way, as mentioned above, at the point of flexion. In either case its extraction is easy.

In this way, on one occasion, a hair-pin, 6 inches long (15·3 cm.) and $\frac{1}{25}$ inch (1 mm.) in diameter, that is, of the size of a No. 4 catheter, French scale, along with 150 grains of calculous deposit of phosphate of lime, were removed from the bladder of a girl aged about 13, who suffered from total incontinence of urine; and in another instance a wire $\frac{1}{16}$ inch (1·5 mm.) thick, of the size of a No. 5 French catheter, and $4\frac{1}{4}$ inches (10·8 cm.) long, along with 264 grains of fusible calculous deposit, were removed from a woman aged 36. In both cases the result was perfect.

The unpleasant consciousness that I had produced a life-long incontinence of urine in a patient while treading in what I thought was a safe surgical path, and the hope that I may prevent others from being similarly unfortunate, are the *raisons d'être* of the present paper, for it seems inevitable that the present plans of operating for stone in the female should be remodelled in some such sense as the above.

P.S.—During the discussion that followed the reading of this

paper at the Garioch Medical Association in May 1879, Dr Davidson, Wartle, showed a calculus whose longest and shortest diameters were $2\frac{1}{8}$ inches and $1\frac{1}{8}$ inch; the longest passing diameter was $1\frac{13}{16}$ inch; the longest and the shortest circumferences were $6\frac{3}{16}$ and $4\frac{1}{2}$ inches; the circumference when grasped by a small forceps $4\frac{3}{4}$ inches, and the weight 980 grains. It was oval and roughish, had been removed from a patient by quick dilatation with the finger and forceps, and Dr Davidson believed that she had perfect power over her bladder. On subsequent inquiry, however, it turned out that she cannot retain her water.

Dr Wilson, of Old Meldrum, showed a stone, flat, oval, and smooth, whose longest and shortest diameters were 2 and $1\frac{1}{16}$ inches; the longest passing diameter was $1\frac{7}{16}$ inches; the longest and shortest circumferences $5\frac{1}{2}$ and $3\frac{15}{16}$ inches; the circumference when grasped by a small forceps was $4\frac{1}{8}$ inches; and the weight was 660 grains. It was removed by dilating the urethra with the finger, and extracting by rather a large forceps, and the patient "retained her water almost perfectly the second day after the operation, and continues well."

Dr Paterson, of Inverurie, showed a third calculus, nearly spherical, and studded with projections like those on the husk of a horse-chestnut. Its longest diameter was $1\frac{7}{16}$ inch, its shortest $1\frac{3}{16}$, and its longest passing diameter $1\frac{1}{4}$ inches. Its longest and shortest circumferences were $4\frac{1}{4}$ and $3\frac{7}{8}$ inches, its girth, plus a small forceps, was $4\frac{3}{16}$ inches, and its weight was 396 grains. It was removed by gradual dilatation with sponge-tents, followed by extraction with the forceps, and the result was permanent incontinence.

I am indebted to these gentlemen for permission to mention their cases.

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NOTE.—Dr. Wilson's case, opposite, is given as cured, on the strength of a report from her attendant, Dr. Mitchell of Rayne. On the 19th of July, 1879, Dr. Mitchell informed me that he had been mistaken in reporting her as cured to Dr. Wilson, and that she has been, on the contrary, incontinent ever since the operation.

ALEX. OGSTON.