N E P H R O T O M Y

AS A MEANS OF

TREATING RENAL CALCULUS.

BY

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THE object of the following communication is to introduce to the notice of the Society, for discussion and consideration, a method of treating stones in the kidney and ureter, that is, I think, worthy of more thoughtful deliberation than it has hitherto received. I, indeed, owe the Society an apology for bringing before it a paper on a somewhat novel method of treatment, without, at the same time, detailing some personal experience of the proceeding the paper discusses.

Having, however, waited in vain for more than two years for an opportunity of putting the operation of nephrotomy to the test of experience, I am induced to publish the following short and incomplete communication, in the hope that the suggestions it contains may receive the benefit of further consideration by others of more mature judgment

than myself; while, perhaps, their opportunities of practice may give occasion for testing the success of the operation herein described, should it be thought worth a trial.

The operation of nephrotomy, though mentioned and recommended by Hippocrates with certain reservation, was by him and his followers restricted to cases in which there was an external swelling—cases in which, as they expressed it, nature showed the way. This, one may suppose, would include cases of calculous impaction of the ureter, with dilatation of the ureter or kidney sufficient to cause an external swelling; it would also refer to renal abscess, or renal fistula. In this limited application, the operation of nephrotomy has been but rarely performed, and I am not aware that in these operations the extraction of calculi has ever been methodically attempted; although the details of a case will presently be given where calculi were successfully removed from the kidney by the operation of nephrotomy.

To justify the attempt to remove a stone from the kidney by operation, it is most desirable—1st, that we should be able to recognise, with some certainty, the presence of the calculus; and 2ndly, that we should possess a plan of operation by which the stone can be removed without more risk to the patient's life than the gravity of the disease, and the severity of his sufferings, warrant us in incurring.

With regard to the first condition, I believe that, at least in children, we can recognise¹ the presence of stones in the pelvis of the kidney by tactile examination, that is to say, of stones of sufficient size to need operative interference; while to confirm the diagnosis, and give it practical efficiency, there are the ordinary symptoms of renal calculus which must coexist.

For the physical examination of the kidney it is well that the bowels should be previously cleared by an aperient, and the patient should lie on his back, his knees being drawn up and supported in that position. The surgeon placing the

¹ I say children because my observations have been chiefly carried on at the Children's Hospital. I cannot doubt, however, that this statement would hold good for some adults.

fingers of one hand on the lumbar region, just below the last rib and outside the erector spinæ muscle, may press the kidney gently forwards from behind; while with the thumb of the same hand, or with the fingers of the opposite hand, he should press in the hypochondriac region in front, as near the lower margin of the ribs as possible. This pressure should be gentle at first, but continuous and increasing, especially during expiration, until the resistance is met with, and the outline recognised that characterises the kidney. For appreciating irregularities of outline on the surface, or in the pelvis of the kidney, it is best to pass the fingers or thumb from above downwards, over the front surface of the organ. This examination may be made in most instances without the aid of chloroform; while in others, chloroform is advisable to relax the abdominal muscles, and overcome the turbulence of the patient.¹

In the two following cases the plan above described was employed, with the result of detecting in one case, as I believe, the presence of a renal calculus, and in the other, the existence of a tubercular deposit in the infundibulum of the kidney and commencement of the ureter. The history of this first case was kindly furnished me by Dr. Gee. It is as follows :—

A. A—, æt. 9, has had pain in the right hypochondrium at intervals for four years; pain greater of late. Bowels regular. No jaundice. The pain has been supposed to be a gastrodynia, and treated accordingly.

May 20, 1864.—The patient is fairly well nourished; not pale. He has daily paroxysms of pain in the right hypochondrium, immediately under the costal cartilages, and a little to the right of the right nipple line; also behind, just below the last rib and outside the mass of lumbar muscles; each paroxysm lasts three to four hours, but is not accompanied by vomiting. He says (and he can be trusted) that he has pains at times about the right external malleolus,

¹ A full and detailed account of the method of examining the kidney by palpation is given by Sir W. Jenner, 'Brit. Med. Jour.,' 1869, vol. i, p. 42.

and also about the upper third of the right thigh. When pain is present the belly is much retracted, and the boy curls up to get relief; the sites of the pain are very tender. No disease of the spine or ribs can be made out; no pyrexia; no derangement of the alimentary canal. Heart and lungs natural.

When he is not suffering pain, by passing the right hand under his body as he lies in bed and pressing the fingers upwards outside the lumbar mass, at the same time pressing the fingers of the left hand downwards in front, about the position of the spontaneous pain, and thus bringing the points of the fingers together under the liver, an indistinctly defined solid mass can be felt; it is about the size of a thumb, rounded, not soft, and when squeezed causes a peculiar sensation in the epigastrium, which is apparently painful, and yet not, the boy says, a pain. This tumour does not feel at all like intestine, and it cannot be traced downwards.

The urine looks natural, yet it contains a considerable quantity of albumen; the microscope shows a few blood discs, but no casts or epithelium.

June 8.—There had been no pain since the last note until yesterday, and the albumen had quite disappeared from the urine. Yesterday at midday the pain returned; it was seated between the costal margin and the umbilical level, a little to the right of the middle line; the pain was sometimes more severe than at others, and it did not seem to radiate at all. No vomiting; tongue clean. The tumour was very perceptible just outside the rectus abdominis muscle in front, and the quadratus lumborum behind, reaching almost up to the costal margin, and about two inches and a half downwards; its lower border was not perceptible. The tumour was rounded, about an inch broad apparently; when squeezed he felt much pain. The urine was notably albuminous.

He was now put upon large doses of citrate of potash, so as to render the urine alkaline.

August 22.—The patient was fat and cheerful, he has not had any severe pain for two months, nor even slight

pain for four weeks. The tumour cannot now be felt; but when pressure is made in its position, he has decided epigastric pain. Urine clear, yellow, alkaline, no trace of albumen. In the sediment of the urine which he passed after I had examined him, there were undoubted blood discs.

May 14, 1866.—He is looking tolerably well, but occasionally has intense pain, which “reduces him terribly.”

Not seen again.

I am indebted to Dr. West for the notes of the following case.

W. S—, æt. 4½, was admitted into the Children's Hospital, Feb. 8th, 1868, under my care. He was a workhouse orphan farmed out by the parish to an old woman, who stated that two months ago the child first passed blood with his water, and that again during the last five days she had noticed the blood.

On admission he was suffering great pain, coming on just before, and continuing during, micturition. He cannot hold his water for any length of time, and he seems in great pain before the water begins to flow, but this pain subsides and he has none afterwards. He has prolapsus ani, but does not pull the foreskin or pinch the glans penis; as far as can be ascertained he has no pain in the loins or inside the thighs. The urine contains a large quantity of blood of a bright colour; under the microscope pus cells were seen, there were no casts of tubes. He was sounded under chloroform, but no stone was found; blood flowed from the urethra directly the sound entered the bladder. The case was transferred to Dr. West.

February 14th.—He was examined by Dr. West, and myself, under chloroform, and a round swelling was detected by palpation in the right lumbar region in the situation of the pelvis of the corresponding kidney; this swelling seemed about the size of a filbert; it was firm but scarcely so hard as a calculus should have been, it was slightly movable and was thought to be probably a renal calculus.

Under remedies the quantity of blood in the urine diminished, but the pus increased, and the pain which at first only preceded urination became almost constant. The child lost flesh and strength, and the urine could scarcely be retained at all.

March 9th.—He was again examined under chloroform, and for the first time a small swelling was detected in the opposite lumbar region apparently connected with the left kidney. This was smaller, softer, and less definite, than the swelling in the right loin; it was evidently not a renal calculus; its existence and consistence threw much doubt upon the nature of the swelling in the right kidney. At the same time the vesical symptoms became so urgent as to make us believe that the child was suffering from tubercular disease of the urinary mucous membrane.

On April 2nd, two months after admission, the child died, worn out by pain or hæmaturia and discharge of pus with his urine.

Post-mortem examination.—The mucous membrane of the bladder was intensely congested, rough, and about the orifice of the left ureter villous and swollen.

Right ureter was thickened in its walls; its upper end was much enlarged by deposit beneath the mucous coat forming the swelling felt during life, its calibre was natural.

Left ureter was greatly distended with urine, apparently owing to obstruction at its vesical orifice.

The mucous membrane of the pelvis and calices of the right kidney was thickened, here and there ulcerated and smeared over with yellow strumous deposit; the tubular texture of the gland was ulcerated in places; softening tubercle was found scattered throughout the cortical substance.

The left kidney was in a much less advanced stage of the same disease.

Since the occurrence of the foregoing case no patient has come under my care with symptoms of renal calculus sufficiently pronounced to make it worth while instituting a methodical examination of the kidney by palpation.

It is likely that the most searching physical examination of the kidney would fail to detect a calculus in the case of corpulent or very muscular adults. It is also probable that small stones would escape detection even in children; yet I believe there are many cases of renal calculus in which the stone would be capable of recognition by examination after the manner that I have described. Should it be impossible to employ this method of examination of the kidney, owing to the conformation of the patient or some other unfavorable circumstance, I would submit for consideration and discussion whether in some cases of renal calculus the subjective symptoms alone are not so pathognomic, that the diagnosis might be considered sufficiently clear to proceed to operation, especially since (as I believe) by the plan of operation recommended in this paper, the kidney could be made the subject of tactile examination without serious danger to life.

For some time I was under the impression that nephrotomy for the extraction of calculus (where there were no external indications) had never been attempted; I am indebted to the kindness of Dr. Wiltshire for more accurate information on this point. In the nineteenth volume of the 'Philosophical Transactions' is the following account, which I quote from the third vol. of the abridgment by John Lowthorpe, p. 191. The paper is headed "The way of cutting for the stone in the kidney, by Mr. Charles Bernard."

"Mr. Hobson, who was Consul for the English at Venice, having been long afflicted with stone in the kidney, was at length attacked with a fit of that duration and violence that it reduced him almost to desperation; and finding no relief from any means that had been used, he addressed himself to Dominicus de Marchetti, a famed and experienced physician at Padua, imploring him that he would be pleased to cut the stone out of his kidney, being fixed in his belief that no other method remained capable of relieving him, adding that he was not insensible of the danger but that death itself would be infinitely more eligible than a life of that misery under which he had long, and did then, groan. Marchetti seemed very desirous to have declined it, representing not only the

extreme hazard, but, as he feared, the impracticableness of the operation; that it was what he had never attempted, and that to proceed to it was in effect to destroy him. But Mr. Hobson persisting that if he refused, he would never desist until he found out some one who would do it, Marchetti was at length, by his resolution and importunity, prevailed upon to undertake the operation; and having prepared his patient, as he thought convenient, he began with his knife cutting gradually upon the region of the kidney affected, so long till the blood disturbed and blinded his work, so that he could not finish it at that attempt. Wherefore dressing up the wound till the next day he then repeated it, and accomplished it by cutting into the body of the kidney, and taking thence two or three small stones he dressed it up again. From this instant Mr. Hobson was freed from the severity of his pain, and in a reasonable time was able to walk about his chamber, having been in no danger either from flow of blood or fever. Marchetti continued to dress the wound for a considerable time, but was not able to close it up; it soon became fistulous from the continual flowing of urine through the sinus; but being in other respects restored to his former health and vigour, and the matter discharged being little, Mr. Hobson took leave of the professor and returned to Venice under the care and management of his wife, who, one morning as she was dressing the sore, fancied she felt something hard and rugged as she wiped it; upon which examining a little more carefully with her bodkin, which served her instead of a probe, she found it to be a stone of the figure and magnitude of a date-stone, which being removed, he never afterwards complained of the least uneasiness in that part.

“About ten years afterwards he returned to London, where the learned Dr. Tyson, and myself, were by Dr. Downs, who had known him formerly in Venice, invited to see him. And after we had received the foregoing account from himself, he gave us the satisfaction of viewing the sore which continued open. Mr. Hobson, without any complaint, permitted me to pass my probe so far into the sinus that we concluded it reached into the kidney. The matter it then discharged was

but little in quantity but always diluted with, and smelling strongly of, urine. The orifice would sometimes close for three or four days together, and then the matter made its way through the common passages with the urine, yet without any difficulty or pain. There was no question but that there was a coalition of the kidney and the psoas muscle. When we saw Mr. Hobson he was as able in appearance to perform the functions of life and to undergo any fatigue as any man of his years (being then I conceive upwards of fifty), and was the next day to ride post forty or fifty miles."

To this account of Mr. Hobson's case the narrative adds a learned discussion on the originator of the operation of nephrotomy, the sum of which is the following. That Hippocrates recommended the practice of nephrotomy only when an external swelling existed. That we have no manner of evidence that cutting into the kidney for the removal of stones was practised in his time or in many ages after. That both Celsus and Galen are silent in this matter. That a certain Serapion, who lived some time between the seventh and eleventh centuries, mentions the operation only to condemn it. That in the thirteenth century Avicen speaks of the operation as a dangerous one. Much later, a certain Rosetti recommended it, though he never seems to have practised it himself nor to have induced others to do so.

Mr. Charles Bernard concludes the history of Mr. Hobson's case with the following remark—"that though it is the opinion of those authors who have treated of wounds of the kidney, that if they penetrate the pelvis they terminate in death; yet that the result of the case related shows us that they ought not to have so magisterially exploded the operation."

The following is the operation by which I propose to extract calculi from the pelvis of the kidney. The patient being in the prone position a longitudinal incision should be made along the outer border of the erector spinæ muscle, beginning at the lower margin of the last rib, and extending downwards for four inches towards the ilium.

The skin and fascia, the latissimus dorsi, the serratus posticus inferior, and a layer of the fascia transversalis, being divided, the quadratus lumborum muscle is exposed, this with the erector spinæ should be drawn towards the middle line with a retractor, and the body of the kidney will come fully into view; the fascia surrounding it being laid open, the finger can be passed inwards, so as to touch the hilus of the kidney and feel the commencement of the ureter and pelvis.

In this operation one or two lumbar intercostal arteries will be met with and would require division and ligature; the ilio-lumbar nerve might also be cut.

There is little difficulty in reaching the pelvis of the kidney by the proceeding above described and without incurring any serious risk; whether, however, a stone could be extracted without undue violence to the renal tissue, can only be ascertained by performing the operation where a stone exists.

I have seen renal calculi in children situated in the pelvis of the kidney and freely movable, which I can scarcely doubt could have been removed during life. Again, there are instances of long existing and branched stones in adults which could scarcely be removed without inflicting unjustifiable violence on the kidney or its surroundings. The position, shape, and connections, of the stone or stones would materially affect the facility of their extraction. It is therefore, on all considerations, highly desirable that the operation of nephrotomy should be performed on the dead body of a patient, dying with renal calculus, before putting it in practice on the living.

The operation above described will, at least as I believe, enable us to ascertain enough of the position, size, and connections, of the calculus, to judge whether its extraction should be proceeded with. The operation could be abandoned if, after introducing the finger and examining the kidney, it seemed inadvisable to attempt the removal of the stone; nor do I think that an exploratory proceeding such as I have suggested would put the patient's life in any serious danger.

The objections that may be raised to the operation of

nephrotomy are first, in respect of its difficulties, and next in respect of its dangers.

The *difficulties* of exposing the kidney effectually, so as to examine it, though considerable, are, to my mind, not insuperable; they would vary greatly in degree in proportion to the thickness of the fleshy parts to be cut through, and the amount of sub-renal fat met with. They would vary also as the kidney or ureter might be found dilated or otherwise. Dilatation of the kidney or upper part of the ureter from an impacted calculus would greatly facilitate the operation; and though in such a case it would be likely that the renal tissue would be seriously disorganised, still even then there would be more chance of a sound and efficient kidney on the opposite side than in cases of long-standing vesical calculus where both kidneys are commonly disorganised.

The difficulty of extracting a stone or stones from the kidney would depend upon conditions that have been already mentioned, and would (as I venture to think) in some cases prove insuperable. Still, it is to be hoped that so much of the position, size, mobility, and shape, of the stone could be ascertained by examination with the forefinger through the wound in the soft parts, as to enable the surgeon to stop short of opening the kidney in the event of its being thought unadvisable to attempt the extraction.

The dangers of this operation would, as we may suppose, chiefly arise from hæmorrhage, from incision or laceration of the renal tissue, and from extravasation of urine. It is almost certain that a simple wound of the pelvis of the kidney or commencement of the ureter would cause very considerable loss of blood, and that it is only in cases where the secreting structure of the kidney itself was wounded that any serious hæmorrhage would be likely to ensue. This danger is probably not so great as one would imagine; in the case of Mr. Hobson, quoted in this paper, it cannot be doubted that the kidney was freely cut into; and as bearing on this question I may briefly mention the case of a boy, æt. 14, who was admitted into St. Bartholomew's Hospital under Mr. Paget, on May 8th, 1864. He had fallen forty feet from

the top of a house on to a heap of brick rubbish and old iron. There was a large wound in the right loin dividing the erector spinæ muscle; through this wound a portion of the kidney as large as a walnut protruded, a piece of its substance had been chipped out, leaving a gap which would admit the end of the finger. The wounded surface of the organ had a fibrous appearance, it did not bleed but distilled urine; and the whole exposed portion seemed to have been deprived of its capsule. This patient suffered severely for some days from inflammation of the peritoneal surface of the diaphragm; on the sixth day his general condition improved, there was a free discharge of urine from the wound, which contained no blood; on the sixteenth day the exposed parts were granulating, and after the ninth week urine ceased to flow from the wound. The patient completely recovered, and was able again to resume active work. In this case the wound in the kidney was not of a contused character, so as to account for the absence of hæmorrhage, for Mr. Vernon's account (in the second volume of the 'St. Bartholomew's Hospital Reports') expressly states that a piece of the organ had been "chipped off." It is also noteworthy, as bearing on the same point, that the wound of the kidney, though it did not bleed, from the very first gave exit to urine.

Notwithstanding the experience derived from the two cases quoted, I imagine that no prudent surgeon would willingly cut freely into the secreting structure of an undilated kidney for the removal of a stone; but would hesitate to attempt the extraction of any stone that appeared fixed in the substance of the organ, and that could not be approached through the hilus. In a kidney much dilated, however, the amount of secreting structure to be cut through to reach a stone might be reduced to a very thin and but slightly vascular layer.

I think that, without presumption, one might assume the danger to life from extravasation of urine would not be great after nephrotomy, since there would be so free an exit for urine through the external wound.

In conclusion, I would venture to repeat that, before at-

tempting the operation on the living, the possibility of removing renal calculi by nephrotomy should first be decided by operation on the body of one who has died with a stone in the kidney. I hope that this experience may shortly be forthcoming, either by others performing the operation themselves on patients who may have died with renal calculus, or by the kindness of some surgeon giving me an opportunity of operating under similar circumstances.