A Clinical Lecture

ON

STONE IN THE KIDNEY.

Delivered at St. Thomas's Hospital.

By H. BETHAM ROBINSON, M.S.LOND., F.R.C.S.,

Surgeon in charge of Out-patients, and Surgeon to the Throat Department.

THE subject I have chosen for our consideration to-day was determined by a very good illustrative case, that of the woman in Alexandra ward, upon whom I operated a few days ago, and where the calculous kidney formed a very definite abdominal tumour.

S. B., a married woman, aged 35, coming from India, was admitted into St. Thomas's Hospital, September 14th. At 10 she had fever, which left her with an enlarged spleen. At 14 she first noticed some pus in her urine; there was no inconvenience with it, and it soon disappeared. Within the last year she again noticed pus. The amount of urine passed seemed to be normal. For the last six months there has been pain in the back and in the left flank. In May a lumbar abscess was detected, which was opened in Calcutta on May 27th, in the left lumbar region. One month later another opening, higher up, had to be made, and since then discharge has continued.

On admission into hospital there were two sinuses discharging pus just about the outer border of the erector spinae; there was no urea in the pus. A hard mass was to be felt in the situation of the left kidney, having the shape of the latter, but much larger in size; its firmness gave the impression of a stony lump. Skiagraphy corroborated this, for a dark shadow was to be seen, having the outline of the pelvis and calices. The urine (on the 20th) was acid, specific gravity 1.012, with a cloud of albumen and pus cells, and crystals of oxalate of lime and triple phosphates; the amount for twenty-four hours was 33 oz., which contained 6 gr. of urea to the ounce. The right kidney was abnormally mobile.

She was operated on on September 21st. The site of the upper opening being in the angle between the last rib and the erector spinae, an oblique incision was made in the loin between the two openings; in so doing a sinus was cut across which led from the lower opening towards the upper pole of the kidney, passing deeply through the fascia and round the anterior border of the quadratus lumborum. The perirenal fat was very matted, so that the kidney in its capsule was freed with difficulty; from the upper end of the kidney a considerable quantity of pus was set free, the cavity for which extended well up under the ribs. Into this perinephric abscess the upper portion of the calculus projected through the kidney substance and capsule. The sensation on manipulating the freed kidney was like that of "oyster shells in a bag." The kidney was now incised in its length posterior to the outer border, and some thick pus came out from the upper end. The calculous material completely filled the pelvis and calices, and the extremely thinned cortex was simply riddled with gritty particles. As the kidney appeared functionless, it was decided to remove the organ. It was difficult to clear the pedicle very satisfactorily owing to the infiltration of the fat; this was tied with $\frac{5}{8}$ silk, and effectually closed the vessels. A tube with a wick was placed down to the pedicle, and a gauze drain into the upper pocket. The wound was sewn up with thick salmon gut.

The calculus weighed 42 grams, and consisted of a nucleus of laminae of oxalate of lime with a very thick coating of phosphates on the outside; the part in the pelvis had a well-marked extension into the mouth of the ureter.

In reviewing this history, the first point to comment on is that she came from India, where, as you know, stone is extremely common. In our own isles we have stone districts, especially in the eastern counties. This geographical distribution is a very interesting matter, but it is one which is very inadequately explained. Quality of food, condition of subsoil, and the water supply have all been held responsible; whatever the cause may be, the result is some error in metabolism leading to the excessive production and excretion of such chemical products as uric acid, oxalate of lime, and phosphates. It is the cohesion of these crystals in a matrix of a colloidal material that forms the calculus, the colloid menstruum having its origin from the local irritation. This is a subject that has special interest for us, as it was to the experiments of Rainey and afterwards by Ord, both connected with this hospital, that light was thrown on calculous formation.

It must not be supposed that stone does not occur out of special districts, for it does so, its victims usually having a gouty family history.

The symptoms of stone in the kidney are very variable and often very indefinite. Three signs stand out from others pointing to a renal calculus—pain, attacks of renal colic, and haematuria. In a large proportion of cases we have not all these signs present together, the only one being anything like constant is pain.

Now in the case before us we have to deal with an instance where the calculus itself had produced no symptoms—in fact, had she not developed the perinephric abscess, the calculus might have remained much longer unsuspected. If we consider the slight pyuria over twenty years ago related with the then presence of the calculus, we learn how long the kidney will tolerate such calculous formation. The reason for this was shown from the fixation of the calculus in the pelvis and calices, the mass producing a cast of the excretory structures.

When pain exists by itself as the only symptom, extreme care has to be taken in localizing it to the kidney, for it may be simulated by affections of neighbouring structures, as stomach, colon, gall bladder, or spine.

Certain generalizations may be stated with regard to pain from a stone. (1) That any stone free to move about in the pelvis or calices is likely to be the most painful. A freely-moving pelvic stone will be forced down into the extremely sensitive orifice of the ureter and may produce an attack of renal colic not less severe than the actual passage of a stone down the ureter. A stone free to move in a dilated calyx may also produce pain of a colicky nature but not so severe. The converse proposition may be stated that a stone fixed in both pelvis and calices may exist with little (perhaps dull aching) or no pain. (2) That stones fixed in the parenchyma may give no or only dull aching pain.

It has been considered by some that the nature of the calculus makes a difference in the amount of pain: an oxalate one, which is usually tuberculated on its surface, causes most irritation, then a phosphatic, and least a smooth uric acid one.

Pain may be a dull ache fixed behind just under the last rib or also passing to the front just along the border of the rectus below the umbilicus: it may be a sharp radiating pain as in the colic going down the front of the thigh, or into the testis. Such a pain would presumably only be on one side, and it is only a one-sided pain that can be of any use in diagnosis. Mere indefinite backache is of no value, for it may be present in most general kidney affections and its presence may be indicative of some such structural change.

A well-marked attack of renal colic is characteristic. The intense pain in the kidney region generally radiating downwards, especially into the testis, with nausea or vomiting, followed by sweating, and often accompanied by a rise of temperature, point to the cause. The most typical attacks are due to a stone travelling down the ureter, but a stone in the pelvis driven into the orifice of the ureter, and not able to pass further, may be almost equally severe. Again, much the same colicky attack may be seen when a blood clot is passing down the ureter.

Haematuria occurs far less often than we are led to believe from our textbooks. Perhaps this is due partly to accepting our patient's statements, where the ordinary smoky urine is not accounted by them as due to blood. It must be remembered that blood from the kidney is usually mixed with the urine without clots: the appearance of bright blood and clots would not be the case, except the bleeding was free, which is not the rule with a calculus. If the bleeding is considerable, casts of the pelvis or ureter may be got, the passage of which may be attended, as before stated, by marked colic. Haematuria of whatever amount when present is not constant, and its appearance may be related with exercise or jolting; such a haemorrhage suspected of being dependent on a stone should stop with rest. Additional signs may be frequency of micturition, which is common to most urinary disorders, and the detection of crystals in the urine.

The use of the x rays as a means of diagnosis is of very doubtful value. The best shadow should be obtained from an oxalate of lime calculus, next by phosphatic calculi, and least, if any at all, from one of uric acid. There are many difficulties to contend with, such as a thick loin, inability of the patient to keep the diaphragm quiet for even a short period, and the presence of blood. Under these conditions, even an oxalate calculus may not be defined. One may definitely say that no reliance should be placed on this test. Taken under favourable circumstances, in four recent cases of my own where the symptoms were strong enough to warrant exploration, two gave positive information and two negative. In all of them calculi were removed; of the positive, one was returned as being made up chiefly of calcium and magnesium phosphates with a small quantity of urates, while the other was a branched mixed phosphate and oxalate calculus; of the two negative, one was a small oxalate calculus and the other was one of calcium and magnesium phosphate. Besides the

error of not detecting a calculus that is present, cases have been met with where a very evident shadow was produced, and on thorough exploration no calculus has been found. To conclude: most surgeons are agreed that it is better where the signs are evident not to allow skiagraphy to have a casting vote; I have had myself two cases in private, where I had no doubt about a stone being present, refuse operation simply because *x* rays showed nothing.

Having decided to expose the kidney to remove the suspected stone, the question arises as to the best method of doing so. This should be through a lumbar incision, and, of course, behind the peritoneum. It has been advocated in cases where the pain present cannot be definitely referred to one or other organ to do a preliminary abdominal section before removing the stone through a lumbar wound. Such instances must be rare in which the pain cannot be fixed more on one side than the other, and when this is determined it behoves us to explore the more painful side. Another thing to be remembered is that even when the kidneys are palpated within the abdomen, no more certain information may be gained if the stone is a very small one. Where a stone has been felt after abdominal section it has been suggested to there and then remove it, on the supposition that no more dangerous infection of the peritoneum will have to be dealt with, say, than in dealing with an appendix abscess. This risk should not be taken, and this method cannot be sanctioned except under most unusual conditions.

The incision usually employed for performing nephrolithotomy is the oblique lumbar one, which begins above, just below the twelfth rib at its junction with the outer border of the erector spinae, and extends forwards for about 4 or 5 in. in a line directed towards the anterior superior spine. To get more room this can easily be extended above and below as may be necessary to explore the ureter, or when there is considerable induration of the perineal fat preventing satisfactory exposure through a smaller opening. Often the loin incision is made more transverse, but this involves more muscle section, and is difficult to extend.

With a view to cause as little damage as possible to the muscular wall, Abbé and Mayo Robson have exposed the kidney on McBurney's principle—the external oblique is split in a line from the tip of the last rib to the inner side of the anterior superior spine, and the internal in a line from the ninth costal cartilage to the posterior superior spine. I have not tried this incision, but its advocates claim that it gives plenty of room to thoroughly explore both kidney and ureter. In these incisions the loin must be opened out by an air-cushion or sandbag under the opposite loin.

Another incision that may be employed is that used by Edebohls for nephropexy. Here the patient is put in the prone position with an air cushion beneath the abdomen to push the kidney into the wound. The incision is along the outer border of the erector spinae; the fibres of the latissimus are separated, the lumbar fascia cut through, and the perirenal fat and back of kidney are readily seen. I have used this method for one case—that of the lad K., from whose kidney I removed 21 calculi, one large branched, and the others small, which I here show you. Although this was on the right side there was some difficulty in bringing the kidney well up into the wound, but this was in the main due to considerable induration of the perirenal fat. I think it might be more difficult on the left side, and, in any case, would be so when the distance between the last rib and iliac crest was limited.

In all these operations in freeing the organ after exposure care must be taken not to drag too violently on the structures composing the pedicle, for tearing through of the renal vein has been recorded.

Having got the kidney up into the wound and steadying it between the thumb and finger, the question comes where to incise it. It is an established fact that wounds through the parenchyma heal very readily, so such an incision is usually selected. This should be a vertical one about the convex border, passing well into the pelvis so that the finger can be easily introduced to make a thorough exploration; the bleeding, which may be free at first, very readily stops with pressure. With reference to this incision, Kelly has drawn attention to Broedel's researches on the distribution of the renal vessels in the parenchyma. There are two sets of arteries, the larger set supplying the whole of the anterior aspect and a part of the posterior, and a lesser set for the rest of the posterior aspect. If the incision is made in the line between these two there should be very slight haemorrhage; this line will be situated on the posterior surface about

one-fourth of its breadth behind the outer border. This line, Kelly says, is much more defined when the renal pelvis is distended, and accordingly he has suggested artificially producing such distension by catheterizing the ureter and injecting fluid.

A systematic investigation of the pelvis and calices should be made with the finger and sound, and any stone removed with forceps or scoop. The surgeon should not omit to pass the sound down the ureter, so that no stone may remain behind lodged in this position.

If the stone is felt at the start in the pelvis, should it be cut down upon? Apart from the fact that great care must be taken in making such a cut, owing to the tendency to divide a branch of the renal vein, wounds here in the past have been frequently followed by a fistula, and as such a sequel is unusual with wounds through the parenchyma, the latter has been the approved method. Morris is, however, of opinion that, provided the wound in the pelvis is sutured, it tends to heal readily enough.

In suturing up the wound in the kidney in the ordinary way the stitches frequently, on tying them, cut through. To avoid this, in my last two cases I have again followed Kelly, who advises the use of mattress sutures; the stitches used have been No. 1 catgut.

In the case we are considering to-day the operation had another termination. The extreme thinning of the cortex, and the riddling of what remained of it with calculous particles, showed us that the kidney was completely disorganized, and any attempt at saving it useless. The only course was to do nephrectomy, which was thereupon done.

The after-progress of the case has been most satisfactory, both as to the condition of the wound and as to what was of greater importance—namely, the secretion of urine. Although there was sufficient amount of urine being passed before the operation—and from the state of the left kidney, presumably, all this came from the right side—yet there was just the element of doubt as to the effect of doing the nephrectomy. Had we considered before the operation the possibility of having to nephrectomize our patient, we might have ascertained the amount of secretion from the respective kidneys. This may be done by a Luys's separator, which divides the bladder into two halves, as some of you saw me do in another kidney case recently. That the removed kidney did not secrete any urine is shown by the measurements and quality since the operation. The average amount passed has been 36 oz., having 6 gr. of urea per ounce, the same as before operation. The urine now has a specific gravity of 1010, is acid, without any albumen or pus.

NOTES ON LOCAL ANALGESIA.

By ARTHUR E. BARKER, F.R.C.S.,

Professor of Surgery, University College; Surgeon to University College Hospital, London.

OF late so many inquiries have reached me by letter and otherwise in regard to the method I occasionally employ for the production of local analgesia, and these are so difficult to answer offhand that it appears desirable to publish the newest experiences in this field. This seems the more necessary as, since a former paper, many details have been worked out and fresh observations made which simplify and perfect the procedure very materially. My own part in formulating the method has been a modest one, and yet many who have either used local analgesia themselves or have seen it employed by others state that my results are in most respects far more complete than they have obtained or seen elsewhere. If this be so the reason is not far to seek. There are, scattered through the literature of local analgesia in different countries, many most interesting observations—anatomical, chemical, pharmacological, physiological, and clinical—bearing on the subject. Some of these have apparently escaped the notice of those who have practised local analgesia or have not perhaps been fully appreciated. I have merely studied these, tested those which required it by careful experiment, and endeavoured to combine them all into a simple clinical procedure embodying their good points. This has resulted in the formulation of a procedure which I venture to think is an addition of some importance to surgery.

A careful study of the principles underlying the method is indispensable for efficiency, together with considerable experience in a variety of cases. This is a little laborious at first, but extremely interesting and well worth the trouble.