METHOD OF LOCATING A MOBILE RENAL CALCULUS AT OPERATION

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The case described below presents several interesting features which will be apparent; but its outstanding feature is that the stone had considerable freedom of movement within the bounds of the kidney. According to its location different syndromes were produced so as to cause, at first, some difficulty in the diagnosis. Because of its changing position, it might have been difficult to locate at operation; a special technique was therefore devised.

When a small stone is known to be somewhere "in the substance of the kidney" (i.e., somewhere in the calical system) several methods have been available for its extraction. In the past the kidney has been split from pole to pole in the hunt for vagrant stones. The method has been used very often; death from post-operative haemorrhage is not uncommon as a sequel. Twelve years ago two patients lay in adjacent beds after a kidney-splitting operation. One died of post-operative haemorrhage. The other announced that he would have a haemorrhage and die; his statement proved correct. The frequency of this complication is not surprising when one considers the immense blood supply of the kidney. One-third of the heart's output goes into the renal arteries (Pickering, 1943). By another estimate, all the blood in the body—about 10 pints—passes through the kidney vessels in three or four minutes (Wright, 1941).

As an alternative to large-scale kidney-splitting, the kidney may be carefully palpated in an endeavour to feel the stone before cutting. This is rarely successful, and then only with a large stone. If this fails it is recommended to "needle" the kidney. The needle can sometimes be felt to grate upon the stone. Even if one is lucky enough to impinge on the stone it may, if free in the calix, be pushed quietly along without yielding any grating sensation. The kidney may also be radiographed on the operating table after delivery through the wound. A cassette is wrapped in a sterile towel and the kidney laid upon it for a picture to be taken. The method needs a long flexible renal pedicle, which is often not available. In that event the cassette cannot be placed close up to or flat against the kidney, and the shadow of that viscus is therefore grossly distorted in the photograph: kidney and stone appear in the picture, but it is impossible to say exactly where the stone lies in relation to the calical system.

The method under description involves none of these disadvantages. It entails insertion of several straight needles into the kidney, which is then radiographed. The needle nearest to the calculus guides the incision. The method is obviously "inspired" by the modern technique for nailing the fractured neck of the femur (Farquharson, 1939).

Case Record

A sailor, already diagnosed as a case of appendicitis, was admitted to a tropical military hospital. At a previous port he had been in a civilian hospital, where appendicitis had also been diagnosed; no operation had been undertaken, as the condition resolved quickly.

Examination showed a heavily built man of 38. He looked quite well and comfortable, and he was apyrexial. He said that he had been subject to attacks of colicky pain in the upper abdomen for several years. The pain was always worse in the right hypochondrium, where it usually began; it then radiated horizontally to the back. He suffered from indigestion, but there had never been jaundice. During the attacks of pain he had no frequency of micturition. There were no physical signs except the Murphy-Moynihan sign (inhibition of expiration on deep pressure over the gall-bladder). Gall-stones were provisionally diagnosed; cholecystography was ordered. This showed a normal gall-bladder shadow. But behind it was a shadow that could have been due to a calculus in the renal pelvis. Intravenous pyelography showed that this shadow was within the shadow of the renal pelvis: hydronephrosis was present as judged by the clubbed calices. The urine contained no pus cells. Under cystoscopy with intravenous injection of methylene blue the dye appeared from the left ureter in 3½ minutes. There was no efflux from the right ureter. Evidently the stone was completely blocking the right uretero-pelvic junction.

The next day he had a brisk rigor. Temperature rose to 103° and he looked very ill. The urine was still free from bacteria and pus cells. Malaria is rife here, and although the parasite was not found in his blood, a white count showed 14% monocytes. This was consistent with malaria, and he was accordingly given a full course of mepacrine. In a few days the fever subsided. Right retrograde pyelography was then undertaken. This showed that the stone was no longer wedged into the uretero-pelvic junction; it was lying in the lowest calix. Urine draining from the right ureteric catheter was loaded with pus and *B. coli*.

It was now evident that the febrile attack had been due not to malaria but to infection of the hydronephrosis; no pus had then appeared in the urine because the pelvis had been blocked by the stone. A course of sulphathiazole was given to control infection of the right kidney. His blood urea was then 85 mg. per 100 c.cm. This was surprising; I would have expected the sound kidney to control his blood urea. B.P. 120/80. After a further course of sulphathiazole his blood urea had sunk to 45 mg. per 100 c.cm., though *B. coli* was still present on urine culture.

This was judged to be the optimum time for operation. Preliminary radiographs showed that the stone was still in the lowest calix. Under general anaesthesia the kidney was exposed by Mayo's incision. Only its lowest pole was visible, projecting beyond the last rib. This rib was therefore removed. Even then the kidney was delivered with difficulty. The pedicle was short and could not be properly seen.

With such a mobile stone it was quite probable that shift could have occurred during delivery. Three round-bodied straight needles were pushed into Brod's line, blunt end first. They covered an area which probably contained the stone, and were pushed in so that they converged radially upon the centre of the pelvis. An x-ray cassette was enclosed in a sterile towel, but it was impossible to obtain proper apposition of cassette and kidney. The picture taken was expected to show much distortion on the kidney shadow; it was rapidly developed. The expected distortion was revealed; but it was immaterial, because the stone was clearly seen to be close to the highest needle. It is unnecessary to set a line of needles at right angles to the first line; the stone must be somewhere on a line radiating from the chosen spot on Brod's line to the centre of the kidney pelvis.

A very small incision was made along Brod's line immediately above this needle. The incision was deepened at once in the direction of the pelvis. This exposed the stone, which was seized and removed. It had the spiked appearance of an oxalate calculus. The kidney was sutured with fine gut on an eyeless needle over a free muscle graft. Recovery was rapid and uneventful except for post-operative pyrexia and some inevitable small-scale haematuria; both cleared up rapidly.

Discussion

It is well known that a renal stone may produce different syndromes according to its locality. In this case there was an opportunity to observe four clear-cut syndromes produced by a single mobile stone. Thus it could give at different times a good imitation of four different diseases according to the stage in which the case was seen by different surgeons.

1. Symptom-free but with pyuria (at this stage the patient might easily have fallen a victim to the pernicious diagnosis of "pyelitis"). The stone was snugly lodged in the calix.

2. The stone emerged, to impact suddenly in the uretero-pelvic junction. This caused upper abdominal pain, principally right-sided. Owing to complete blockage of the right renal outflow there were no urinary changes. Thus the renal origin of the pain was missed and the patient was believed by a surgeon to be suffering from the "first-stage" pain of appendicular colic.

3. Impaction persisted, but the pelvic musculature tired of its peristaltic efforts. The pelvis dilated into a hydronephrosis. This caused a dull pain in the back. The sequence of right epigastric colicky pain which finally radiated to the back, accompanied by a story of chronic indigestion, suggested the diagnosis of gall-stones. The Murphy-Moynihan sign was easily, though wrongly, elicited, and this helped to round off the diagnostic picture.

4. The hydronephrosis became infected. The temperature rose rapidly and the clinical appearance was strongly suggestive of malaria. Again the ever-present false scent was provided by an increased mononuclear count. Antimalarial treatment was given, and in a few days the temperature was normal. But really improvement had been due to dislodgment of the stone, allowing the infected hydronephrosis to drain.

There remains for discussion the raised blood urea. One kidney alone is quite capable of keeping the blood urea within normal limits. It follows that this particular left kidney must somehow have been affected by the infected hydronephrosis of the right kidney. This is a remarkable conclusion, and it is difficult to understand in terms of any current theories of renal

secretion. It is true that several cases have been reported in which unilateral infected nephrolithiasis has caused a general rise of blood pressure. It probably acts by effecting a chemical constriction of all arterioles, including efferent glomerular arterioles but excluding afferent arterioles (Pickering, 1943). Thus the glomerular pressure in the sound kidney should rise and, if anything, more urea should be excreted, because urea is probably secreted by a process of mechanical glomerular filtration and not by tubular secretion. In this patient another unknown mechanism must have been involved, because there was no general rise of blood pressure and there was lessened urea excretion as judged by his raised blood urea.

Summary

A mobile renal calculus, according to its different positions, so changed the clinical picture that the following conditions were successively diagnosed: appendicitis, gall-stones, renal calculus, malaria.

During the phase of infected early hydronephrosis the opposite healthy kidney was affected; no explanation has been found for this.

A method is described for accurately locating the stone at operation. Thus only a small incision in the renal substance was needed; this minimized the risk of gross post-operative haemorrhage.

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Medical Memoranda

Fulminating Diphtheria in a War Nursery

A case of fulminating diphtheria in a young child these days must be unusual; when that child has been immunized it becomes something of a rarity. It is therefore hoped that a study of the following cases will prove of interest, and that a few suggestions will help those practitioners who have charge of war nurseries to prevent a similar occurrence.

CASE I

P. L., a boy aged 4, was seen at midnight on March 5, 1944. He had been perfectly well in the morning, but was put to bed after lunch because there seemed to be difficulty in swallowing. He resented being put to bed. Examination of the throat showed nothing abnormal except enlarged tonsils, which were reddened, and a slight increase in temperature. When seen the child was not unduly toxic. Temperature 103°; pulse 170; tongue furred; tonsils grossly enlarged, red, with small whitish patches; some nasal discharge. The cervical glands were enlarged and gave the "bull-neck" appearance. On auscultation heart sounds were quite strong; no abnormal sounds in the chest. A rigor occurred after examination. A clinical diagnosis of diphtheria was made and a throat swab taken. Anti-diphtheritic serum (4,000 units) was given, and sulphanilamide in adequate doses to combat haemolytic streptococci. Early the following morning (March 6) the child's temperature was 101°, the pulse 180, and he was toxic. There was obvious membrane on both tonsils, although the breathing was not obstructed. On auscultation heart sounds appeared weaker than on the previous occasion. A further 2,000 units of A.D. serum were given and arrangements made to send the child to an isolation hospital.

On admission 60,000 units of A.D. serum were given and tracheotomy was performed as a last resource; but the patient died.

Throat Swab.—(1) Morphological diphtheria bacilli present. (2) *C. diphtheriae* present. (3) *C. diphtheriae* present, gravis type. No bacteriological evidence of Vincent's angina or haemolytic streptococci.

CASE II

A. L., twin sister of Case I, complained of a sore throat at 10 a.m. on March 6. She seemed very well; temperature 99°; pulse 130; tonsils reddened only; tongue not furred. At 2.30 p.m. the same day a greyish-yellow patch had appeared upon both tonsils, although the general condition of the patient seemed good. A.D. serum was given, and the child is recovering after being removed with her brother to an isolation hospital. Throat swab—third report: *C. diphtheriae*, gravis type, present.

INVESTIGATIONS AND PROPHYLAXIS

There were 39 children and about 10 staff at the nursery. The problem was to find the carrier and check further outbreaks. The procedure in this nursery is to immunize each batch of children as they arrive, at the conclusion of their medical examination. A.P.T. is used; dosage 0.3 c.cm. first injection, 0.5 c.cm. second injection. Practically all the children had been immunized except a batch of about six to eight

who were waiting for their second injection. Some of the staff had not availed themselves of immunization. One child (J. W.) had been known to have had diphtheria previously, and was admitted to the nursery in Sept., 1943.

Nasal and throat swabs both of children and of staff were taken on March 7, 1944, with the following results:

	Nasal Swabs		Throat Swabs	
	1st Report	2nd Report	1st Report	2nd Report
Children ..	All neg.	J. W. pos.; rest neg.	All neg.	All neg.
Staff ..	"	All neg.	"	"

J. W. therefore was the carrier. He was immediately isolated. The third report showed *C. diphtheriae* present, gravis type; nasal swab. This child was immediately removed to an isolation hospital. Two of the staff and one child were given prophylactic doses of 2,000 units of A.D. serum. There have been no further cases.

SUMMARY AND COMMENT

A case of fulminating diphtheria occurred at a war nursery; the first patient, who had been immunized, succumbed. His twin sister also contracted the disease, but is recovering; she also had been immunized.

Opportunity was given to observe the development and rapid extension of the membrane.

The carrier was found by means of a nasal swab only. The child had had diphtheria, but had recovered and was admitted to an unsuspecting nursery. It had been in daily contact with 39 children for about six months, but no outbreak occurred until March, 1944.

Investigations showed that the child who died was immunized in Devon in 1941: Aug. 12, 0.5 c.cm. A.P.T.; Sept. 10, 0.1 c.cm. A.P.T.; Oct. 10, third dose, but no stated amount. *Doubt, however, is thrown upon whether A.P.T. was the material used.*

It is suggested: (1) Before proceeding to a war nursery (or to school or similar places) children should be immunized. (2) Those who have been immunized two or three years previously should be re-immunized before entry. (3) Where this is not possible, children should be immunized on their first day of entry. (4) Records should be kept of the name and age of the child, the material used, dosage, where immunization was carried out, and, if possible, the name of maker of material used. (5) Children should have throat and nasal swabs taken for K.L.B.; this will show carriers. (6) Any child known to have had diphtheria should be isolated until the results of the throat and nasal swabs are known. This is not foolproof, as a swab which was negative may after a cold be positive. (7) Where there is doubt that the condition may be either a diphtheritic throat or a haemolytic streptococcal throat, isolate immediately and give A.D. serum without waiting for the result of the swab.

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Adenocarcinoma of the Small Intestine in Father and Daughter

Carcinoma of the small intestine is comparatively rare, accounting for about 3% of all intestinal cancers (Ewing, 1940). At the Mayo Clinic only 76 cases of small-gut carcinoma had been recorded up to 1936. Furthermore, intussusception after the first or second year of life is also rare, and Choyce (1932) states that not more than 12% of all cases of intussusception occur in patients over 10 years. Accordingly the following two cases of intussusception of the small gut caused by adenocarcinoma and occurring in father and daughter appear to warrant publication.

CASE REPORTS

Case 1.—A coppersmith aged 43 was admitted to Llandough Hospital, Cardiff, on June 4, 1940. He gave a history of attacks of abdominal pain for 12 years, relieved by vomiting and the passage of flatus, and on a few occasions had passed some blood in the motions following the attacks. A barium meal showed a normal stomach and the barium enema a distended colon. The occult blood was positive. While in hospital he continued to have attacks of abdominal pain, and when seen in a severe attack on June 23 he presented the features of a small-gut obstruction. Laparotomy, performed by Mr. W. D. Lovelock-Jones, revealed a jejuno-jejunal intussusception, which was easily reduced. Examination then showed that the apex of the intussusception had been occupied by a tumour, and accordingly about 6 in. of gut containing the tumour was excised and continuity re-established by end-to-end anastomosis. Convalescence was uneventful, and he has remained well since.