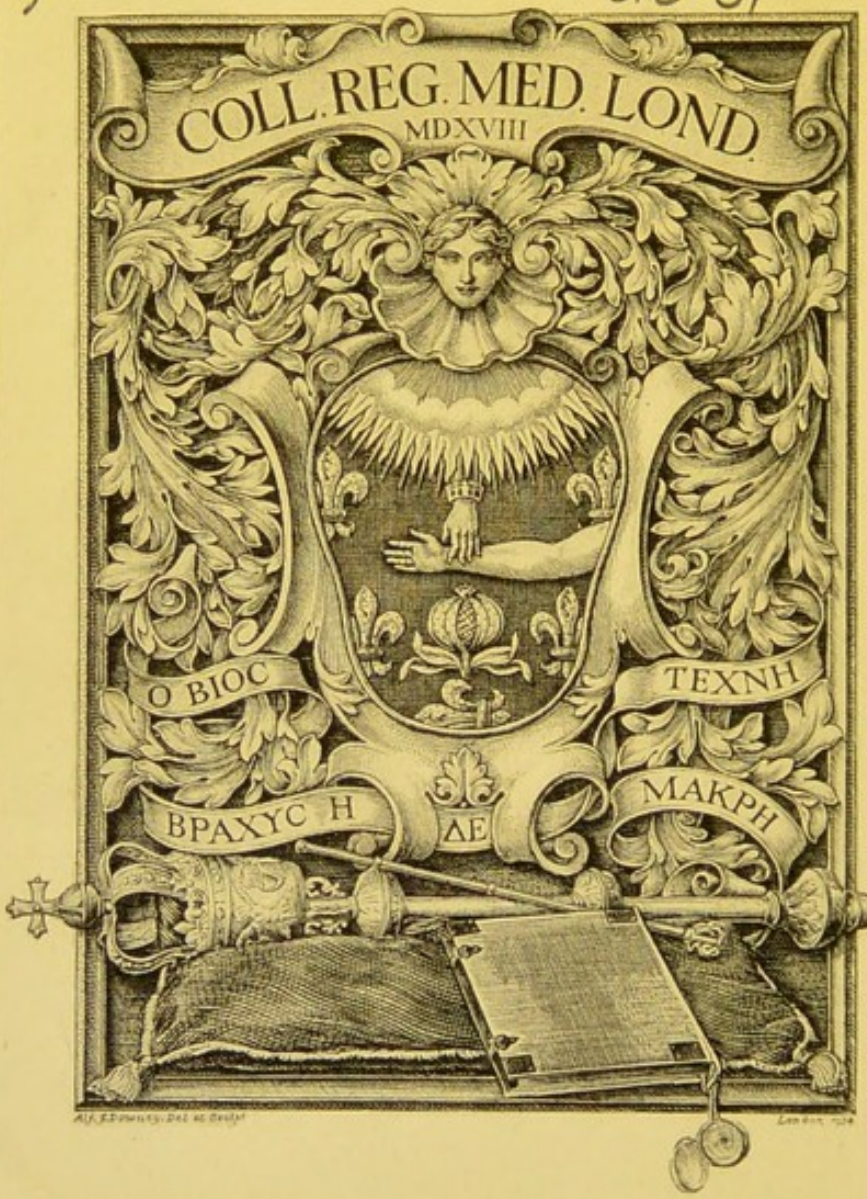
Movable kidney, its pathology, symptoms, and treatment.



With the author's Compliments.

MOVABLE KIDNEY

ITS PATHOLOGY, SYMPTOMS, AND TREATMENT

MOVABLE KIDNEY

ITS PATHOLOGY, SYMPTOMS, AND TREATMENT

BY

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WITH ILLUSTRATIONS

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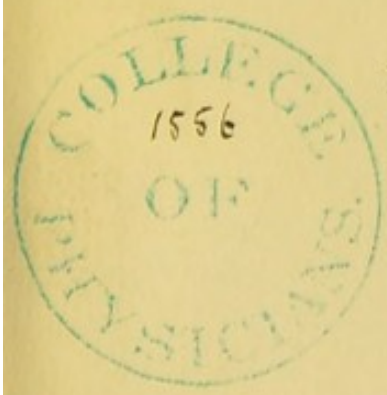

PREFACE

An attempt has been made in this book to give a concise account of the various conditions included under the term "movable kidney." The experimental pathology described herein was undertaken by one of us when holding the Luther Holden Research Scholarship at St. Bartholomew's Hospital. The results of the experiments have, however, been critically examined by both of us. The greater part of this work has already appeared in print in the *Practitioner* (October, November, December, 1907). We desire to express our thanks to the editor of that journal for kind permission to reproduce the same, and for the use of several of the plates. We are indebted to the writings of others in several instances, and wish to take this opportunity of acknowledging the value of their work, should we have omitted to do so in any part of the text. To those members of the staff of St. Bartholomew's Hospital who have allowed us to make use of their cases, and especially to Mr. H. J. Waring, we offer our best thanks. Our thanks are also due to Dr. F. W. Andrewes, curator of the St. Bartholomew's Hospital Museum, for permission to reproduce illustrations of several pathological specimens, and to Dr. F. H. Champneys for most kindly reading through the proofs and for many valuable suggestions. For Plate No. 7 we are indebted to Mr. F. Gustav Ernst.

H. W. W.
C. M. H. H.

March, 1908.

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MOVABLE KIDNEY

CHAPTER I

INTRODUCTORY

No treatise which attempts to deal with such a subject as movable kidney can be complete, unless it includes a short account of the steps by means of which our present knowledge of the condition has been reached.

We propose, therefore, to give a brief summary of the views which have been held on the subject by the earlier writers. Mesue, of Venice, writing in 1561, seems to have been the first to draw attention to movable kidney, but appears to have regarded it as a condition chiefly to be found as a consequence of some form of renal tumour.

In 1581, dislocation of the kidney arising from internal or external (traumatic) causes, is referred to by Franciscus Pedemontanus, but Riolan was the first to recognize the clinical importance of the condition, and to point out that rapid diminution of the perinephric fat played an important part in its production. In his book, published in 1682, he says : " Although the kidneys appear strongly fixed in the loin, they may still be able to leave this position, and move downwards or fall forwards. The cause of this is not only that the fat, in which they are normally enveloped, disappears, but further, either from enlargement due to tumour or stone in their pelvis, their own weight pulls them down, their attachments not being sufficiently strong to hold them in place."

Pierre Rayer, in his *Traités sur les Maladies des Reins*, published in 1839, gives the first full account of the condition,

and its symptomatology. He appears, judging from his own account, to have been the only physician of the time well acquainted with pathological mobility of the kidney, though he refers to Riolan's writings. In his book, he states that women furnish the largest number of patients, and that the kidney is most often found movable on the right side. It is also, he says, often associated with a hypochondriacal frame of mind. "Especially in those who discover for themselves a tumour in the abdomen, the nature of which their physician is unable to explain." He refers to a medical man, who, discovering such a tumour one day when in his bath, retired from the profession and resigned himself to death. He describes also a case of "floating kidney" in which a mesonephron was present, and which he considered a congenital anomaly, owing to the great length of the renal vessels. He treated his cases, as a rule, by ordering a corset or bandage, which, however, he states only gave partially satisfactory results. This he combined with a diachylon plaster, and rest in a horizontal position. As an instance of the symptoms of such cases, he quotes the following account of a woman, aged 43, who complained of intermittent gastro-intestinal derangements, and who was a permanent hypochondriac. On examination, he found a tumour in the right loin below the margin of the liver, firm, smooth, and kidney-shaped. This was movable almost to the umbilicus. "He could take it in his hands." It was quite separate and easily distinguishable from the gall-bladder. In the lumbar region was *un vide*. The left kidney was not felt. The patient was married, had one living child, and had had two miscarriages (figures which he quotes, possibly, for the purpose of showing the relation of pregnancy to the condition).

He carried out his routine treatment on this case, with the result that the pain, usually experienced on movement, was much relieved.

Another of the earlier writers was Landau, whose book, admirably translated and edited by Champneys (New Syd. Soc., 1884), is a valuable contribution to the literature of

the subject, not only on account of its wealth of clinical material, but also because it contains careful records of numerous post-mortem examinations, made with the special object of elucidating the cause of the condition.

The operative treatment of movable kidney is of comparatively recent date. King performed an exploratory laparotomy in order to remove a movable tumour (probably a floating kidney), but on opening the abdomen he was unable to find it.

Hahn, in 1881, recorded two successful cases of lumbar fixation, and gave to the operation the name of nephrorrhaphy, afterwards known in France as nephropexy. His subsequent results do not appear to have been so satisfactory, failure being undoubtedly due to his faulty technique. His method was to sling the kidney into position by means of catgut sutures, which merely traversed the capsula adiposa. His principles, however, were sound, and showed a great advance on those of Martin, of Berlin. The latter, in 1878, had performed nephrectomy, and by so doing, in addition to subjecting his patient to an operation which at that time had an exceedingly high mortality, had removed an important organ whose functions were probably only slightly, if at all, impaired.

Hahn, recognizing that his method was not always successful, soon modified his original procedure, and adopted direct renal fixation. In this he soon gained the support of numerous other surgeons, among whom one must mention Morris, Tuffier, of Paris, who employed partial decapsulation, and Vulliet, of Geneva, who used a detached tendon of the sacro-lumbalis as his suturing material. These surgeons laid the foundation for the innumerable operations now in vogue, all of which may be regarded as elaborations or slight modifications of their original methods.

Definition and Classification.

In dealing with such a subject as movable kidney, it becomes of the utmost importance to understand exactly what is meant by the term, and to arrive, if possible, at

some practical basis for a classification. Hitherto, a certain amount of misconception has existed, as a result of which most of the statistics on the subject are entirely valueless, from ignorance of what the various observers chose to regard as pathological mobility of the organ in question. In addition to this source of error, variations in nomenclature have played their part in adding to the confusion. The word " movable " has been applied to the kidney from three different points of view, namely, clinical, anatomical, and pathological, and in addition to this, we have the class of kidneys described as " floating " to reckon with. Morris confines the term " movable kidney " to one which possesses freedom of movement in one plane only, the vertical, and reserves the term " floating " for those kidneys, which, in addition, possess freedom of movement towards the anterior abdominal wall.

It is now commonly acknowledged, though Landau held a contrary view, that the normal kidney has a certain definite respiratory excursion, and it is obviously necessary to arrive at some conclusion regarding the extent of this movement, before we can assert that any kidney possesses abnormal mobility. This respiratory excursion has been stated differently by various authorities, Morris and Dentu agreeing closely, however, in fixing 2 to 5 or 3 to 5 centimetres as the normal range. Treves, however, considers this estimate too high. It is probable that the position of the body at the time of observation has an important influence on renal mobility. As a rule, greater respiratory excursion is noted in cases of lumbar operation, than when the abdomen is opened from the front. The explanation of this is not far to seek, for the kidney owes its movement on respiration to the liver. It probably is not influenced *directly* at all by the diaphragmatic movements, as the part of the diaphragm with which the kidney is in contact shows little or no respiratory change. In the semiprone position adopted in the lumbar operation, the kidney is of necessity brought into closer relation with the liver than it would be with the patient lying flat on the back. Our own observa-

tions would agree with the range of movement already given as normal for the right kidney, whilst observations, made during the course of abdominal sections, have convinced us that the left one moves very little, if indeed it moves at all.

Some authors have exaggerated the frequency with which movable kidney occurs, by including in their statistics all cases in which the kidney is palpable. This, we consider, is quite unjustifiable. In about 60 per cent. of the women, whom we have examined with special reference to this point, in the surgical and gynæcological wards at St. Bartholomew's Hospital, we found at least the lower pole of the right kidney palpable ; yet, in none of these cases, could abnormal renal mobility, in our opinion, be said to exist.

This brings us to the question as to what circumstances justify the diagnosis of movable kidney. In our opinion the following do so :—

1. Excessive respiratory descent ; meaning thereby that the excursion shall exceed 2 to 5 centimetres, and that, in consequence, not only the lower pole, but most of the anterior surface of the kidney shall be palpable on deep inspiration.

2. Cases in which abnormal mobility may be communicated to the organ from the exterior. This includes those cases in which the organ is so displaced as to be no longer influenced by the respiratory movements.

3. When rotation of the kidney, alone, or in combination with descent, is able to take place. In the first of these conditions the kidney would not be palpable through the abdominal walls.

As a rule, we have found, in most cases of movable kidney, that a varying amount of prolapse of the organ has taken place ; by this we mean that the centre of the kidney at rest is on a lower plane than normal, and does not merely undergo increased respiratory excursion.

As to degrees of mobility, various classifications have been made. Glénard, for instance, formulates four classes :

1. Kidney descends on inspiration, so that the lower pole can just be palpated.

2. Kidney can be held between the fingers, but the upper extremity cannot be defined.

3. Tissues above the upper pole of kidney can be compressed, and some definition of the upper pole made.

4. Kidney "floating," and can be felt during expiration by mere palpation. The floating kidney is uninfluenced by respiration, is usually to be found in the region of the umbilicus, but may extend well into the iliac fossa.

As we have already stated, we do not consider the first class at all abnormal, and any statistics based on this classification would, in our opinion, lead to quite erroneous conclusions.

Morris's classification is founded on an anatomical rather than a clinical basis. He considers that the kidney may possess an abnormal mobility within its tunica adiposa, this too within the perinephric fascia, or that both conditions may coexist. As, even post-mortem, it is extremely difficult to decide the exact points on which he relies for his classification, it is clear that for clinical purposes at all events it has little or no practical value.

To recapitulate somewhat, we find one or two chief characteristics in all cases of movable kidney, which must form the basis of a practical classification. They are—

1. Increased respiratory excursion, or

2. Change of position (accompanied by mobility), including under this heading—

(*a*) Prolapse.
(*b*) Rotation of one or other pole.
(*c*) A combination of *a* and *b*.

Now, it is not possible to base a classification on the first of these alone, for the following reasons :—

First, and this may sound paradoxical, this increased respiratory movement is not always present in movable kidney. For instance, in cases in which there has been rotation of one or other pole, the most severe symptoms may occur, and yet no extra-respiratory excursion take place.

Secondly, because it is impossible to precisely determine

how much movement shall constitute abnormal mobility. Assuming the normal range on movement to be about ½ inch, can we say that ⅔ inch is abnormal ; and, if we can say this, who shall decide through the abdominal wall between ½ or ⅔ inch excursion of a kidney ?

We are therefore compelled to fall back on the second of our two characteristics, but we must remember that change of position, except under class *b*, must always be accompanied by free movement. This reservation is necessary to exclude such cases as congenital displacement of the kidney. In these circumstances, the organ may be found in almost any part of the abdomen, *e.g.*, the iliac fossa, or a median (horseshoe) kidney may be present ; but it is almost invariably found more firmly anchored in position than a normal kidney.

We would therefore suggest the following classification :—

1. Kidney which has merely prolapsed.

2. Kidney has prolapsed and lower pole has rotated inwards. In this case, there is usually no expiratory upward movement on abdominal néphroleptique, but kidney will return to normal position on recumbency.

3. Kidney has prolapsed, lower pole rotated inwards, and has further undergone anterior displacement. There is in this case no tendency to return to the natural position on recumbency, but the kidney tends to become more prominent immediately beneath the anterior abdominal wall.

4. Kidney has undergone rotation only ; there has been no prolapse, it lies high up, and is often not palpable without an anæsthetic.

CHAPTER II

SOME POINTS ON THE ANATOMY OF THE KIDNEY BEARING UPON ITS PATHOLOGICAL MOBILITY

We do not propose to describe fully, or in any sense to attempt a complete account of the anatomy and topography of the kidneys in this chapter ; but merely to go into those points which we regard as of importance in the maintenance of these organs in their proper position, and which we have been able to verify by our own observations and dissections.

The kidneys lie in the lateral vertebral recesses, or kidney pouches, on each side of the spine in the lower dorsal and upper lumbar regions. These depressions vary very considerably in their shape and dimensions in the two sexes, and even in different individuals, and their antero-posterior diameter has a considerable bearing on the question whether the kidneys are palpable or no during life.

In one patient, a kidney may be distinctly palpable, whereas, in another patient, in whom the kidney lies on the same level, no part of it can be felt on clinical examination. The ease with which these organs can be felt also depends, to a certain extent, on the obliquity of the lower costal margin.

In men the kidney pouches are deep, narrow, and rapidly diminish in breadth from above downwards, whilst in women they are much shallower and broader, and their transverse diameter is found to only slightly decrease as they are traced downwards.

Deletzine and Volkoff demonstrated these facts very clearly by an elaborate series of experiments, made by

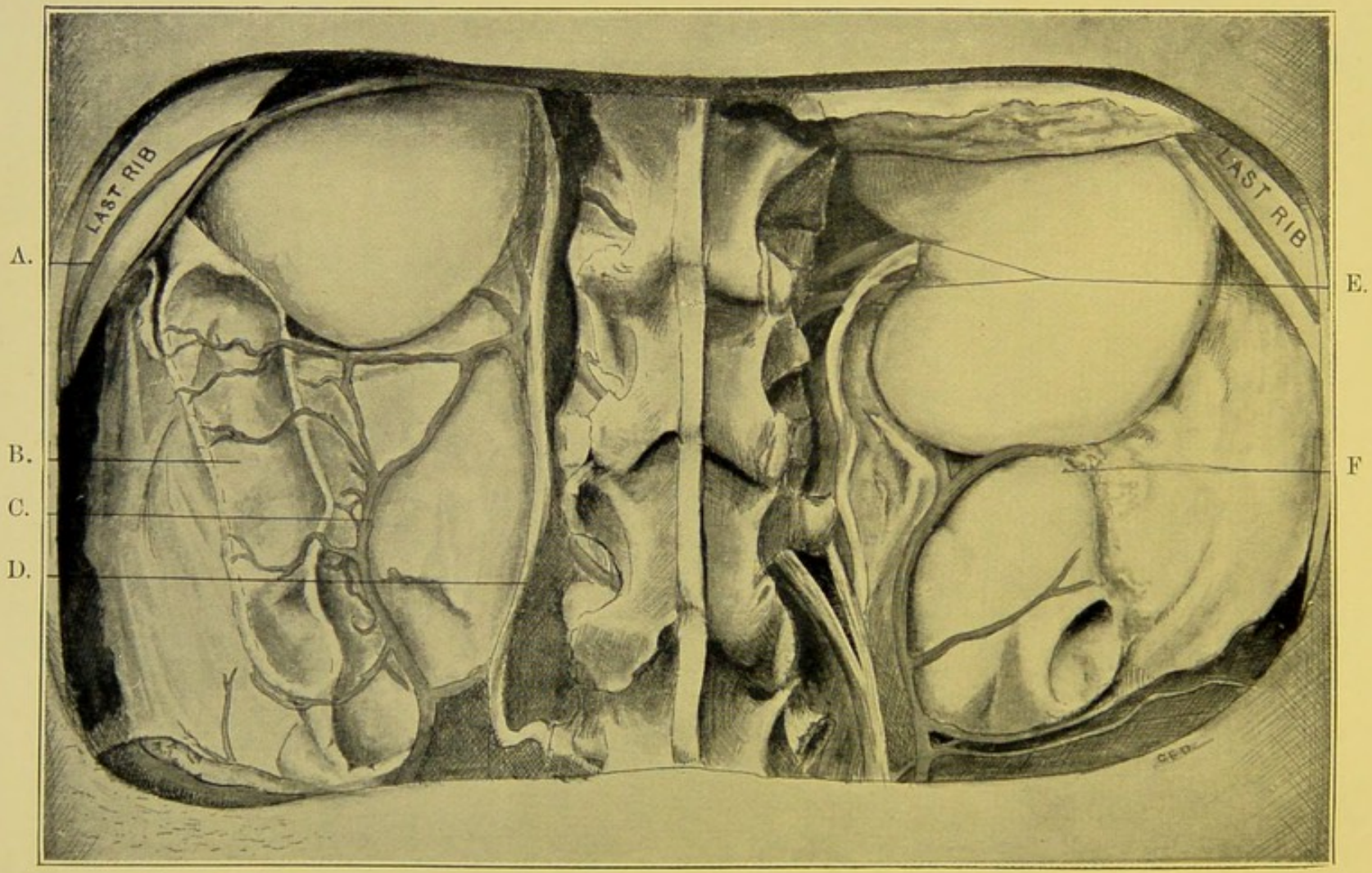


FIG. 1.*—DRAWING OF A DISSECTION OF THE KIDNEYS FROM BEHIND.

A, Subcostal artery ; B, descending colon ; C, colica sinistra ; D, ureter ; E, terminal branches of right renal artery ; F, ascending colon.

* We are indebted to the *Practitioner* for the use of this block.

means of measurements and casts, on the shape of the renal fossæ in the two sexes.

The kidneys lie with their long axes directed from above downwards and slightly outwards, and occupy portions of the epigastric, hypochondriac, and lumbar regions. The lower pole of the right kidney extends as low as the lower border of the body of the 2nd lumbar vertebra, whilst that of the left is from about ¼ to ½ inch higher. Laterally, the kidneys are entirely under cover of the ribs, in front about the lower and inner third is exposed, and posteriorly the amount differs on the two sides.

On the right side, almost five-sixths of the organ lies below the level of the 12th rib, which merely skirts along its outer convex border, whilst, on the left, two-thirds of the kidney lies below the lower border of the last rib.

One is very apt to underestimate the extreme obliquity of the last rib, which is well shown in the accompanying drawing of a specimen in the anatomical museum of St. Bartholomew's Hospital (Fig. 1). In this dissection it will be seen that, although the upper renal pole reaches as high as the 11th intercostal space, even on the right side the tip of the lower pole lies no lower than a line drawn horizontally inwards from the tip of the 12th rib. The relative level of the kidneys may vary within a limit of one or more inches, and yet the pathological border may not be reached, as shown by the almost transverse course of the renal vessels.

The diaphragm is in relation with about the upper third of the posterior surface of the right kidney, and slightly more of the left.

This part of the diaphragm is almost entirely muscular, and its fibres can be seen passing vertically upwards from the ligamentum arcuatum externum, to their insertion into the central tendon. Their curve is so very slight, that its obliteration on inspiration can have but little effect in the production of the normal respiratory descent of the right kidney.

The right pleural sac, although it extends below the vertebral end of the 12th rib, does not pass normally beyond

the lower border of that portion of the rib, which lies external to the outer border of the erector spinæ.

Relations of the Colon (see previous drawing).—Although in the adult the exact relationships of the large intestine to the kidneys vary, still the following broad differences on the two sides remain constant :—

(*a*) That on the right side the ascending colon and hepatic flexure lie mainly on the inner aspect of the kidney.

(*b*) That on the left side the descending colon lies to the outer side, and partly astride of the corresponding organ, the branches of the colica sinistra passing upwards and outwards across the anterior aspect of the kidney to get to their distribution.

The splenic flexure of the colon lies above and well to the outer side of the upper pole of the left kidney, being firmly fixed, and supported in that position by the diaphragmato-colic ligament.

The usual arrangement is shown in the diagrams below, although the exact relationships are subject to a certain amount of variation in individual cases.

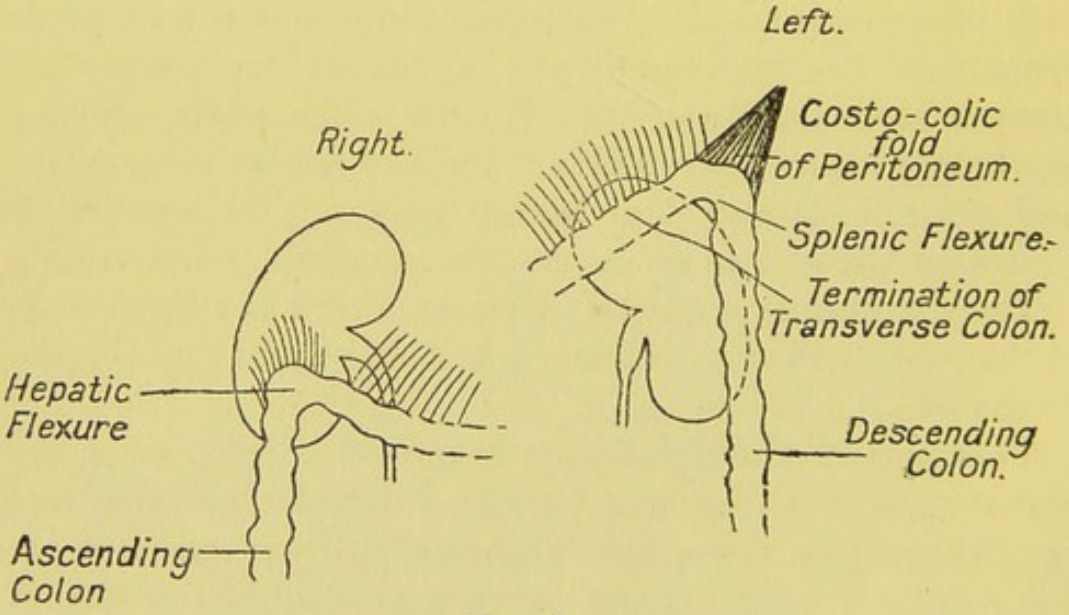


Fig. 2.

It will be seen that the hepatic flexure, if the bowel be loaded, would tend to drag on the kidney, whilst the descending colon, firmly suspended above, would, on the contrary, bind the kidney in position by means of its mesocolon.

Passing across the line of greatest convexity of the left anterior renal surface are also the pancreas and splenic vessels, both of which structures must be important factors in preventing any forward displacement of the organ.

In the normal adult, the lumbar fascial planes are so infiltrated with perinephric fat, and the adipose tissue lining the lumbar recesses, that a satisfactory examination is wellnigh impossible. When, however, a dissection is made of properly hardened specimens, either in the adult or in the fœtus, the fibrous investments of the kidney can be seen to have very definite limits and attachments.

They may be divided into three strata :

(*a*) The capsule proper of the kidney.
(*b*) The capsula adiposa.
(*c*) The perinephric fascia.

(*a*) *The Capsule proper*, or tunica propria, consists of a thin semi-transparent layer of fibrous tissue, which gives a complete investment to the kidneys except just at the points of entry and exit of the renal vessels and ureter. As it is traced inwards, it is seen to dip into and line the renal sinus, and then to be reflected on to the renal vessels, with the tunica externa of which it soon blends, as it passes towards the middle line. The posterior layer of this reflection was named the suspensory ligament by Englisch, who attributed to it much greater importance in the support of the kidney than we think its strength warrants. He described it as passing inwards between the renal artery and ureter to gain attachment to the psoas sheath. Dipping inwards from the true capsule into the parenchyma of the gland are numerous delicate fibrous septa, which offer no bar to the decapsulation of the normal healthy kidney ; but, in cases of generalized or localized interstitial nephritis, or perinephric inflammation, these may become much thickened, and render the capsule firmly adherent to the glandular surface.

(*c*) *The Perinephric Fascia* is best seen by a dissection made from the front.

The peritoneum can be dissected off with the colon, and then its anterior layer (fascia pro-renalis) is exposed.

The limits of the perinephric sheath can be demonstrated most satisfactorily if it is inflated with air by means of a small puncture in its anterior surface. When the transversalis fascia reaches the outer renal margin it splits into two layers, an anterior or fascia pro-renalis and a posterior or fascia retro-renalis, and it is by the reunion of these that the perinephric sheath is formed. These two layers form a complete investment for the kidney except at its hilum and lower pole. At the hilum, the fascia pro-renalis passes across the middle line to join the corresponding layer of the opposite side, and the fascia retro-renalis, which is of slightly denser texture, partly blends with the psoas and quadratus lumborum sheaths, but also passes onwards to obtain direct attachment to the periosteum on the antero-lateral aspect of the vertebral bodies.

From its posterior surface also, a fibrous lamina proceeds inwards between the psoas and quadratus lumborum to be inserted into and blend with the periosteum on the lateral aspect of the bodies of the upper lumbar vertebræ immediately in front of the roots of their transverse processes.

At the lower pole the two layers are continued downwards and slightly inwards, as a funnel-shaped prolongation, to end by blending at a point on the iliac crest just external to the sacro-iliac joint of the same side. Here there is a weakness in the perinephric sheath, and it is down this channel that the kidney prolapses, and guided by the direction of the funnel, the organ soon assumes a position with its long axis directed downwards and slightly inwards.

Passing from the upper part of the perinephric sheath, in an upward and inward direction, is a strong fibrous band, which is partly continuous with the diaphragmatic fascia and crus of the diaphragm, and partly attached to the vertebral bodies.

As the latter portion passes upwards it splits to enclose the suprarenal capsule, but there is by no means an equal division. Whereas the anterior portion is weak and thin,

the posterior has considerable density and thickness, and constitutes such a strong band that we propose to call it the true " Suspensory Ligament " of the kidney.

This suspensory ligament,which can always be recognized as a tough band offering considerable resistance to the enucleating finger in post-mortem examinations, together with the prolongation inwards of the retro-renal fascia at the hilum, we regard as important factors in the limitation of movement, and maintenance of the kidney in its proper position. As the pelvis of the ureter leaves the renal sinus, its calibre rapidly narrows until, at a point a short distance below its origin, it pierces the retro-renal fascia.

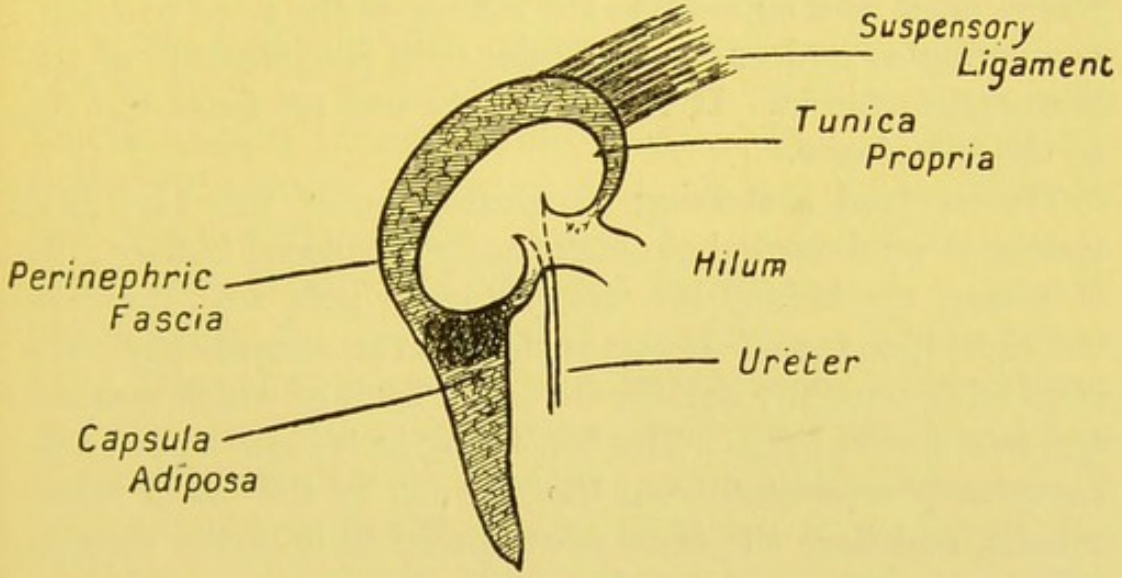


FIG. 3*.

The portion of the ureter lying within the perinephric sheath is free to follow the kidney in all its movements, and thus a kink may be produced at its point of exit from the perinephric sheath, where, as it passes downwards on the psoas muscle in the extra-peritoneal fatty tissue, it becomes more fixed in position. Separating the fascia pro-renalis from the peritoneum clothing the posterior abdominal wall is usually a thin layer of extra-peritoneal fatty tissue, which is present in fair quantity even in the seventh-month fœtus.

(*b*) *The Capsula Adiposa.*—The immediate surroundings of the fœtal kidney are almost entirely devoid of fat, except

* We are indebted to the *Practitioner* for the use of this block.

for one fairly constant patch lying along its outer convex border ; indeed, it is not until the child approaches puberty that the characteristic coat of adipose tissue makes its appearance. Up to this time the perinephric sheath is separated from the tunica propria by a potential space only, and running across this interval are numerous branching alveolar septa, into the meshes of which fat is subsequently deposited in great abundance.

Although the capsula adiposa gives a more or less complete investment to the kidney, it is massed chiefly along the outer convex border and below the lower pole. In the latter situation it forms a definite cushion of denser texture, which must lend support to the kidney in the erect position, occupying as it does the funnel-shaped prolongation of the perinephric fascia. It is completely cut off from the fat in the iliac fossæ.

We received a striking demonstration of this fact in a specimen we dissected of congenitally misplaced kidney. In this case, the kidney lay with its lower pole well down in the right iliac fossa. It was enclosed in an exceedingly well-marked perinephric sheath, the lower limit of which reached the true pelvic brim. The fat, filling in its lower part, was completely separated from the iliac fat by the fascia retro-renalis, and bore the same relationship to it as the capsula adiposa does to the fat lining the lumbar recesses.

In connexion with the left fascia pro-renalis, Zuckerkandl and Toldt have described an additional thickened process, to which they appear to have attributed much importance in the suspension of the left kidney, and have stated that it is derived from the descending mesocolon, during the process of development.

In our own dissections we were unable to identify this layer, or to satisfy ourselves that the fascial connexions of the left kidney were in any way stronger than those of the right.

CHAPTER III

ÆTIOLOGY OF MOVABLE KIDNEY

THE first question which presents itself for consideration under this heading must be the frequency with which abnormal renal mobility exists. That there is a great deal of divergence of opinion on this point is shown by comparing the statements of various authorities. These differ within fairly wide limits. Glénard gives 22 per cent.; Kuttner and Lindner, 20 per cent.; Morris, 7 per cent.; Skorczewsky, 3 per cent. in men and less than 10 per cent. in women, as representing the frequency of occurrence. These figures were taken for the most part from clinical observations, and are therefore entirely dependent on what the various observers regarded as constituting a movable kidney. We have already remarked, and again repeat to emphasize the fact, that in a large number of women the lower pole of the right kidney is definitely palpable, and further that it moves on respiration. Such a kidney comes within the limits of Glénard's classification, and this fact probably accounts for the high percentage which he returns. As we have already pointed out, we do not think such a kidney should be regarded as "movable." From our own observation, we should say that not more than 3 to 5 per cent. of women who present themselves for medical examination have a "movable kidney" in the true sense of the term. One point is, however, agreed on by all, namely, the greater frequency with which the condition occurs in women. As to the reason for this fact a variety of views exist.

Pregnancy has been blamed by many writers as an im-

portant cause of movable kidney, resulting in women suffering from the latter condition so much more frequently than men. Morris adopts this view to some extent, and gives the four following reasons for so doing :—

(i.) There is a sudden loss of intra-abdominal tension during and after parturition.

(ii.) The violent contractions of the diaphragm which take place during labour.

(iii.) Post-partum flaccidity of the abdominal walls.

(iv.) Too early return to ordinary occupations after delivery.

We are not able to agree that pregnancy plays any important part in producing movable kidney. A *possible* cause of movable kidney sometimes occurring as a sequel to pregnancy may be referred to here. A temporary hydronephrosis on the right side, at times accompanied by pyuria, is occasionally met with in pregnant women. Such a condition does not usually persist after child-birth. The return of the affected kidney to its normal size may result in the organ becoming movable. In our series we found that 39 cases of movable kidney occurred in multiparæ, 37 in nulliparæ, and in 8 no definite history was obtained with regard to child-birth.

Kuttner agrees with our view that the condition is met with as frequently in the nulliparous, as in those who have borne children. If diminution in intra-abdominal tension played a large part in the production of a movable kidney, we should expect to find it occurring after the removal of large tumours, such as ovarian cysts, from the abdomen. This would be the more likely, since Nature provides no compensating mechanism in such cases as she does after parturition. But our statistics show that movable kidney is not a sequel to ovariotomy. In a large number of such cases which were examined at periods of from six months to five years after operation, only one of movable kidney, which dated from the operation, could be found. Most of this series of cases had been operated upon by Mr. Harrison Cripps, who insists on three weeks' absolute rest in

the supine position after all his abdomino-pelvic operations. This may partly account for the low percentage of cases of movable kidney which resulted from the operation.

Violent contraction of the diaphragm may certainly produce an increase in the ordinary respiratory excursion of the kidneys, especially in the case of the right one. It is, however, questionable whether the contractions of this muscle during labour would be sufficient, *per se*, to dislodge the kidney from its normal position. In this connexion, it is important to note that the ordinary conception of the movements of the diaphragm is an erroneous one. The posterior muscular fibres of the diaphragm pass almost vertically upwards from the outer portions of the crura, and the external arcuate ligament, to their insertion. The greater number of these fibres are inserted directly into the posterior margin of the central tendon, but a certain proportion are continuous with a band of condensed tissue which passes upwards in the posterior mediastinum, and is lost in the neighbourhood of the roots of the superior and inferior venæ cavæ. It is probable that the function of these fibres is not a respiratory one, but by their contraction they tend to fix and prevent movement of the cardiac openings of the great venous trunks. An X-ray screen examination would seem to show that on inspiration the liver descends as a whole ; but this is not the case. The rounded posterior surface remains almost stationary, whilst the anterior thin margin tilts downwards and backwards, the posterior surface acting as a fulcrum. As a result of this movement of the liver pressure is brought to bear on the upper inclined plane of the kidney, and the latter is forced downwards. Since the diaphragm contracts in the manner described, its movements cannot directly affect either kidney, but can do so only through the medium of the liver.

Morris's third and fourth reasons are theoretically good, since post-partum flaccidity of the abdominal muscles would allow the perinephric fascia to be pulled on, in the event of the patient resuming an active occupation before the muscles

had regained their normal tone. In this connexion, the statement made on good authority is interesting, that in certain European countries as many as 10 per cent. of the poorer multiparæ have movable kidneys. Against this we must put the fact that in parts of the Highlands, where the poorer women are in the habit of getting up on the fifth or sixth day of the puerperium, movable kidney is quite uncommon. These women, however, suffer much from uterine prolapse, caused no doubt by the giving way of the subinvoluted pelvic floor. This is in a large measure due to the fact that they resume an active occupation (carrying heavy fish-baskets on their backs) too soon.

Men are rarely the subject of movable kidneys, unless of the acute traumatic type. The reason for this may be found on consideration of the causes, which, in our opinion, tend to produce abnormal renal mobility. In a consecutive series of 100 cases of abnormal renal mobility which we collected, in 89 instances the patients were women.

As regards social station, our experience points to movable kidney being as common, or perhaps commoner, in the well-to-do.

In our opinion, there are three factors which render women more liable to the affection than men :—

1. The shape of the renal fossæ in women. As we have pointed out in the anatomical section of this work, the fossæ in the female sex are wider and shallower than in the male.

2. Chronic constipation, which is admittedly commoner in women, and will also serve to produce the condition in the right kidney rather than in the left.

Arbuthnot Lane, in a paper published in the *Clinical Journal* (June 5, 1901), draws attention to this factor. In chronic constipation, the cæcum and ascending colon get overloaded, and this tends to produce constant traction on the lower pole of the right kidney, with which the hepatic flexure of the colon is in immediate relation.

The upright position and straining at stool will both tend to drive the cæcum down into the pelvis, and thus to increase the drag on the right kidney.

On the left side, the relationship of the splenic flexure of the colon to the kidney is quite different (*vide* Anatomical section), and does not exert the same downward traction.

3. Tight lacing. This may undoubtedly assist in the production of a movable kidney. A specimen in the museum at St. Bartholomew's Hospital shows this very clearly. At the same time it seems probable that the kidney in the first place may occupy, in such cases, a slightly lower position than usual. Under normal circumstances, the line of constriction, in those who tight-lace, appears to be lower than the maximum diameter of the kidney, and thus would tend to support rather than depress the organ. On the other hand, in cases, in which the pressure is considerable and is exerted over a long period, the kidney appears to be affected through the undue constriction of the liver. It is most noticeable that a well-marked linguiform lobe of the liver, showing a transverse band of constriction above it caused by tight lacing, is frequently accompanied by a movable right kidney.

Other well-recognized causes of renal mobility undoubtedly exist, besides those to which reference has already been made. Such are to be found in pathological changes of the kidney itself, or of surrounding organs, especially the liver; in Glénard's disease; and as the result of trauma. In addition, we frequently find rapid loss of weight associated with a movable condition of the kidney. Occupation seems to play no very important part as a causative factor, except that heavy manual labour involves the risk of producing mobility of the kidneys through strain or accident.

Let us examine these causes a little more in detail. The pathological renal conditions most often found associated with mobility are new growth, especially suprarenal tumours, hydronephroses, polycystic disease, hydatid cyst, and stone. In many of these cases, it is of course uncertain whether the pathological changes present are the cause of the abnormal mobility, or are merely associated with it. It is quite clear that any of these conditions may give rise to such mobility. But it is equally certain, at all events in the case of hydro-

nephrosis, that abnormal renal mobility in many instances existed prior to the development of the cystic condition, and, in fact, produced it. Tuffier, Morris, and Bruce Clark have all demonstrated this beyond doubt, and we ourselves have notes on a case, in which a movable kidney was observed to become hydronephrotic (*vide* Pathological section).

Traumatic cases are not very uncommon, and several instances have been recorded illustrating this point. In a case seen by one of us, the patient, a jockey, was thrown from his horse, which fell crushing him beneath. Within an hour or two hæmaturia, associated with pain in the right loin, was noticed. He recovered from the accident, but, during the next two years, several attacks of Dietl's crises occurred. The man was subsequently operated on, and what had been diagnosed as an enlarged movable kidney proved to be a very mobile hydronephrosis of fair size.

With regard to the part played in the production of movable kidney by rapid loss of weight, it is difficult to speak in decided terms. No doubt a history of loss of weight and of decrease in adipose tissue is often to be obtained, but, in many cases, the reverse is met with. It must further be borne in mind that the general adiposity of a patient forms a by no means trustworthy index as to the quantity of perinephric fat that may exist. As a rule, it is true, the common operative experience is to find, in these cases, a singular lack of fat in the renal fossæ. Still, in several of our cases this was not so. [If the operation is to be a success this occasional excess of fatty tissue has to be most carefully dealt with.]

The part that the fatty capsule plays in preventing renal ptosis is also somewhat uncertain. It is probable, however, that the pad of fat, lying below the inferior pole of the kidney in the perinephric funnel, does act to some extent as a support to that organ.

In Glénard's disease, a movable condition of the kidneys is one of the most constant phenomena. The cause is undoubtedly to be found in the general relaxation and stretching of the fascial planes which occur in this disease.

The right kidney is often found movable when the liver shows considerable enlargement, due either to fatty change, cirrhosis, or to new growth. In this case, direct pressure will account for the displacement.

With this general statement, which is based merely on our impressions received in the post-mortem room, the results obtained by Addison in his researches into the topographical anatomy of the abdominal viscera are not in accordance. He makes the following statements* :—

"That when the liver is displaced upwards it leaves the right kidney to some extent.

"That when the liver is lower than usual it moves down, to some extent, on the surface of the right kidney. But from this latter conclusion it does not follow that the liver in its descent does not push the right kidney down in some measure. From its firm position and attachments, we should not expect that in any one case the kidney would move downwards as much as the more movable liver. That the liver in its growth and displacement downwards increases the hepatic surface of the right kidney, and pushes the duodenum off the kidney, seems quite clear."

Summing up, he says : "It would seem, therefore, that whilst the general levels of the viscera vary in particular cases, in which the liver and right kidney share, the liver is unable to materially displace the right kidney downwards."

Some authorities, among whom one might mention Albarran and Tuffier, hold that movable kidney is either a congenital condition, or, at all events, that a strong congenital tendency may exist, as evidenced by abnormally long renal vessels, a mesonephron, etc. It is stated, in some cases, to run in families. Though the tendency may exist, we cannot accept the actual occurrence of the condition as a congenital anomaly. If it were so, children ought to suffer from movable kidney much more frequently than they do. It is rare to find a child suffering from this complaint. We have

* Addison, *Topographical Anatomy of the Abdominal Viscera in Man.* Edinburgh, 1901.

only once noted it in a child under ten years of age (the patient was two), and it is well known that a true mesonephron, if it exists at all, is only very exceptionally found. Further, if congenital, one would expect symptoms to appear at puberty, the most active time in the child's life, yet this is not the case.

With regard to the somewhat rare occurrence of movable kidney in children, Jules Cromby has collected 18 cases, 8 of which occurred before the age of ten. Among the patients were 16 girls and 2 boys. G. F. Still has also recorded two cases without symptoms, occurring in children, in one of which the diagnosis was verified post-mortem.

As to the relative frequency with which movable kidney occurs on the two sides, we found it on the right side alone in 74 cases, on the left side alone in 16 cases. In 4 cases only, were both kidneys affected. In 2 of these the right kidney was most involved, in 2 the left.

The reason for the right kidney suffering so much more frequently than the left has been already referred to in discussing the actual causes of movable kidney.

With regard to age incidence, any accurate calculation is difficult. The reason for this is, of course, that many patients have movable kidneys, without being aware of the fact, and the discovery is made more or less by accident. All that we can arrive at is the age at which symptoms are complained of. In our series of cases, we found that by far the larger number occurred between the ages of twenty-five and thirty-five, no less than 50 per cent. falling within this period.

CHAPTER IV

PATHOLOGY

Movable kidney is a disease which is of itself rarely fatal, and therefore a complete case, that is to say one which has been under clinical observation, and which has been subsequently carefully examined post-mortem, is a rarity.

Although movable kidney is a fairly common clinical condition, yet such authorities as Ebstein and Neumann record it as appearing only 16 times in a series of 14,698 autopsies. The explanation of this discrepancy lies in the fact that, unless the mobility is actually sought for, and this is by no means part of an ordinary routine post-mortem examination, only the most pronounced cases, or those in which some gross renal lesion exists, are recorded.

Even if noticed, the records are very frequently so brief that they are useless except from a statistical point of view.

Landau, after an exhaustive search, was able to secure the accounts of only 16 autopsies, recorded in sufficient detail to be of value.

The information derived from surgical procedures is also necessarily limited, because through the usual lumbar incision for nephropexy, only the kidney and its pedicle can be examined, and a very imperfect idea of their relations obtained.

The kidney does not often present at once in the wound, and has to be hunted for in the depths of the lumbar recesses, perhaps even in the iliac fossa of the affected side. When it is brought into view, therefore, its relations may be altered, and it is difficult to be certain of the relative posi-

tions of even the component parts of the pedicle. Such changes, for instance, as ureteral curvatures are obliterated by the manipulations necessary to bring the kidney up into the incision, or out on to the loin.

The following statements, therefore, are based on the comparatively few post-mortem records which we have been able to secure, on personal observations during nephrorrhaphy, or on those few cases in which the abdomen has been opened, either as the result of a mistaken diagnosis (*e.g.*, pyloric cancer), or in order to ascertain the condition of the opposite kidney.

We have also attempted to fill in the gaps of this somewhat scanty pathology by recording the results of the experimental work which we have performed on animals.

The kidney can become movable in one of three ways :

1. As a result of the rapid absorption of the capsula adiposa, the kidney may prolapse and become slightly more movable than normal within its perinephric sheath.

2. The degree of mobility may be increased, together with anterior and inward displacement of the gland, either (*a*) by bulging of the perinephric fascia ; or (*b*) by loosening or stretching of the perinephric attachments to the vertebral column.

3. In the traumatic cases, by rupture of the true suspensory ligament of the kidney, with the result that the upper renal pole falls forwards.

As the kidney slips downwards within its sheath, the lower pole, guided by the direction of the perinephric funnel, gradually passes towards the middle line, so that the long axis of the organ comes to be directed from above downwards and inwards.

Pari passu with this change the kidney undergoes slight rotation around its vertical axis, so that the hilum often looks almost directly forwards, and, at a post-mortem examination, whilst the organ is still *in situ*, appears to be on the anterior aspect of the inner border of the gland.

Soon, as a result of this, traction is made on the renal vessels, and the lower pole passes still further inwards,

describing in its course an arc of a circle, the centre of which is at the point of origin of the renal artery from the aorta, the artery itself being the radius.

The unsupported weight of the kidney produces elongation of the renal vessels, and, as Victor Bonney has pointed out, the organ becomes suspended by its own neurovascular pedicle. This traction on the renal plexus causes the referred aching pain in the lumbar region of which so many of these patients complain.

Whether by means of the coronary ligament in the case of the liver, or by the true and the ovario-pelvic ligaments in the case of the ovary, Nature always so arranges matters that strain of support is not normally thrown upon the vessels and nerves, the entirety of which is essential for the proper performance of the normal physiological functions of the gland.

If this mechanism gives way, its failure is made evident by the feelings of pain and distress experienced by the patient, or by signs of degeneration occurring in the organ itself. These are brought about by mechanical interference with its circulation, or by disorganization of its nervous mechanism.

The change of position which the kidney undergoes, brings about lengthening and narrowing of the renal vessels, and an alteration in the direction, and occasionally of the calibre, of the upper part of the ureter. The part of the ureter, which lies within the perinephric capsule, is free, and follows the kidney in all its movements, but immediately it pierces the post-nephric fascia and passes downwards and inwards on the psoas muscle towards the pelvis, it becomes much more firmly fixed in position. We see, therefore, in these cases, the ureter passing at first upwards and perhaps inwards from the renal sinus, and then making a more or less acute bend downwards to resume its normal course on the posterior abdominal wall.

The points stated above are exceedingly well brought out in the record of a post-mortem examination, made by Mosler, in 1866, and we have been so much impressed by its extreme

accuracy of description that we have thought fit to reproduce it in some detail.

The subject was a woman, æt. 36, who died of pneumonia.

Mosler says : " The right kidney was deeply situated under an enlarged liver. The kidney was rotated half round, so as to bring its outer convex border almost entirely horizontal and looking downwards, and on a level with the crest of the ilium, the hilum looking upwards and inwards.

" The right renal vein ran obliquely upwards, and opened into the vena cava inferior at a somewhat acute angle. The ureter, which was entirely covered at the origin by the kidney, first describing a slight curve, ran upwards over the trunks of the great vessels, and then passed towards the pelvic cavity as usual.

" The diameters of the vein, artery, and ureter were normal. No special alterations, attributable to the abnormal position of the kidney, could be made out.

" The right kidney was slightly smaller than the left kidney."

The kidney usually slips downwards and outwards from underneath the duodenum, but, in some few instances, the peritoneum covering the anterior renal surface, is more adherent than usual, and, by the dragging of the kidney, thickened peritoneal bands are formed which constrict the duodenum.

The best marked band is usually found narrowing the lumen of the duodenum near the termination of its second part ; but sometimes one or more may also be seen passing upwards to the neighbourhood of the pylorus, or the termination of the first part of the duodenum. As a result of this stenosis the stomach and duodenum may become enormously dilated, as in the following case, which Bramwell brought before the annual meeting of the British Medical Association in 1901.

It will be seen that probably, in this instance, the irritation caused by the dragging on the pylorus had given rise to great hypertrophy, and occasional spasm of the pyloric sphincter. In this patient the symptoms were so severe

that they ultimately proved fatal, but, in the more common type, this interference with the gut only results in chronic dyspepsia, or in acute attacks of nausea and vomiting with severe epigastric pain, brought on by some sudden strain or unusual exertion.

Case—Abstract of History.—The patient was a woman, æt. 49, who for twenty-nine years had suffered from repeated attacks of severe "indigestion," which had become worse in the last ten to fifteen years : attacks consisting of a feeling of epigastric uneasiness, followed by great distension and pain, and relieved by vomiting.

These paroxysms were always brought on by exertion, not much relieved by a careful regime, diet, or drugs, but relieved by rest.

The right kidney was fairly movable, and it was noticed that the stomach was often much dilated at times, but, in spite of the use of a firm bandage and renal pad, the patient gradually got worse. The attacks became more frequent in their occurrence, and more severe in nature, and eventually proved fatal from syncope, brought on by acute excessive dilatation of the stomach by gas.

Post-mortem Examination in Full.—"On opening the abdomen, the whole of the left hypochondriac, epigastric, and umbilical regions were found to be occupied by an opalescent sac, reaching down to within 2 inches of the pubes. It looked exactly like a thin, flaccid ovarian cyst. This was found to be an enormously dilated stomach, hanging down like a large bag. The cardiac end filled the whole of the diaphragmatic vault, and was as thin as wet paper, tearing with the least traction, while being brought to the surface.

"The pylorus was distinctly lower than normal, and surrounded by thickened and matted peritoneum. It was distinctly thickened and contracted. The swellings, felt in the region of the pylorus during life, proved to be the head of the pancreas and some lymphatic glands, surrounded by thickened fibrous tissue, but in which no malignant disease was present.

"The duodenum, which was much distended, formed a sausage-shaped sac, constricted at both ends. Its junction with the jejunum was constricted, and firmly held down by a band of thickened peritoneal tissue, which extended downwards towards the right iliac region, and then gradually spread out into the mesentery. It appeared to be the right border of the large mesentery.

"Extending from the surface of the pylorus downwards and to the right were three distinct cords of thickened peritoneal tissue, which gradually spread out over the right kidney. The latter was freely movable up and down for the space of 3 inches, and with it moved its peritoneal coverings. When the kidney was pulled down to its full extent, the three peritoneal bands were very distinct, and clearly dragged upon the pylorus.

"Before anything was removed from the abdomen, it was distinctly seen how the descent of the kidney tightened and dragged upon the peritoneal covering of the pylorus. Also the natural covering of the kidney moved with it, and its lower margin did not glide under the peritoneum, but moved over the peritoneum on the surface of the posterior abdominal wall, caused by an overlapping of the two peritoneal surfaces.

"On opening the stomach the contraction of the pylorus was found to be of a purely muscular nature from hypertrophy of the sphincter, the mucous membrane covering it being healthy.

"Microscopic examination of portions of the sphincter, and also the thickenings round the pylorus, proved the absence of malignant disease."

The common bile-duct may also be affected with the production of the slight degrees of transient jaundice, which sometimes occurs in cases of movable kidney.

This symptom is probably caused by temporary dragging on the duodenum in the neighbourhood of the ampulla of Vater by the bands described above, and is certainly never due to actual mechanical compression of the common bile-duct by the kidney itself.

In some cases of movable kidney occurring in patients showing general enteroptosis, in which the duodenum and liver have clearly suffered, the fundus of the gall-bladder may be found even on a level with the iliac crest. The S-shaped curve of the cystic duct is obliterated, and the duct is bent acutely on itself, so as to form an angle not greater perhaps than one-third of a right angle. This of itself might produce a dropsy (" hydrops ") of the gall-bladder, and the accompanying narrowing and stretching of the common bile-duct might be so pronounced as to produce biliary stasis, followed by an infection of the biliary passages, and the formation of gall-stones.

Certainly cholelithiasis and cholecystitis are not infrequently seen in cases of movable kidney, and may give rise to some difficulty in diagnosis ; but we are inclined to think that these conditions occur rather in association with, than as the result of, movable kidney. Moreover, it must be borne in mind that these middle-aged women, living a sedentary life, and often compelled by dull dragging lumbar pain to rest upon a couch for days at a time, are just the subjects in whom cholelithiasis is most common, and it would therefore be indeed surprising if gall-stones were not occasionally found in such cases.

But that movable kidney can do more than produce a slight icteric tinge, coming on after an acute attack of pain in the loin, we are not prepared to admit.

Dr. Ochsner has described a sphincter of the duodenum, just below the entrance of the bile and pancreatic ducts, and it is possible that spasm of this, originating in the same way as that of the pyloric sphincter in Bramwell's case, might cause a temporary jaundice of slight degree. That a freely movable kidney can produce marked pressure effects on the surrounding organs is well shown in a case recorded by Girard.

Case.—A middle-aged woman, who, six months previously, had had severe abdominal pain brought on by an attack of coughing, and for one month had noticed swelling of the right leg, died of pulmonary tuberculosis.

At the autopsy, the right kidney was found to possess a mesentery at least 2 inches in length. The kidney was lying to the inner side of the ascending colon; the latter, distended with gas, pressed the kidney against the inferior vena cava. At this spot, the vein showed considerable constriction with dilatation below to double its normal calibre. From the heart downwards to the site of stricture, the vein was healthy; below this point it was thrombosed to within 2 inches to 3 inches of the groin. There was considerable œdema of the right leg.

The stomach and the duodenum are, however, not the only parts of the alimentary tract which show pathological changes.

In discussing the ætiology of movable kidney, we suggested that one of the causes of the greater frequency of the condition on the right side was the drag of an habitually distended cæcum, acting through the ascending colon. At first sight, it is a little difficult to understand how this is brought about, and in normal conditions it probably does not occur.

But Arbuthnot Lane has shown how common it is to find dense adhesions of peritoneal thickening encasing the ascending colon, and that this obstruction is most marked in the upper 2 inches of its extent. He attributes this condition to an old peritonitis, either of tuberculous origin, or one originating in the appendix. He also thinks that a common cause is the habitual distension of the cæcum as the result of constipation, associated with attacks of inflammation in the wall of the gut. In this way, the hepatic flexure may become firmly adherent to the anterior surface of the right kidney, and the downward pull be made possible. The following case well illustrates this point :—

Case.—C. S., a married woman, æt. 23 years, came under treatment in June, 1900.

She stated that, two months previously, she had brought on an acute attack of pain in the right loin, accompanied by increased frequency and urgency of micturition, by jumping from a high table. Since that time she had suffered from occasional shooting pains, radiating from the right lumbar

region downwards along the outer aspect of the right thigh. She was said to have had a bad attack of " inflammation of the lungs " as a child, and showed evidence of old morbus coxæ.

At the operation of right nephropexy, the kidney was found freely movable in all directions, but firmly adherent to the ascending colon, which moved with it, and from which considerable dissection was necessary to free it.

This must, however, be an explanation which holds for only comparatively few of the cases, and we have yet to explain the frequent coincidence of abnormal mobility of the kidneys with downward and inward displacement of the ascending, or more rarely of the descending, colon.

As the kidney slips about on the posterior abdominal wall, in what Morris has described as the cinder-sifting movement, it gradually loosens the attachments of the peritoneum, and the latter becomes relaxed and flaccid as the result of the drag of the bulging kidney. The kidneys slip downwards and inwards, and then usually come forwards on the inner side of the colon, but, in a few cases, the right kidney may appear to the outer side of the ascending colon. Should the perinephric fascia become sufficiently stretched, the kidney will fall still further forward towards the anterior abdominal parietes, carrying before it the loosened peritoneum. If the latter is sufficiently relaxed, and considerable absorption of the capsula adiposa has taken place, in some rare instances, the kidney may form an almost complete investment for itself, and possess a mesentery of 2 inches, or even more, in length.

With the rarest of exceptions floating kidneys have derived their mesenteries in this way, and we are afraid the congenital mesonephron must be regarded as a myth of the embryologist's imagination.

If such a condition did exist, it is almost inconceivable that in the easily palpable abdomens of children, such " tumours " should be of so comparatively rare occurrence.

The kidney also, in the early stages, may insinuate itself between the layers of the ascending or descending meso-

colon, and, by its subsequent movements, still further loosen the colic attachments, and facilitate the downward gliding of the gut. So pronounced may this become that the cæcum, which itself may be on a lower level than usual, appears to pass at once into the transverse colon, which may lie within the cavity of the true pelvis.

An abnormally mobile kidney may become secondarily fixed by adhesions to the surrounding viscera, of which the commonest are :—

(*a*) The lower border of the liver.
(*b*) The gall-bladder.
(*c*) The transverse colon.

An interesting point is that, in many of the cases recorded in which the kidney was adherent to the inferior sharp margin of the liver, it was fixed by its outer convex border in such a position that the hilum looked almost directly downwards.

Changes in the Kidney.

In discussing and interpreting the pathological changes which are found in abnormally mobile kidneys, two points must be always before our eyes, and we must ask ourselves this important question :—

Are the changes which we find the causes or merely the results of movable kidney ?

Large and heavy tumours of the kidney undoubtedly do sometimes become movable, and in this category we would place some cases of hydronephrosis, polycystic disease of the kidneys, and some large solid renal tumours, especially swellings which have had their origin in suprarenal relics. These we do not propose to consider here, but it is interesting to note that Rayer and Brunet record tumours of the suprarenals and pancreas as displacing and mobilizing the kidneys.

Case.—A. S., a tailor, æt. 35, was admitted into St. Bartholomew's Hospital in May, 1900, with the following history :—

About six years previously, patient had noticed a swelling

in the region of the umbilicus, and since that time had suffered a good deal from dyspepsia and obstinate constipation.

He had experienced several acute attacks of pain in the abdomen within the period mentioned above, and these were occasionally followed by hæmaturia.

On exploring the abdomen, the left kidney was found to be represented by a knob of tissue 1 inch by ½ inch. The right kidney was lying to the right of the umbilicus, immediately beneath the anterior abdominal wall.

It was of large size, about 5 inches by 3 inches, horseshoe-shaped, and freely movable. Its upper pole was considerably enlarged, and showed a lobulated cystic condition, which was at the time thought to be of congenital origin. It is probable that here the mobility was a secondary condition, the symptoms dating from its time of onset.

A somewhat similar case is recorded by J. Hutchinson, jun., in the *Clinical Journal*, October 25, 1905.

It is not uncommon to find congenitally large kidneys, whether of normal or horseshoe shape, very freely movable, and, after looking through the records of a large number of cases, our impression is that a large kidney of this description is much more liable to become movable, and to cause symptoms, than an organ of normal size.

In doing a nephrorrhaphy on the ordinary subject, the spare long-waisted woman with shallow loins, two points are at once evident :—

(*a*) The extremely small amount of capsula adiposa, and also of the fat which ordinarily lines the lumbar recesses.

(*b*) The actual mobility of the kidney is often far in excess of what was suspected from the clinical examination. The kidney, with its lengthened vessels, often almost shoots out of the wound, when pressure is made on the front of the relaxed abdomen.

In the chronic cases, the kidney usually appears somewhat small and light, is rather pale in colour, and has a peculiar flabby feel quite apart from any dilatation of the pelvis. Usually the capsule does not appear thickened, strips readily,

and does not leave a granular renal surface. It is said that the opposite kidney hypertrophies to make good its fellow's deficiency, and Rayer records an extreme case, in which the affected kidney weighed 80 grammes, whilst the sound one scaled as much as 150 grammes.

One cannot help thinking, however, that in some of these cases the smallness of the organ and its concomitant mobility are effects of one common cause, viz., mal-development of the kidney and its perinephric supports.

In one or two cases, we have observed fibrous thickening producing scarring and puckering of the kidney surface, but these must be looked upon as exceptional. Sometimes the capsule is so friable that it tears in the dissecting forceps in the attempt to reflect it.

Speaking of the pathological changes which may occur in a movable kidney, Landau says :—

" In some cases, the kidney substance is itself degenerated, sometimes by fatty changes, sometimes by the contraction of the connective tissue within it, and it is sometimes in a state of hydronephrosis."

Hurry Fenwick makes the following statement :—

" Some form of ureteric obstruction, either an acute bend of the ureter, due to adhesion or mal-insertion in movable kidney, or a valve, or a vessel-leash bow-stringing the ureter, may produce a local interstitial nephritis."

He also says :—" There is generally infection in addition to the obstruction."

On several occasions we have cut sections of minute wedge-shaped portions of the renal cortex, removed at the operation of nephrorrhaphy, but were able to find no definite evidence of any interstitial change.

In one patient, a woman æt. 25, sections showed perhaps a slight increase in young fibrous tissue, but the alteration was so minute that we hesitate to lay any stress upon it.

In another patient, a woman æt. 21, there was a minute cortical cyst present.

The acute cases show a very different picture, even when operated upon some time after the attack has passed off.

The kidney is large, engorged with blood, and dull red, or even purplish in colour.

The pelvis is usually dilated, but as this enlargement takes place chiefly within the renal sinus, the extra-renal portion not being a prominent feature in the pedicle, the former condition may pass unnoticed, unless careful observation is exercised.

The renal poles overhang the hilum, and the whole kidney appears more curved than usual ; indeed, when felt by the hand inserted through the lumbar wound, it may give the impression of being a horseshoe-shaped organ. On the surface of the kidney, small opaque white areas, about 1 centimetre or more in diameter, are often seen. These appear to be local thickenings of the capsule at the points of attachment of the fibrous septa, which connect the tunica propria with the perinephric sheath.

Even at these points the capsule strips very readily, and there is no evidence of any local interstitial change, the cortex appearing perfectly smooth, and bulging through the capsular incision.

Occasionally rather pale areas may be seen on the renal cortex, but these do not necessarily correspond in position with the capsular thickenings, and are probably pressure effects. On section they show no evidence of fatty change.

There is yet another condition which may be present, a well-marked hydronephrosis, with little, if any, secreting tissue surviving.

The contained fluid is often under considerable pressure, and if the case is operated on during an acute attack, it may spurt out with considerable force on incision of the sac.

In the acute cases, that is to say, the cases which are liable to " torsion " attacks, it is the obstruction to the urinary outflow that is the chief damaging factor, although vascular changes by no means play a wholly subordinate part.

J. Rose Bradford imitated this effect very closely by experiments upon dogs (*Trans. Path. Soc.*, 1897).

He completely occluded one ureter for periods of ten to forty days, and then drained the affected kidneys by sewing

up the proximal part of their ureter to the abdominal wall and making a urinary fistula. After free drainage had been established in this way, for periods of from one to seven weeks, he killed the animals, and found that the kidneys had quickly resumed their normal shape, but were much diminished in size, in extreme cases consisting of only a quarter of their previous bulk.

The organ, instead of becoming a shrivelled sac, as one would expect to find it, appeared as a miniature specimen, macroscopically perfect, of its former self. The ureter remained thickened and dilated.

There was no general cirrhosis, but only a slight increase of fibrous tissue along the course of the larger vessels.

He regarded the atrophy as being accounted for by :—

(i.) Diminution in size of the renal cells ;
(ii.) Disappearance of many tubules ;
(iii.) Crowding together of the remaining tubules.

The nuclear staining of the renal cells was not affected, but their protoplasm had lost all its granules, and appeared clear and glass-like.

In an experiment of our own upon a cat, we caused complete ureteric obstruction for forty-eight hours, by means of a glass rod placed behind the ureter, and a figure of eight silk ligature lightly applied. At the end of that time we reopened the abdomen, removed the obstruction, and satisfied ourselves that the tube was patent. By this procedure we artificially produced a condition of affairs, analagous to an attack of torsion of the ureter in a case of movable kidney.

The cat was killed fourteen days later.

At that time the ureter was found patent, and the most striking feature was the dilatation of the intra- and extra-renal portions of the pelvis, and the ureter proximal to the site of ligature.

This early hydronephrosis had been noticed at the second operation, and, so far as could be judged, showed the same amount of dilatation at that time.

Sections of the kidney showed no marked changes, with the exception of great vacuolation of the renal epithelium. Fresh sections, stained with Sudan III., demonstrated the fatty nature of these clear glass-like globules extremely well.

We would regard the small pale movable kidney, showing a slightly dilated pelvis, as one of the earlier stages of Rose Bradford's experimental specimens—not differing much in outward appearance, capable of recovering themselves to a certain extent on the removal of the intermittent attacks of obstruction, but nevertheless considerably impaired in function,—an argument which those who say that movable kidney is a condition of no importance must find it difficult to refute.

That hydronephrosis, usually of the intermitting variety, is an effect, but not a very common one, of movable kidney has been shown both by clinical observation and by experimental work. Terrier and Baudoin collected 83 cases of intermitting hydronephrosis, and found that the more usual cause of this special form of the affection was a floating kidney, which caused a kink in the ureter. One would expect to find the condition more frequent on the right side, if movable kidney played an important rôle in its production, but on the contrary, if anything, it is slightly more common on the left side of the body.

In an analysis of a series of 62 consecutive cases of nephrorrhaphy, performed for movable kidney in St. Bartholomew's Hospital between the years 1899 to 1905, we found that in three cases it is recorded that the renal pelvis was slightly dilated, and in one only was a condition of well-marked hydronephrosis present.

There are, however, two fallacies in these statistics :—

(*a*) These patients were all admitted into hospital as suffering from movable kidney ; and all well-marked cases of hydronephrosis, having their origin in this, or in some other condition, would not be included in this list, however movable the kidney might be at the time of operation.

(*b*) As we have pointed out before, unless very careful search is made, a condition of early pelvic dilatation may

not be noticed. The kidney may be hollowed out in its interior, and yet its external configuration may show little, if any evidence, either by its size or shape, of this condition ; and the extra-renal portion of the pelvis, surrounded by loose fatty tissue, may easily escape notice.

Very careful palpation of the hilum of the gland, or a free incision into its convex border, may be required to demonstrate this condition of early hydronephrosis.

Cases.—The following three cases are typical examples of acute movable kidney, in which hydronephrosis resulted. As they illustrate very well the type of case we are considering, we have given a brief abstract of their notes.

1. M. A. K., multipara, æt. 62, when first seen in 1901, gave the history that for the last few years she had suffered from intermitting aching pain in the left loin, made worse by any undue exertion. Also, that several weeks previously she had had an acute attack of pain commencing in the left loin, and radiating down into the left groin and the outer side of the corresponding thigh. The pain was relieved by lying down. There was no hæmaturia or polyuria following the attack. She stated that since this attack her urine had been "thick." She had passed no stone. Her left kidney was found to be prolapsed, very tender on palpation, and abnormally mobile. There was slight albuminuria, and her urine contained a small amount of pus.

The affected kidney was explored from the loin, and was found to be abnormally mobile. Its convex border was incised, and the pelvis was explored. The latter was found to be dilated, and, as there was no evidence of stone, nephropexy was performed.

Her doctor writes, in 1906, five years after operation :—

"After the nephrorrhaphy, patient experienced no further acute attack of pain, and the lumbar aching gradually ceased. At the present time she is quite well, and I regard the case as a complete cure. Urine, normal ; no albumen or pus."

2. G. B., a young man of twenty-two years, came under treatment in 1901. He stated that for about the last twelve months he had suffered from acute attacks of pain in the

right loin, usually accompanied by vomiting. These paroxysms occurred as frequently as once a fortnight, and usually lasted from two to three hours. There was no history of a traumatic onset, nor were attacks followed by hæmaturia.

Right nephrorrhaphy was performed, and proved very successful. At the time of operation the kidney, which was very movable, was explored by an incision into the convex border, and was found to be in a condition of early hydronephrosis.

The lumen of the pelvic opening of the ureter was narrowed, owing to the oblique direction of the opening of the ureter into the renal pelvis. There was no actual fibrous stricture present.

This patient was seen by us in July, 1906, and his right kidney was found to be firmly fixed in a good position. He had had no pain since the operation, and only a feeling of slight weakness in the right side on severe exertion.

3. R. A., a multipara, æt. 55, when seen in August, 1900, gave the following history :—

In July, 1900, patient had a severe attack of pain on the right side of the abdomen resembling ureteric colic, and accompanied by hæmaturia. Fourteen days later, a somewhat similar but less severe attack on the left side, but no hæmaturia.

On the first occasion, there was complete suppression of urine for eighteen hours, and during the subsequent twenty-four hours patient passed 9 pints of dilute blood-stained urine.

On examination, the abdomen was found to be uniformly tender all over. The right kidney, which was felt to be enlarged, was palpable in its whole extent, and was freely movable. The urine contained a trace of albumen, and a very small amount of pus.

On opening the abdomen, the left kidney, except for slight respiratory excursion, appeared normal.

The right kidney, which was freely movable, was in a condition of early hydronephrosis, and its anterior surface

was scarred and puckered by fibrous bands. The abdomen was then closed, and the right kidney fixed in the loin by the usual lumbar operation, but before doing so, it was opened in order to exclude the possibility of stone ; the ureter, which was also examined, was clear. During the operation, it was noticed that the perinephric fat was tough and adherent, but did not appear to limit the movements of the organ to any great extent. Unfortunately, we have been unable to trace the after-history of this case.

It will be noticed that all these cases of our series which showed pelvic dilatation, were those in which a history of so-called torsion symptoms was obtained, and which fall into our classification (see p. 54) as examples of the acute form of movable kidney, for which Bruce Clarke has suggested the name of acute renal dislocation.

It is comparatively rare to find that a movable kidney has been observed, and its gradual transition into a hydronephrosis has been watched clinically. Morris, however, records one such case in his work on *Surgical Diseases of the Kidney and Ureter*. This was a lady, on whom he operated in 1893, and from whom he removed a left hydronephrosis. Subsequently the right kidney became movable, and then hydronephrotic. Four years later lumbar drainage was established with an excellent result.

One case, to which we refer more fully when dealing with the subject of infection, was observed to pass through three stages—movable kidney, hydronephrosis, and eventually pyonephrosis (see p. 47).

The clinical observation, that only a small percentage of cases of movable kidney pass on into a condition of hydronephrosis, receives striking confirmation from the experimental work which has been done on animals. Tuffier found that the production of artificial ureteric curvatures in dogs resulted in hydronephrosis in a comparatively small number of the experiments.

We ourselves, working on cats, failed in every case to produce a hydronephrosis by mobilizing the kidneys.

The method that was adopted was to incise the peritoneum

on the outer side of the kidney, completely free the latter from its connexions, and bring it forwards through the incision, so that it lay free within the abdominal cavity. All loose tissue round the pedicle was removed, and the peritoneum behind the kidney was brought together by a few fine silk sutures, in such a way that no constriction of the renal vessels or ureter was produced.

We found, in some of our experiments, that the object of the operation was defeated by the occurrence of omental adhesions, which prevented free intra-peritoneal movement of the kidney, in one case the omentum being found completely enveloping the organ. In some, however, no adhesions resulted, and we record the autopsy of one such case, which shows some of the changes that may occur in movable kidney.

Post-mortem Examination Ten Weeks after Operation.—The right kidney was found to be "floating" within the abdominal cavity almost in contact with the anterior abdominal wall. It lay with its hilum looking directly outwards, and its posterior surface directed anteriorly, so that it had rotated round a vertical axis through an angle slightly greater than 180 degrees.

The renal vessels appeared somewhat narrowed, and had been stretched to almost twice their normal length. The ureter described a gentle curve with the convexity outwards as it passed backwards to the posterior abdominal parietes, but, in the undisturbed condition of the parts, there did not appear to be any acute bend or kink such as would obstruct its lumen.

The segmental subcapsular veins were engorged, and the kidney itself appeared broader and somewhat flattened, and felt flabby as compared with that of the left side. There was no sign of pelvic dilatation.

Weight of right kidney = 15·46 grammes.

Weight of left kidney = 15·08 grammes.

Microscopical Examination showed no pathological changes in the renal tissue. The renal capillaries, however, were slightly engorged.

There is one condition which, occurring in association with movable kidney, frequently produces a hydronephrosis, viz., an aberrant renal artery. The latter usually supplies the lower renal pole, and passes transversely outwards in front of the ureter. As the kidney falls forwards, a kink of the ureter, as it curves over the abnormal artery, is produced, and, in some cases, the spur of mucous membrane resulting is quite sufficient to cause ureteral stasis.

But there is another condition which is frequently present, and upon which sufficient stress does not seem to have been laid, and that is a fibrous stricture of the ureter at the point at which it is crossed by the abnormal artery. This may so narrow the lumen of the tube that it will only admit a fine bristle with difficulty, and results in the formation of a persistent, rather than of an intermittent, hydronephrosis.

For the notes of the following case, we are indebted to C. W. Gordon Watson, under whose care the patient was admitted into the Metropolitan Hospital.

Case.—L. B., a woman æt. 48, came under observation in October, 1906. She was apparently quite well up to July, 1906, about which time she began to have attacks of pain in the right loin, accompanied by vomiting. A swelling in the right lumbar region was identified as a freely movable kidney, enlarged to about twice its normal size, and this swelling was observed to be gradually getting larger. During the periods of time intervening between these attacks, she complained of a feeling of local discomfort, nothing more.

There was no history of hæmaturia or pyuria, nor had she ever passed a large quantity of urine at any one time.

A few weeks later, immediately prior to the time of operation, there was a renal swelling in the right loin about the size of a full-time fœtal head.

It was not of uniform consistence, feeling hard in some places, and in others elastic and softer. No absolute diagnosis was made, and as there was a possibility of the swelling turning out to be of a malignant nature, it was thought to be wiser, in the circumstances, to explore from in front. The abdomen was opened by an incision through the right linea

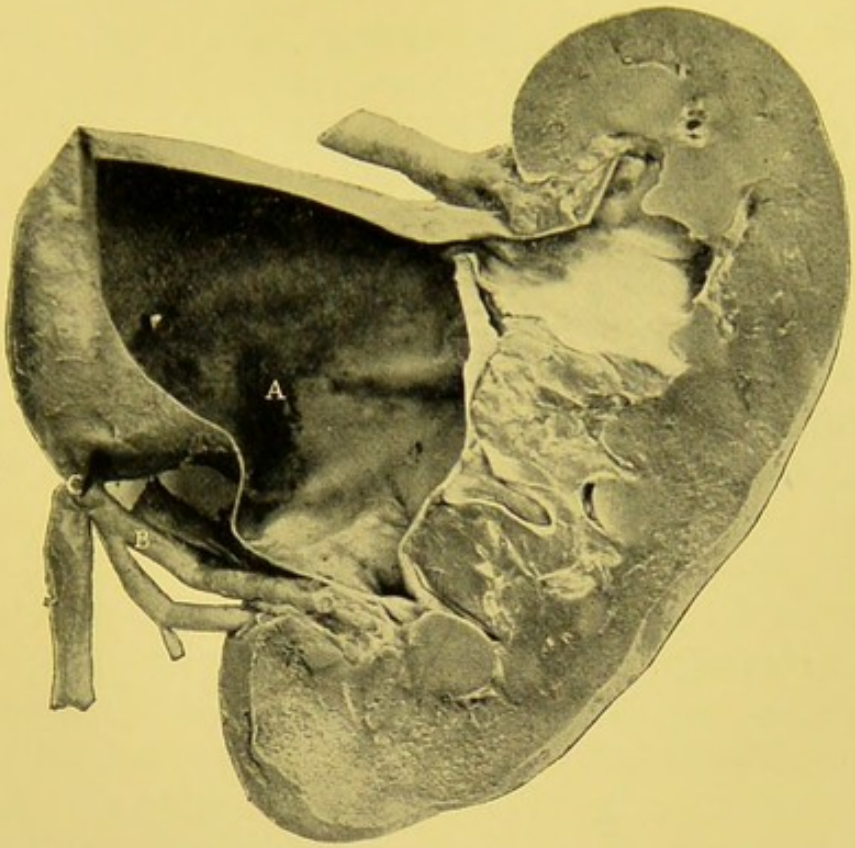
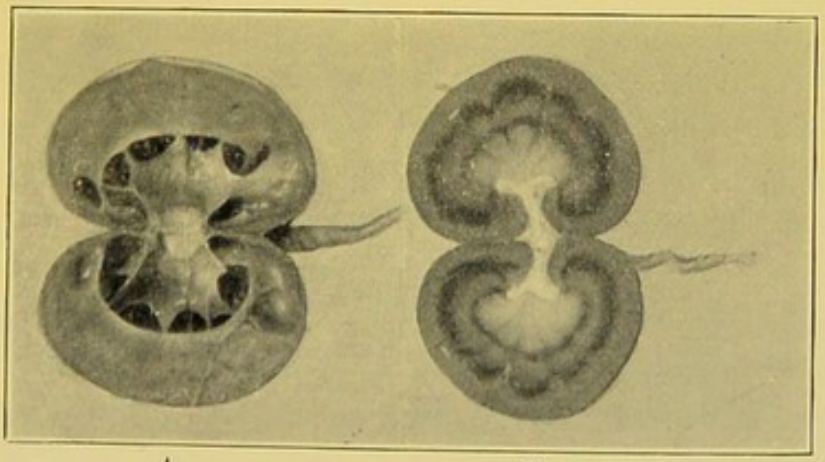


FIG. 4.*—SPECIMEN OF A HYDRONEPHROTIC MOVABLE KIDNEY, FROM ST. BARTHOLOMEW'S HOSPITAL MUSEUM.

A, Dilated pelvis and calyces ; B, aberrant renal artery ;
C, fibrous stricture in ureter.



A. B.

FIG. 5.*—A. KIDNEY (CAT) OF WHICH THE URETER HAD BEEN COMPLETELY OCCLUDED BY LIGATURE SIX WEEKS PREVIOUSLY.
B. OPPOSITE KIDNEY OF THE SAME CAT.

N.B.—In the recent state the hydronephrotic kidney was almost twice the size of its fellow.

* We are indebted to the *Practitioner* for the use of these blocks.

semilunaris, and a large hydronephrosis was found. The pelvis, which was the part mainly affected, was very tense and thinned out. The dilatation ended abruptly at the lower part of the kidney, where the ureter was kinked and constricted by an abnormal artery from the aorta running to the lower renal pole, and passing in front of the ureter. There was, in addition, an actual fibrous stricture of the ureter at the site of constriction. Owing to the kidney being movable and displaced downwards, the ureter was acutely bent over the upper border of this vessel. The artery was ligatured and divided.

The pelvis was then gently massaged until most of the urine had been squeezed down the ureter. This proceeding lasted for about a quarter of an hour, as the urine was with great difficulty forced downwards through the narrowed lumen. The abdomen was then closed, no attempt being made to fix the kidney.

It is usually stated that complete urinary obstruction produces simple, and eventually complete, atrophy of the kidney. Morris says :—"It is necessary for the production of a hydronephrosis that the obstruction be incomplete, or, if complete, only temporary, for a complete and permanent obstruction is followed by atrophy of the kidney."

This explanation would be quite sufficient to account for the hydronephrosis produced by kinking of the ureter in some cases of movable kidney, but we would go a step further, and say that a complete and permanent ureteric obstruction always produces a hydronephrosis.

In our animal experiments, we found that complete occlusion of the ureter in cats always resulted in pelvic dilatation, and the production of a hydronephrosis within from one to five weeks ; and Bainbridge also, working on ureteric pressures after division and ligature of one ureter, records this as an invariable result (*Journ. Path. and Bact.*, January, 1901). He has shown that complete obstruction of one ureter permanently damages the secreting power of the renal tubules. On incising the affected ureter proximal to the

site of ligature, he found that a considerable quantity of urine at once escaped from the renal pelvis.

It consisted partly of urine previously pent up in the pelvis, and partly of urine secreted very rapidly after the ureter was opened. This fluid was deficient in acidity, and contained a very small percentage of total nitrogen. After this initial rush of urine had ceased, and it lasted only for a few minutes, the affected kidney appeared to recover its balance, and secreted, at a very slow rate, a very dilute urine greatly deficient in nitrogenous constituents.

These experimental facts exactly resemble the clinical phenomena observed in a case of torsion of a movable kidney, or after reduction of a retroverted gravid uterus. As the incarceration is relieved, a sudden polyuria occurs, consisting of a much larger quantity of dilute urine than the slightly dilated pelvis could possibly contain; and subsequently a slow secretion of dilute urine from the affected side is shown by the segregator, or catheter cystoscope.

Bainbridge also found that the ureteric pressure steadily and rapidly decreased from the time of ligature, and therefore one may conclude that several attacks of torsion of twenty-four to forty-eight hours' duration, when the distending force is at its maximum, would produce a marked permanent increase in size of the kidney, had not the latter such a remarkable power of recuperation as Rose Bradford's experiments show it to possess.

Renal Crises (*Dietl*).—The condition producing the acute train of symptoms known under this title is usually spoken of as torsion or incarceration of the kidney.

Bruce Clarke, in a paper read before the Medico-Chirurgical Society, 1893, proposed to revert to the term of "acute renal dislocation," used by some of the earlier writers, and cited a number of cases in all of which a definite history of some sudden strain or exertion brought on the paroxysm. But as, in all cases of these so-called crises, there is venous or ureteric obstruction, we think that perhaps the name of renal strangulation is the more appropriate.

Why some cases should be liable to these sudden attacks,

whilst in others, in which almost similar physical conditions are present, they never occur, has yet to be explained.

It is not even definitely known why so many cases of movable kidney cause no symptoms at all. Excessive mobility is certainly not the determining factor, because cases are seen in which a forwardly displaced floating kidney, so freely movable that it can be manipulated into the umbilical region of the opposite side, gives rise to not even a feeling of local discomfort.

We think that the true explanation lies in the fact that, in these patients, one renal pole is capable of a much greater range of movement than its fellow. When this has occurred, as the result of some sudden strain (renal dislocation), the kidney may become temporarily fixed in its new position by a piece of gut slipping in behind it, and preventing its return to its natural position (renal strangulation).

In the acute cases of traumatic origin, which usually occur in males, it is the upper pole which is at fault in the majority of instances, and these are the patients who experience the more severe symptoms of pain and hæmaturia.

The acquired acute cases (see p. 54), on the other hand, show less severe symptoms, although of the same type, and it is more common to find in them, as a result of the downward hepatic pressure, that the mobility is chiefly confined to the lower pole.

The kidney, therefore, undergoes rotation about its transverse axis, and, in this way, causes obstruction to the venous return.

The ureter also may share in the mechanical disorganization, and its lumen become obstructed :—

(i.) By torsion ;

(ii.) By kinking over the renal vessels if it is the upper pole which becomes displaced ;

(iii.) By kinking and the formation of a spur of mucous membrane at the point at which the ureter pierces the fascia post-renalis, if the lower pole is the one chiefly displaced, and a certain amount of prolapse of the whole kidney is present.

However, these two lesions do not always occur together. If the vessels alone are constricted the following changes are characteristic :—

(i.) Secretion of a small amount only of a highly concentrated urine, or even complete suppression, probably due to reflex spasm of the opposite renal vessels ;

(ii.) Subsequent secretion, during the following five or six hours, of a large amount of dilute urine containing albumen, tube casts, and blood ;

(iii.) The appearance of a tender swelling in the loin, which is the enlarged kidney ; the latter, when exposed, is found to be large, tense, of a dark red or purple colour, and may show, here and there, subcapsular hæmorrhages causing partial detachment of the capsule. There may also be hæmorrhage into the intermediate zone of the kidney.

In one case of acquired acute movable kidney in a young female patient, whom we saw operated upon, these subcapsular hæmorrhages were well shown. For some years she had suffered from dull aching posterior renal pain, and during the year preceding nephrorrhaphy had been subject to acute attacks of renal torsion, accompanied by severe attacks of abdominal pain and albuminuria.

These attacks were usually brought on by playing tennis, or some other form of active exercise. Her right kidney felt distinctly enlarged, and was so freely movable, that it could be pushed over into the opposite side of the abdomen with ease. She was operated on a few days after one of these attacks, and when seen six months later was completely cured.

Hurry Fenwick,* discussing this condition under the title of "Intermittent Strain or Tug on the Renal Vessels," especially in connexion with the presence of an aberrant artery to the lower renal pole, says :—

"The lower pole, even the lower third of the kidney, may be seen to be of a dull white colour. This area is sharply marked off from the dull red of the remainder of the apparently healthy cortex. The capsule over the area may strip at a touch, or it may come off with difficulty, and then little

* *Clinical Cystoscopy*, p. 443.

patches of the cortex come away with it. This difference in capsular detachment varies according to the age and stage of the patch of nephritis. The cortex of the impaired area is usually smooth, white-greyish-yellow ; it is soft, and tears easily. Sections from it show a fatty change in the epithelium, and a marked state of chronic nephritis. Sometimes the surface of the area is distinctly granular, but I have never seen this change so abruptly limited as the white."

Infection of Movable Kidney.

The subject of infection of movable kidney is an extremely difficult one about which to obtain definite evidence, but our own clinical observations, and a careful consideration of the experimental work of others, have forced us to the conclusion that it does occasionally result.

In all probability, however, infection and suppuration only occur in movable kidneys which either show pelvic dilatation as the result of ureteric obstruction, or have become secondarily fixed by adhesions to some other abdominal viscus, such as the liver or colon.

The following case is extremely interesting, as it shows the unusual sequence of movable kidney, uronephrosis, and eventually pyonephrosis :—

A middle-aged woman had for some years suffered from the chronic form of movable kidney, the most prominent symptom being aching lumbar pain. She was seen by a well-known London surgeon, who found a right movable kidney without any evidence of enlargement. No operation was advised. Some considerable time later, she came under the observation of Mr. Percy Paton, to whose kindness we are indebted for an account of the case. Her symptoms had become steadily worse, and, when seen by him, she was found to have a cystic renal swelling of considerable size in the right loin. There was no pyuria. On exploration, a large movable pyonephrosis was found, which was removed.

Cultures taken from the pus showed a pure growth of a

coliform organism, which was not B. typhosus, nor the ordinary type of B. coli.

Rovsing, of Copenhagen, in the *British Medical Journal* for 1898, part ii., pp. 15-47, has also recorded a very interesting case.

Case.—The patient, an anæmic emaciated woman, æt. 56, came under his observation in 1897. She stated that she had been perfectly well up to 1885, when, after a fatiguing day's washing, she noticed blood in her urine. The hæmaturia occurred twice in the ensuing twelve years, each time after severe exertion. Her urine contained numerous red and a few white corpuscles, and many small motile bacilli, found on cultivation to be B. coli. A rounded hard tumour in the right loin was thought to be a malignant kidney.

Rovsing explored from behind, and found the kidney displaced downwards in a remarkable oblique position, with its upper pole turned towards the vertebral column, the convex border turning forwards and upwards, so that the kidney seemed to have made half a turn on its pedicle. It was kept in this position by the very pronounced tight-lacing liver, the furrow of which was exactly opposite to the upper edge of the kidney, whilst the latter was behind and densely adherent to the posterior surface of the liver.

The kidney was enlarged, being especially longer than normal, and was bluish in colour. It was explored by an incision into its convex border, but, except for slight dilatation of the pelvis and some congestion, nothing abnormal was found. A small piece of tissue was excised for microscopic investigation, and the kidney then fixed in the loin after a somewhat troublesome procedure in freeing it from the liver.

The excised portion of renal tissue showed stasis in the veins and capillary vessels. No infiltration of round cells. In the tubuli recti a number of small staff bacilli.

Within three weeks of the operation, the urine was free from blood and albumen, but still contained B. coli; however, after two months' administration of freely-diluted salol, it was found to be sterile.

He records that, one year later, the patient remained in excellent health.

On theoretical grounds one would expect that a movable kidney would not infrequently become the seat of tuberculous disease ; but we are not able to bring forward any definite evidence to show that this is more common in movable than in normally fixed kidneys, from the cases at our disposal. The following patient, however, had suffered from symptoms referable to a movable right kidney for about twelve years, and although her bladder symptoms were of some duration, still, it seemed probable that the right kidney was the primary site of the tuberculous lesion.

Case.—M. W., a married woman, æt. 35 years, came under observation in the early part of December, 1907. She stated that she had suffered from attacks of pain in the right loin for about the last twelve years. These attacks were of three to four hours' duration, and had latterly occurred as frequently as two or three times a week ; they were gradually becoming more severe. The pain, which was described as being " cramp-like," commenced in front at a point above and to the right of the umbilicus, and then radiated backwards " through the loin."

During the paroxysms the patient had noticed flatulent distension in the upper part of the abdomen. She had never suddenly passed a large quantity of urine.

Although originally the pain had appeared at nights on the patient retiring to rest, for the last five or six years lifting a heavy weight or walking quickly had always been sufficient to bring on an attack.

In addition to these troubles, since her last child in August, 1906, she had suffered from a dull hypogastric ache which was relieved by passing her water, but micturition was often accompanied by a scalding sensation in the urethra.

There had been increased frequency of micturition during the daytime, and she had usually to get up three or four times in the night.

On examination, the abdominal walls were found some-

what thin and lax. In the recumbent position, the lower border of the liver, which was not enlarged, could just be felt below the costal margin ; the lower pole of the left kidney, and the spleen, were also palpable.

The whole of the right kidney could be felt with ease, the lower pole reaching as low as a point immediately below the level of the umbilicus. The organ lay with its long axis directed downwards and inwards, and its inferior pole, which was tilted forwards, was almost in contact with the anterior abdominal wall near the middle line.

The kidney, which was distinctly enlarged, was slightly lobulated and tender ; it did not move on respiration. On raising the patient's shoulders it descended still further, and the lower border of the liver was felt three fingers' breadth below the costal margin in the lateral vertical plane.

Per vaginam, a much thickened right ureter could be felt.

The urine, which was acid, contained a small amount of albumen and pus. Cultures taken from it showed no growth, and no tubercle bacilli were found.

The patient gave a positive conjunctival reaction with tuberculin (Calmette).

Cystoscopic examination showed numerous submucous tubercles on the right margin of the trigone, and on the right lateral wall of the bladder ; the opening of the right ureter gaped, and the mucous membrane surrounding it was ulcerated.

Luy's separator was passed, and it was found that within a period of twelve minutes the left kidney secreted 3 drachms of urine containing 1·8 per cent. urea, as against 2 drachms from the right containing only 0·8 per cent. urea. On another occasion 3 drachms were collected from the left side, and only ½ drachm from the right. Both specimens contained a small amount of pus.

CHAPTER V

PHYSICAL EXAMINATION AND SYMPTOMS

A PATIENT who complains of symptoms which suggest a movable kidney should, in the first instance, be carefully examined in the recumbent position. In this way a kidney which is floating in the region of the umbilicus, or even on the opposite side of the abdomen, will not escape detection, and any abnormal condition of the liver as regards its size, configuration, and level will be discovered. This careful palpation of the front of the abdomen, combined with bimanual renal examination, will also give a valuable standard for comparison with the changes which gravity produces in the second position.

Theoretically, the ideal position of the patient, for the examination of a condition which is so largely influenced by gravity, is the standing posture, but practically this method does not fulfil one's expectations. In the first place, it is not usual, and women do not like it, an important point in dealing with patients of the better classes ; and secondly, any advantage which may be derived from this position is more than counterbalanced by the rigidity of the abdominal muscles. Even when the patient is stooping forward, complete abdominal relaxation is difficult to obtain. In our opinion, the most satisfactory practical procedure is to place the patient on a couch, the back of which is raised through an angle slightly less than 45 degrees, and, in this position, adopt the method of examination described by Glénard under the title of " abdominal néphroleptique." Failing a couch of this description, the patient's shoulders may be well

raised by means of pillows, and the head bent slightly forwards and well supported. This latter point is very important, for if any strain is thrown upon the muscles of the neck, as evidenced by the prominence of the sternal heads of the sterno-mastoids, the condition of the abdominal muscles will prove far from satisfactory. If in this position, combined with slight flexion of the corresponding thigh on the abdomen, some cause, such as excessive nervousness on the part of the patient, defeats the purpose of examination, then, we think, it is wiser to give a general anæsthetic, and secure an efficient investigation in this way.

Glénard has somewhat happily described his method as consisting of three stages :—

1. The lying in wait.
2. The capture.
3. The escape.

Suppose, for the sake of example, it is the right kidney which it is desirable to examine. The surgeon sits on the affected side of his patient, and places the palm and fingers of his left hand behind the patient's right loin, the tips of the fingers reaching well up into the renal angle ; before anything further is done, as great relaxation as possible of the abdominal muscles is secured, and the patient is directed to allow all her weight to rest on what should be the " supporting hand." The right hand is then placed on the front of the affected loin, the tips of the fingers being directed upwards and outwards, towards, and, if necessary, underneath, the right costal margin, and bimanual pressure is then made. This must be gentle at first, until the patient's confidence is secured, and then the right finger-tips press more and more deeply with each succeeding expiration until the kidney is " caught " and palpated.

If the affected organ is freely movable and prolapsed, by carrying forward the thumb of the left hand on to the front of the loin immediately beneath the costal margin, and squeezing the lumbar region during a deep inspiration, the kidney can be fixed in its prolapsed condition.

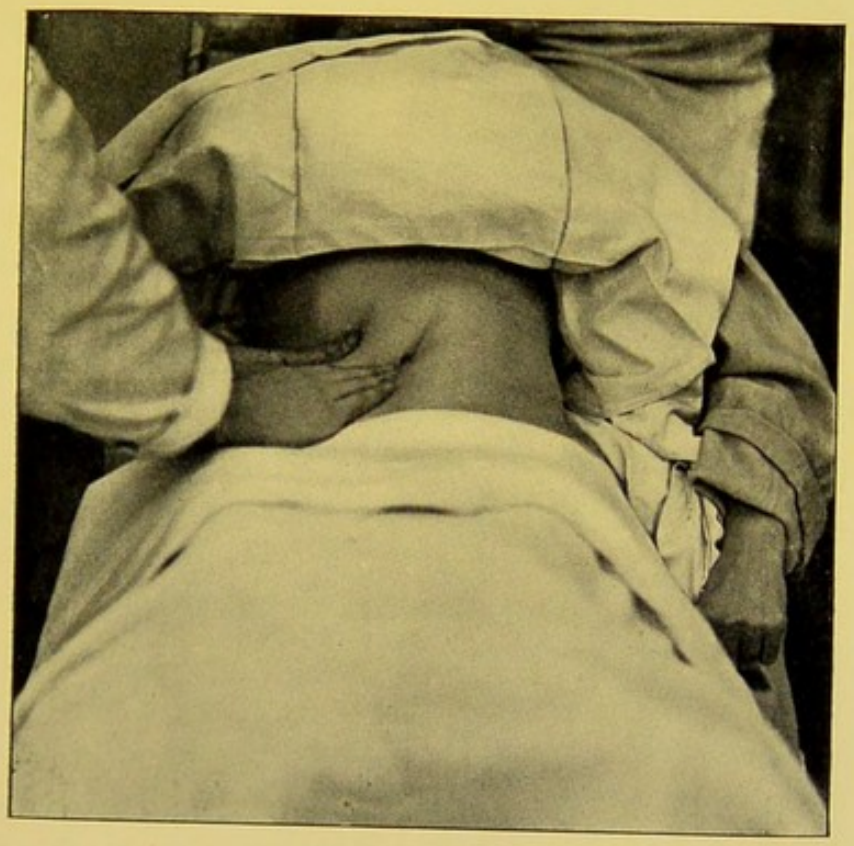


Fig. 6.—"Abdominal Néphroleptique."

This manœuvre sets free the right hand, which may be used for more accurate and careful palpation at the surgeon's leisure, not only to determine the size and shape of the kidney, but also to thoroughly investigate any inward rotation of the lower renal pole.

When the left kidney is examined, it must be done from the left side of the patient, for it is a fatal mistake to lean across and attempt to make the examination from the right side.

The amount of anterior renal displacement must be noted by a supplementary examination, with the patient lying on the sound side in the semi-prone position, as if for lumbar exploration.

We do not think the proper physical examination of a kidney is so simple and easy a matter as most of the text-books would seem to indicate.

In one of the most severe acute cases we have seen, occurring in a man in whom violent attacks of pain and hæmaturia were of frequent occurrence, the affected kidney, which was the left, although found at the time of operation to be freely movable, could not be identified by repeated previous examination.

One word of caution is necessary. If a freely movable and prolapsed kidney is fixed in its abnormal position with the "supporting hand," and palpated with the other, an exaggerated impression of its size is very apt to be obtained. At the time of operation we have repeatedly seen kidneys with no sign of enlargement, which had previously been recorded in the notes as feeling considerably larger than natural.

Occasionally, also, we have found that an efficient examination, as described above, has produced an attack of posterior renal aching which has lasted for as long as twelve to eighteen hours, and has been sufficiently severe to necessitate the patient lying up.

As we have pointed out before, loss of expiratory return, although indicative of stretching of the perinephric fascia, is no guide to the occurrence or absence of true renal

symptoms ; also that inward rotation of the lower renal pole, although a much more valuable sign, is of itself by no means infallible.

We have never felt the pulsation of the renal artery as described by some writers.

Symptoms of Movable Kidney.

In a large number of cases, a movable kidney may be present, and never give rise to any symptoms. It is difficult to obtain accurate statistics on this point, but, in our opinion, it is the minority rather than the majority of individuals who possess this abnormality, for whom treatment directed to the kidney is ever required.

In such cases as present symptoms, the severity of these may exhibit every gradation from a dull aching pain in the back to the acutest paroxysms of renal agony. To the latter the name of Dietl's crisis is commonly applied.

For clinical purposes the anatomical classification, which we have suggested, is not very convenient. More useful will be found the division into acute and chronic cases, the former being still further divisible into two groups : (*a*) Traumatic ; (*b*) Acquired.

Dealing with the acute cases first, we find that the symptoms are referable to the mechanical obstruction either of the renal vessels or ureter, or of both at the same time. This strangulation is undoubtedly the cause of the intense pain and shock which are always met with. Such a condition may be traumatic in origin, the onset of symptoms, in a patient previously in excellent health, following immediately upon some definite and severe injury to the loin. On the other hand, the acute attacks may be superimposed upon a case of chronic movable kidney. In the latter case, the attacks, at first slight, soon become more and more severe, and occur at gradually decreasing intervals. Each paroxysm is usually initiated by some undue exertion, and these cases contrast with the traumatic ones, as in the latter the first attack is, as a rule, the most severe.

Of necessity, however, the acute cases, whether traumatic or acquired, have much in common in their symptomatology. We shall, however, have occasion to note certain differences, beyond those already referred to, which help to distinguish the two conditions. Newman (*Transactions of Clinical Society*, 1897) and Bruce Clarke (*Medico-Chirurgical Trans.*, 1893) have recorded cases of the acute traumatic variety. We have thought it worth while to give a detailed account here of one of the former's cases, as it so well illustrates the condition under discussion.

Case.—R. C., marine engineer, æt. 40, came under observation in 1895, complaining of symptoms whose onset dated from an injury received on board ship four years previously. At that time he had received a severe right lumbar strain, caused by a blow immediately under the right costal margin, owing to a sudden roll of the steamer whilst he was entering the manhole of a boiler. He was immediately seized with severe pain in the right side, the duration of which was sufficient to prevent him from doing his work during the three weeks following his accident. Coincident with the attack of pain he noticed blood in his water, but the hæmaturia lasted for several days only, and then gradually disappeared. During the succeeding four years he was never quite free from aching posterior renal pain. Any undue exertion, or sudden movement of the body, at once brought on an attack of pain resembling right ureteric colic, accompanied by severe vomiting and faintness.

Complete rest always afforded marked relief to these symptoms, and if active exercise was avoided, he seldom felt any ill effects from his accident.

In the quiescent intervals the urine was normal, but during the attacks it became concentrated, small in amount, and contained much blood. This was followed by the passage of a considerable quantity of pale dilute urine as the pain subsided.

At the operation of nephrorrhaphy, which Dr. Newman performed, and which resulted in a complete relief of the symptoms, "it was found, on opening the adipose capsule,

that the right kidney was not only movable, but rotated, so that even when the patient lay on his right side, the upper extremity of the organ pointed forwards. On carrying the fingers round the fibrous capsule, the fatty tissue was found to be only slightly adherent, and the pelvis was dilated to a moderate degree. The ureter was easily made out with the finger, and was found to be kinked over the renal vessels, and the kidney itself was observed to be enlarged, swollen, and engorged with venous blood. . . . When the fibrous capsule was incised, the soft cortical substance of the kidney pouted through the incision, and, on separating the capsule, free bleeding occurred."

For the notes of a somewhat similar case we are indebted to Dr. Henry Blake, of Great Yarmouth. The patient came under his observation in September, 1907, for an attack of complete retention of urine due to an enlarged prostate. The prostate, which was of the "middle-lobe" type, had caused symptoms of only two months' duration. It was subsequently removed by supra-pubic enucleation, and had no immediate relation to the renal condition.

Case.—S. M., a printer, æt. 47 years, had been under medical observation for about thirty years. Since the age of 17 years he had suffered from attacks of severe right ureteral colic, accompanied by profuse hæmaturia of a few hours to several days' duration. The initial attack had immediately followed, and had apparently had its origin in, a severe football accident. The paroxysms were gradually brought on by some extra exertion, and occurred as frequently as three or four times a year ; but during the last five to fifteen years, he had experienced an interval of one year, and another of nine months, during which he had been quite free from pain.

Speaking generally, therefore, one may say that his symptoms during the latter years were certainly less severe than had formerly been the case. He had never passed any gravel or an actual stone.

On examination, the right kidney could not be felt, and a skiagram showed no evidence of renal stone. Excluding, of

course, the prostatic enlargement which was present, the cystoscope demonstrated the absence of any bladder lesion which could have accounted for the hæmorrhages.

In November, 1907, the right kidney was explored from the loin, and a freely movable hydronephrosis was found. Although hollowed out by the dilated intra-renal portion of the pelvis, the kidney itself was not much enlarged, but the dilatation of the upper portion of the ureter was very marked indeed. The convex border of the kidney was incised, and the pelvis explored for stone by the finger.

No calculus was found, and a bougie passed down the ureter showed that there were none impacted lower down. An aberrant renal artery was looked for, but not found.

* * * * * *

We think there is little doubt that this was a case of acute traumatic movable kidney, with symptoms extending over the unusually long period of thirty years ; and, moreover, the repeated " torsion " attacks had resulted in obstruction of both the renal vessels and the ureter. As the kidney became enlarged, much displacement or rotation became more and more difficult, and this would explain the lessened degree of severity and frequency of the intermittent attacks.

An unusual feature in the case was the early age (47) at which symptoms due to innocent enlargement of the prostate supervened.

There are several points of interest about such cases as this. In the first place, the majority, unlike the generality of movable kidneys, occur in men, who naturally are more exposed to accident than women. In the next place, the abdominal examination is often difficult owing to muscular development, or adiposity of the patient, a fact which may prevent palpation of the kidney. Also the kidney may not be freely movable, but may, as in Newman's case, have simply undergone rotation around its shorter axis, and is therefore unlikely to be felt in the abdominal examination. The diagnosis is sometimes further obscured by the fact that no immediate symptoms, pointing directly to an injury to the kidney, may have followed the strain, which has produced

the renal dislocation. In these circumstances, the diagnosis of renal stone is most likely to suggest itself—the points in favour of this view being (1) the paroxysmal character of the pain, which may very closely simulate that of ureteric colic due to calculus ; (2) the fact that it recurs from time to time ; (3) the pain is invariably made worse by exertion, and relieved by rest ; (4) the urine is likely to contain blood and albumen. In some cases, however, the quantity of urine passed is diminished to a considerable extent, a fact which will point rather to movable kidney with torsion symptoms than to stone.

At the same time, one must remember that this suppression or great diminution in the quantity of urine secreted, may occur with a calculus in the renal pelvis. The exact mechanism by which the calculus-anuria is brought about is still an open question. The inhibition in some cases is probably caused reflexly. But, as Newman has pointed out, the most important aid to diagnosis is furnished by microscopical examination of the centrifugalized urine. In such, the presence of blood casts will point almost conclusively to some intra-renal condition rather than to hæmorrhage from the renal pelvis due to the irritation of a stone. An X-ray examination should always be made in doubtful cases, and will at times materially assist the diagnosis. In addition to the characteristics of the urine, just mentioned, Newman has drawn attention to the attitude which is adopted by many of the patients suffering from acute renal strangulation. No longer being able to lie down, they assume a sitting posture, and lean forwards ; the abdomen pressed against the flexed thighs, the knees being often clasped in the arms.

It is at times possible to differentiate clinically between the pathological conditions which are present in these acute attacks. In certain general particulars, of course, all present comparable symptoms. Thus, all are accompanied by paroxysms of lumbar and abdominal pain, which may become wellnigh intolerable. The patient may become collapsed, with small pulse, cold sweats, and anxious ex-

pression. Vomiting frequently occurs. The abdomen, rigid at first, especially on the affected side, and not moving well on respiration, may subsequently become distended. In fact, the clinical picture may suggest the possibility of rupture of some part of the gut. The urinary changes, however, afford valuable diagnostic information, and sometimes will also show whether it is the renal vessels, or the ureter, which are obstructed. If the ureter alone is constricted, a large tender swelling, the cystic nature of which can at times be determined, may be felt in the loin. This is, of course, a hydronephrotic sac, tensely distended with fluid. When the obstruction is relieved, a large amount of dilute urine, deficient in nitrogenous constituents, is passed within the space of ten to twenty minutes. This consists partly of the fluid previously pent up in the sac, partly of urine secreted *for a short time* at a very rapid rate by the damaged kidney. This fluid contains no albumen, tube casts, or blood, unless the obstruction has lasted for a considerable time. In the earlier attacks, the ureteral stasis, lasting only a comparatively short time, is not sufficient to produce much dilatation of the renal pelvis. If an operation is undertaken during a quiescent period, a somewhat pale and flabby kidney is found, showing little or no evidence of dilatation of the intra-renal portion of the pelvis, unless the kidney is actually opened up. As the attacks become more frequent, the kidney tissue gives way before the repeated strain thrown upon it. The cells lining the renal tubules undergo fatty degeneration, many of them are absorbed, and removed by the lymphatics, and gradually a hydronephrosis supervenes, in some instances so pronounced that only traces of renal parenchyma remain, spread out on the wall of the sac. Moreover, as the pelvic dilatation increases, the pelvic ureteric opening becomes more and more oblique, and a vicious circle is established, due not only to the oblique angle at which the ureter leaves the pelvis, but also to the distended pelvis pressing on the ureter in much the same way as an aneurysm on the proximal portion of its artery. If one of these more advanced cases is operated upon in the

acute stage, a congested hydronephrotic sac is exposed, tensely distended with fluid which spurts out with considerable force on incision of the sac. A case recorded by Bruce Clarke, in *Trans. Med. Chir. Soc.*, 1893, illustrates several of these points very clearly. We subjoin an abstract of the notes of this patient :—

G. P., a man æt. 22, came under treatment in 1890. He complained that, for the previous year, he had suffered at times from severe attacks of pain in the right loin, accompanied by vomiting, and sometimes by hæmaturia of the renal type. These attacks were always brought on by exertion (carpet-lifting), lasted for about twenty-four hours, were always relieved by recumbency and rest, and were succeeded by the passage of a copious amount of dilute urine of low specific gravity. Mr. Bruce Clarke operated during one of these attacks, exposing the right kidney through an incision in the loin, and describes the appearances seen as follows :—

"The kidney was found without difficulty, and was at once seen to be considerably enlarged and tense. It was about the size of a large cocoanut, and was evidently filled with fluid. An incision was made into it, and the fluid spurted out from its interior. No calculus could be detected. The walls were thinned out and contained little, if any, secreting substance. During the process of exploring the interior of the cavity with the finger, and whilst the outflow of urine through the incision was prevented by the finger, the fluid began to gradually escape down the ureter until the cyst was all but emptied. Whether this was due to the unkinking of the ureter or no could not be made out with absolute certainty, but this seemed to be the most probable solution of the case."

We have gone rather fully into details on the subject of hydronephrosis, in order to emphasize the fact that this condition is likely to be met with in cases in which the ureter becomes kinked owing to rotation of the kidney.

In cases in which the renal vessels are obstructed, the attacks which result present a somewhat similar clinical picture to those just described, but differ in two important

respects :—(1) No tumour is to be found in the loin, though the kidney often feels enlarged and swollen on palpation ; (2) the urine presents different features. We have seen that, in cases of ureteric obstruction, the urine in the early stages is either passed in very small quantity, or may be suppressed entirely ; and that later a large amount of urine of low specific gravity and poor in nitrogenous constituents is secreted. Further, that it is unusual to find either blood, albumen, or tube casts in it. Where the renal vessels of one kidney are partially obstructed, the urine, though concentrated, does not seem so likely to be suppressed as in the former case, and, moreover, it contains blood, blood casts, granular and hyaline casts, and albumen. As the attack passes off, a moderately large quantity of urine of low specific gravity is passed, but containing the abnormal constituents mentioned. If palpated, the organ is found distinctly tender, and somewhat enlarged. Pressure causes a sickening pain resembling that felt when a testicle is unduly compressed. At operation, the organ is found to be enlarged and congested, with occasionally definite subcapsular hæmorrhages.

If both ureter and renal vessels are obstructed, the clinical picture will be a combination of the two types already described. It is interesting to note that in a case recorded by Newman, after one of these severe attacks, the patient was found to be unduly excitable, and to suffer from persistent headache, and dimness of vision. Such symptoms suggest a possible toxæmic or uræmic condition, induced by the suppression of urine. In the case referred to, no urine was passed between 8 p.m. on February 12, and 7 a.m. on February 14. Now, although it is possible that such an acute disturbance in the urinary functions may produce toxæmic symptoms, in our opinion, the conditions met with in chronic cases of movable kidney are not the least likely to do so. We, therefore, regard as quite unwarrantable the suggestion that has been made, notably by Suckling, that the neurasthenic symptoms, loss of weight, etc., which a certain number of such cases exhibit, may be regarded as

toxæmic in nature. The urine in these chronic cases shows, as a rule, nothing abnormal whatever. It will be obvious from the description which has been given of the acute cases that under certain conditions great difficulty in diagnosis may arise. This is the more likely to occur when the patient is a young adult, in whom no previous symptoms of movable kidney have occurred, and in whom there has been no definite history of a possible traumatic cause. The following three cases are worth recording, as examples of such acute symptoms occurring in young adults, and as illustrating the difficulties in diagnosis, to which they gave rise. They may be regarded as illustrating the acquired acute variety of movable kidney.

Case 1.—J. M., a man æt. 23, had complained, since the age of 15, of attacks of pain felt in the lumbar region posteriorly, and also in the abdomen about the umbilicus. These attacks were gradually becoming more severe. At 21 years of age, the pains became worse, and culminated in a very severe attack, brought on by jumping on to a railway platform from the line when hurrying to catch a train. The pain was accompanied by severe hæmaturia, bright and almost pure blood and clots being passed. The patient vomited. Two similar, but less severe, attacks occurred a few weeks later. The diagnosis of renal calculus was made, and a right lumbar exploration performed. The kidney was found freely movable, and a white band was noticed attached to the capsule, which itself was thickened. (This appearance is often to be seen in the capsules of movable kidneys.) Nothing else abnormal with the kidney was detected, even after it had been opened along its convex border, and the pelvis explored with the finger. The wound was closed, but the kidney was not fixed. After operation, the patient remained free from pain for three months. (Was the kidney during this time adherent to the scar, and did it subsequently become loose again ?) Then the attacks began again, but not so severely as before, and unaccompanied by hæmaturia. The urine contained no albumen. At the present time, attacks occur about every ten days, particularly if the patient is tired; the pain, which lasts

eighteen to twenty-four hours, consists of intense aching in the right posterior renal angle, accompanied by tingling and a numb feeling down the outer and posterior aspect of the right leg. No immediate relief is obtained by rest, but after some hours this proves efficacious. At the time of the attack, the right kidney, which is movable and slightly prolapsed, feels somewhat enlarged. There is increased frequency of micturition during the attacks. Physical examination, and the manipulation which this entails, tend to bring on an attack.

Case 2.—F. M., a man æt. 24. Patient had experienced several severe attacks of anterior and posterior renal pain on the right side. The last attack was associated with transient hæmaturia and vomiting. Was admitted into hospital eighteen hours after the onset of symptoms. The urine contained a trace of albumen, and a considerable quantity of oxalate crystals, to which the urinary symptoms were attributed.

The abdomen was found uniformly distended and tympanitic. For three days subsequent to admission no fæces, or flatus, were passed.

The patient's condition became critical. The diagnosis of intestinal obstruction was made, and laparotomy performed. The intestines were found congested, and very much distended, but no mechanical obstruction was discovered. The only actual abnormality found existed in the right kidney, which was movable, somewhat enlarged, and hard, the latter condition being due to the intense congestion which was also present. After operation, the patient's condition improved, but five days later a second subacute attack occurred, which, however, passed off in twenty-four hours. The patient eventually made a good recovery, though, from time to time, he still experiences slight attacks of lumbar pain. At the present time, the right kidney feels somewhat enlarged, is slightly prolapsed, and freely movable.

Case 3.*—A. B., a man æt. 27, draper's assistant. Patient had complained, for six months, of severe epigastric pain,

For the notes of this case we are indebted to the kindness of Mr. R. Foster Moore.

accompanied by vomiting of gastric and bile-stained material; no hæmatemesis; no obvious cause was found. The attacks, which had originally occurred once in three weeks, had lately become more numerous, and more severe. Between the attacks, which lasted about three days, the patient was in normal health. There were no urinary symptoms. Patient was losing weight, but was not emaciated.

On examination, an oval freely movable lump was felt (only occasionally) in the abdomen, a short distance above and to the left of the umbilicus. Its nature was doubtful. The right kidney felt larger than normal, possessed increased respiratory excursion, and was freely movable on palpation.

The stomach capacity was 2 pints.

In spite of treatment by rest, diet, lavage, and drugs, the patient got worse, attacks occurring eventually every three days, and, at his own request, an exploratory laparotomy was performed.

The right kidney was found enlarged and freely movable. The pylorus was prolapsed, so that the stomach lay entirely to the left of the mid-line. (The pylorus was the lump which had been occasionally felt on abdominal examination.) The stomach was not dilated, but the duodenum was much enlarged. Posterior gastro-jejunostomy was performed. The patient died on the seventh day from general peritonitis.

Post-mortem.—Position of stomach as above; not dilated.

First and second parts of duodenum were enormously dilated, the circumference of the gut measuring 8 inches, the dilatation ending abruptly at the termination of the second part.

The operation anastomosis was quite sound.

The right kidney was large, weighed 9 ounces, was movable, but otherwise normal. The left kidney was very small, represented merely by a small knob of fibrous tissue. The left ureter was normal.

Microscopical examination of the pylorus was negative. The case was thought to be one in which a right movable kidney had caused constriction of the second part of the duodenum, by dragging on a peritoneal band passing from

the kidney to the termination of the second part of the duodenum, and thus to be similar to Bramwell's case, already referred to. One of the most remarkable features of this case was the extreme dilatation of the duodenum, in which the stomach had not shared. The explanation of this fact does not seem at all obvious.

Chronic Cases of Movable Kidney.—When a movable kidney gives rise to symptoms at all, undoubtedly the most constant of these, in our experience, is pain.

It is important to remember that the degree of renal mobility bears no relation whatever to the pain complained of. In a patient in whom the greatest range of movement we have ever seen existed, there was no pain whatever.

The sensory changes which are associated with movable kidney, may be grouped into two classes :—(*a*) subjective ; (*b*) objective, the former being by far the more numerous.

The appreciation of pain, as is well known, varies immensely with each individual, and largely depends on the presence or absence of the neurasthenic element.

By those who are not neurotic, the pain is usually described as being of a dull aching character, felt, as a rule, in the posterior renal angle, and also anteriorly at a point on the lateral vertical plane a short distance below the paracentral spot.* It may, however, not remain limited to these areas, and is sometimes complained of lower in the back, although here great care must be taken to exclude any possible disease of the pelvic organs, especially when the pain is located at the base of the sacrum. Occasionally pain, undoubtedly due to movable kidney, is met with, extending down the thighs and back of the leg. Sometimes a sense of dragging or of weight is complained of.

As a rule, exertion or jolting from any cause makes the pain worse, rest usually relieves it. This is not, of course,

* The paracentral spot is the point of intersection of the transpyloric and the lateral vertical planes, corresponds to the tip of the ninth costal cartilage, and is on a level with the intervertebral disc between the first and second lumbar vertebræ.

the invariable rule, as a certain small percentage of patients complain that the pain is worse at night. In most cases of female patients, we have found that the pain is accentuated just before the menstrual period. This may be due to an increased congestion of the bloodvessels, which is stated by some authorities to occur, or possibly the nervous system at such a time becomes more sensitive to all forms of stimuli. In chronic cases of movable kidney, pregnancy as a rule relieves such symptoms as may exist. This is not, however, invariably the case—occasionally a Dietl's crisis may occur, towards the end of the sixth month of pregnancy, in a patient who has never before experienced any acute symptoms. Under these circumstances the diagnosis may present very considerable difficulty. In neurotic and hysterical subjects the effect of this constant aching sensation may produce the most exaggerated description of their sufferings. No longer localized, the pain tends to become generalized, and this marks an important stage in the progress of such cases. The following extract from a letter from one of these patients gives a fairly accurate picture of the proportions the pain may assume :

"Every bit of my body is ablaze with pain. It is like sparks all over me . . . then I get strung up to such a pitch, I cannot stand. It is all in my stomach, that is the trouble, and my back. Every bit of me is on the move. I feel at times I shall choke, and as though my skin was being torn off. Both my kidneys are loose; I feel they are the cause of my symptoms."

Such a mental condition as indicated by this extract can only be produced by a movable kidney in a patient of the most neuropathic disposition. Pain in the head is often complained of by these patients, and is due, in our opinion, either to the constipation which so frequently coexists, or to dyspeptic troubles.

The effect of pregnancy is usually to alleviate the painful symptoms, no doubt by the mechanical support which the enlarging uterus affords to the prolapsed kidney.

Objective sensory changes are fairly frequent, but not very

marked. In a number of patients, whom we have examined with special reference to this point, we have found a slight hyperæsthesia in the skin area corresponding to the tenth dorsal segment. The abdominal reflex is often brisker in such patients on the side of the affected kidney. We have never found any loss of sensation, such as has been described by some writers, in the distribution of the lumbar or sacral plexuses ; the kidney itself, unless the seat of some pathological process, is quite painless on palpation. When this procedure causes pain, the explanation is usually to be found in the congested state of the organ, which follows the mechanical obstruction of the vessels or the ureter. This, too, is the most probable cause of the dull aching pain, of which the patients so frequently complain. But another factor in the production of this symptom is traction on the renal nerves, which is bound to occur in consequence of the elongation of the renal pedicle, so frequently met with in these cases.

Urinary symptoms are not, as a rule, very marked in the chronic cases. We have, however, noted increased frequency of micturition in a fair number of instances. This is usually most marked when pain is present. Very rarely a patient may complain that during the acts of micturition or defæcation a sensation is experienced of a lump being " forced " down into the pelvis. With this micturition may be temporarily arrested. It is highly improbable that the kidney ever actually descends into the pelvis, the sensation being presumably entirely subjective in nature.

Gastro-intestinal symptoms occur very constantly. Of these, constipation has been frequently referred to, and needs no further remark. With regard to the stomach, in the less severe cases one frequently meets with simple dyspepsia, instanced by pain after food, flatulence, and loss of appetite. But more serious disturbance than this occasionally occurs, notably dilatation of the stomach, which may be so pronounced as to indicate the possibility of pyloric cancer, an opinion to which the emaciation of the patient, obvious dilatation of the stomach, and characteristic vomiting, lend

much support. A fatal issue in a case of this kind has been recorded. Happily such extreme instances are rare indeed.

It is common knowledge that neurasthenia, in varying degrees, is frequently associated with movable kidney. The tendency of late has been rather too much inclined to the view that the complaints which the patient makes about the kidney are simply part of this neurotic condition. As a result, in many cases the fact that the patient has a movable kidney has been dismissed as trivial, and of no possible importance in the production of symptoms. This is surely a mistake. In many instances, the constant pain, slight though it may be, has in time produced the neurasthenia, and it is only to be expected that it should do so. Given a constant pain or ache, continued for a sufficient length of time, and who would not become more or less neurasthenic ? If, in addition, the patient is one of a neuropathic stock, the result is sooner reached, and assumes more formidable aspects. Then it is that the pains complained of become generalized, and innumerable. When such an occurrence has taken place, operative interference must be undertaken only with great caution. But, as we point out elsewhere, the mere fact of neurasthenia existing does not necessarily contraindicate operation. The type of individual must, however, be carefully considered, and, in the class of cases just referred to, palliative measures, such as a rest cure, followed by the use of a belt, are, as a rule, preferable to operative interference.

Sometimes patients, the subjects of movable kidney, experience slight attacks of jaundice, and although this is never at all intense, the diagnosis of biliary obstruction, due to gall stones, or cholecystitis, has occasionally been made.

Although extremely rare, only one or two instances being on record, we must mention the occurrence of œdema of the leg, which may be caused by pressure of the kidney on the common iliac vein,* and of the still rarer occurrence of thrombosis of the inferior vena cava.†

* Landau.

† *Journal hebdomadaire de progrès des Sciences médicales*, 1836, iv.

CHAPTER VI

DIAGNOSIS

When examined during the quiescent period, of the commoner swellings for which a movable kidney may be mistaken, we might mention as the most frequent :—

(i.) An extra lobe or linguiform process of the liver on the right side (Riedel's lobe) ;

(ii.) A distended gall-bladder (hydrops) ;

(iii.) Carcinoma of the pylorus ;

(iv.) A fæcal mast in the colon.

There are four objective signs usually given as characteristic of a renal swelling :—

(i.) The presence of a tumour in the loin ;

(ii.) The swelling can be grasped between the hands on bimanual examination, and can be pressed back on to the supporting hand placed behind the loin ;

(iii.) Resonance on percussion ;

(iv.) Movement on respiration.

Of these signs, the latter two are frequently absent in a swelling affecting the left kidney. In the case of a freely movable or floating kidney, one or all may be absent.

A kidney, floating in the umbilical region immediately beneath the abdominal wall, does not move on respiration, is dull on percussion, and may be returned into the renal fossa of its own side only with difficulty, or, perhaps, not at all.

Its identification usually depends upon the recognition of its characteristic form and shape, the fact of its exceedingly free mobility, and, should it slip back into the loin during

palpation, the very characteristic sensation which it imparts to the examining fingers. In spite of this, however, it is quite easy to mistake a floating kidney of the right side, in a patient with rigid abdominal muscles, and associated with marked gastric symptoms, for a localized movable growth of the pylorus.

We, ourselves, have seen two cases in women, between the ages of 35 to 45 years, in both of which there was a six months' history of rapidly increasing epigastric pain and vomiting after food, associated with pronounced wasting, and an ill-defined movable lump in the abdomen, lying somewhat below and to the left of the right paracentral point. In each case, an exploratory laparotomy was performed, and showed the right kidney floating with its hilum directed upwards in the position of the supposed growth.

With regard to a Riedel's lobe, or a distended gall-bladder, matters are rendered rather more difficult by the fact that the former is often associated with a right movable kidney.

A Riedel's lobe gives dullness directly continuous with the hepatic dullness, has a lower sharp margin, and its superficial position, taken in conjunction with its free respiratory excursion, usually serves to distinguish it from a floating kidney. The latter, when lying immediately beneath the anterior abdominal wall, unless actually adherent to the inferior surface of the liver, an unusual occurrence, shows no change of position, even on deep inspiration.

Rovsing, of Copenhagen, has recorded an interesting case (see p. 48), in which a large hard tumour in the right renal region, associated with marked wasting, and attacks of renal hæmaturia on exertion, was diagnosed as a malignant tumour of the right kidney. A right lumbar incision showed a much displaced right kidney, which was adherent to the inferior surface of the right lobe of the liver, and the tumour felt consisted of the liver plus kidney.

A distended gall-bladder, which can be pressed backwards into the loin, is more likely to give rise to an error in diagnosis. A gall-bladder, however, which has attained sufficient

size to give this sign would be mistaken for a hydronephrotic movable kidney, and careful consideration of the symptoms, combined with the fact that there is no band of resonance between the tumour and the liver, ought to be sufficient to direct the attention to the gall-bladder in most instances. It must be remembered that, in obstruction of the cystic duct alone, jaundice is absent, and that the jaundice of movable kidney, coming on after an acute attack of pain, is of so slight and transient a nature, that, taken in conjunction with more definite urinary symptoms, it will allow, as a rule, a correct interpretation of the case to be made.

A case seen by one of us some years ago presented several interesting points in diagnosis :—

A middle-aged woman gave the history that for the previous twelve months she had suffered from repeated acute attacks of abdominal pain and vomiting. The attacks were usually brought on by some form of undue exertion, and occurred as frequently as once every two or three weeks. During the intervals, the patient was quite free from pain except for slight lumbar aching. The urine contained a trace of albumen, but no casts, and there was slightly increased frequency of micturition, most marked in the daytime, when the patient was up and about. Immediately above the umbilicus was a slightly tender, fixed, abdominal swelling of reniform shape.

The question of a floating kidney which had contracted adhesions was discussed, but an abdominal exploration showed an even more unusual condition. A peptic ulcer, situated on the anterior surface of the stomach, had leaked, and resulted in the formation of a small pocket of pus, which had been completely shut off by a mass of indurated omentum and adhesions, forming the swelling mistaken for the kidney. Occasional traction from time to time on these adhesions had no doubt produced the sudden attacks of pain and vomiting.

The following case came under our observation in the early part of December, 1907. Her symptoms were a curious admixture of those characteristic of a gastric ulcer, and

those of a movable kidney with marked gastro-intestinal disturbances.

Case.—H. T., an unmarried woman, æt. 26, gave a history of some two years' duration. During the first year of this period she had suffered from dull aching pain across the upper abdominal zone, and low down in the lumbar region behind. The pain came on from half an hour to two hours after food. It was relieved by vomiting. The sickness occurred sometimes during the course of a meal, but more frequently from ten to forty minutes afterwards. She had never brought up any blood.

She stated that occasionally she had been free from pain for periods of one week or more, but that if she was tired or was exposed to any extra exertion, such as lifting a heavy weight, in a short time this was always followed by pain, with marked abdominal distension.

For the last year she had been subject to sudden attacks of more acute pain, which she described as shooting through the right loin. After several of these paroxysms she had noticed that she had passed an unusually large quantity—1 pint or more—of urine at one time.

The patient's right kidney was lying with its hilum directed upwards and its long axis almost horizontal, and was, in addition, so freely movable that it could be manipulated all over the right side of the abdomen with ease. As medicinal and general hygienic treatment directed towards the stomach afforded no relief of symptoms, a nephrorrhaphy was performed. So far—one month after operation—the result of this procedure has been excellent, but the case is, of course, much too recent to be of any value from this point of view.

Diagnosis in the Acute Stage.

If the patient is seen within an hour or an hour and a half of the onset of the attack, when the abdominal walls are lax and soft, there is little difficulty in identifying the condition as being of renal origin. In the loin an enlarged exceedingly tender kidney, palpation of which may produce

nausea or actual vomiting, can be felt, and this, taken in conjunction with the characteristic renal pain, and perhaps intense frequency of micturition and strangury, will in most instances point to the true nature of the case. The greatest difficulty will arise in the diagnosis from a commoner condition—namely, ureteric colic due to a renal calculus ; and, with regard to this, Newman has pointed out the important significance of blood tube-casts in the urine. The presence of these casts, which will only be found as the attack subsides, points to a lesion in the renal parenchyma from an obstructed renal vein rather than to hæmorrhage from a loose stone in the pelvis of the kidney.

Further, if the patient was known to have a movable kidney previous to the attack under consideration, this would certainly assist in the diagnosis, although, as we have already pointed out, stone formation may occur in a movable kidney.

During the subsequent quiescent period, careful skiagraphy of the renal regions would demonstrate the absence of stone, and this examination can be further supplemented by a screen examination of the kidney at the time of operation. If at this time any uncertainty arises, it is safer to lay the kidney open along its convex border, or by an incision into its pelvis, and thoroughly explore by inserting the finger. A stone impacted in the ureter can be excluded by passing a bougie down it into the bladder.

If the patient is first seen a few hours after the onset of the attack, the diagnosis may be much more difficult. At this time there is frequently either a local or a general condition of tympanites. The abdomen moves poorly, is uniformly distended and tender, feels rigid, and the condition of affairs closely resembles that seen in a commencing general peritonitis due to some perforation of the gut. Perhaps a ruptured or leaking duodenal ulcer simulates the condition most closely. But, in " renal dislocation," there is usually slight pyrexia, the temperature often rising to 100·5° or 101° F., whilst, in ruptured gut, the patient is in a condition of profound shock showing a subnormal temperature.

As the attack of renal distension passes off, usually within four to twenty-four hours, although it may last for several days, the abdominal muscles relax, and an abnormally movable kidney will be felt, curiously enough becoming in a short time hardly at all tender on palpation.

Acute intestinal obstruction may be also simulated, but here again the marked vesical symptoms will usually indicate that the true site of the lesion is in some part of the urinary tract.

We have seen several cases, with well-marked movable kidney on the right side, showing the scars of previous appendicectomy operations, which had in no way relieved the patient.

Perhaps the most charitable view to take of such cases would be to adopt Edebohl's assumption of the close relationship which he supposes to exist between mobility of the kidneys and appendicitis.

CHAPTER VII

TREATMENT

THERE are undoubtedly a large number of cases of movable kidney, which never give rise to any symptoms. The condition is often discovered in the course of a routine examination, when nothing has occurred to direct any special attention to the organ. Such cases require no treatment, and the prudent man will keep his discovery to himself. For if a patient once suspects there is "something wrong" inside the abdomen, the knowledge may lead to a whole host of aches and pains, which the patient will be sure to put to the credit of the kidney, and which in other circumstances would have passed unnoticed, or been dismissed as trivial.

But apart from the effect on the patient, which the knowledge of a movable kidney may produce, the physician himself must beware lest he attributes any rather obscure symptoms to the one tangible sign, which he may have been able to establish. Landau draws attention to this point, and his words are worth quoting :—

"Pleased with his discovery," he says, "the physician may impute all subsequent symptoms to the movable kidney."

However, in a large number of cases, treatment is imperatively called for, and the question arises as to whether palliative measures will suffice, or whether the more radical surgical treatment should be adopted. With regard to the operation of renal fixation, much has been written during the last few years. The symptoms, for which such treatment

has been advised, have been so numerous, that it has become the fashion, among a certain proportion of the medical profession, to decry all surgical interference in cases of movable kidney. Such an expression of opinion is but the natural sequence to, and a reaction against, the mass of indiscriminate writing with which the literature of the subject teems. So far as one can judge, a certain number of surgeons seem to have regarded the operation of nephrorrhaphy as a panacea for the majority of those minor ills to which all flesh is heir, and it is only fair to state that they have been encouraged in this view by certain of their medical colleagues. In a recent monograph on the subject, the writer attributes almost anything from insanity to appendicitis to the malign effect of a movable kidney.

We are convinced not only of the desirability, but also of the necessity, of operative interference in a certain class of case. The cases for operation, however, require careful selection, otherwise disappointment will occur to both patient and surgeon alike.

No one can afford to disregard the gradual impairment and eventual loss of function, which have been clearly demonstrated, in an organ of such vital importance as the kidney. The operation itself is associated with a minutely small death-rate, and the complications following operation by a skilled surgeon are few. We quite recognize that a low mortality is no logical reason for recommending operation, but we are of the opinion that the results obtained by nephrorrhaphy compare very favourably with those resulting from the radical cure of hernia, a condition which may not inappropriately be compared with that of movable kidney.

On the other hand, so long as dyspepsia, vague feelings of epigastric and lumbar pain, and constipation, occurring in a patient in whom the lower pole of the right kidney is palpable on inspiration, are regarded as sufficient grounds for the performance of nephropexy, so long will failure and discredit fall upon the operation.

According to Treves, the majority of cases which show

symptoms undoubtedly caused by movable kidney do not require operation. One class of case, however—namely, that associated with Dietl's crises, should, in his opinion, be treated surgically. We would extend the limit of operation cases somewhat beyond this rather confined margin. In our opinion, the cases in which operation is advisable may be divided into four classes :—

1. All cases showing acute exacerbations of anterior renal pain, often accompanied by vomiting and occasionally by hæmaturia.

2. Cases showing evidence of pathological changes in the kidney, such changes usually being—

(*a*) Hydronephrosis (this is usually a sequel to Class 1) ;

(*b*) Albuminuria—often transient and coming on after some unusually severe exertion ;

(*c*) The presence of casts in the urine ;

(*d*) Occasional increased frequency of micturition, with or without polyuria.

Quite apart from the passage of an increased amount of urine, renal irritation often gives rise to increased frequency, which is so often erroneously looked upon as a purely vesical symptom.

3. Cases in which the kidney is mechanically causing changes in other viscera, *e.g.* :—

(*a*) Stomach or duodenum, as illustrated by gastric dilatation ; or

(*b*) Biliary passages. (These are, however, rarely affected.)

4. Cases of severe aching in the lumbar region, in which an efficient truss has failed to relieve the symptoms.

The following conditions, in our opinion, contraindicate operation :

1. Movable kidney associated with Glénard's disease.

2. Marked prolapse of the genital organs in the female.

3. A certain type of neurosis in the patient. As we have already stated, in considering the symptoms associated with movable kidney, the patient is often neurasthenic.

But this neurasthenic condition does not cause the kidney

to become unduly mobile, and certainly, in a considerable number of cases, the neurasthenia seems to be the result of the kidney condition. Accordingly, we do not regard the presence of neurasthenia as a contraindication to operation, provided that any of these conditions, which we think point to operative treatment, are present. The important point is to recognize the patient, usually of a neuropathic stock, who has all her life suffered from something or other. In such a one, the knowledge that she possesses a movable kidney has, in all probability, produced the overwhelming list of aches and pains, often tabulated on a sheet of paper, which she inflicts on all and sundry who may be compelled to listen to her. Operation on such a patient is doomed to failure. If there is no imperative indication for operation, or if the patient will not undergo such treatment, we must consider what means are available for alleviating her condition. In the first place, one must consider the type of patient with whom one has to deal. In a large majority of cases, the patient will be found to belong to a definite type. Often tall, thin, and with her vital energies depressed, she has probably been in the habit of overtaxing her strength, or, in popular language, "doing too much." She is tired out. To such a patient, the symptoms of her disease must often bear an exaggerated aspect, for her resistance to abnormal sensations, however slight, is lowered. In such a case, a thorough rest is clearly indicated, and, to make the rest a real one, the patient should, if possible, leave her home surroundings, and retire to bed for a month at least. At the same time, she should be fed liberally, and her bowels carefully regulated, with the object of increasing her weight and general nutrition, an end that may be materially assisted by a course of general massage. Whilst such treatment cannot fix an abnormally mobile kidney, it is certain to improve her general health and resistance materially, and, in almost all the cases, the aches and pains will have disappeared long before the "rest cure" is completed. However, the patient cannot remain under these conditions for an indefinite period, and, with the resumption of an active life, the symptoms may

return, perhaps in small degree at first, but tending to become more accentuated as time goes on. What can be done to prevent this ? If the kidney is not to be fixed by operation, some effort must be made to keep it in its position by a mechanical contrivance. The majority of belts and trusses designed for this purpose are admittedly unsatisfactory. There is, however, one notable exception to this. The apparatus to which we refer is one which has been evolved,

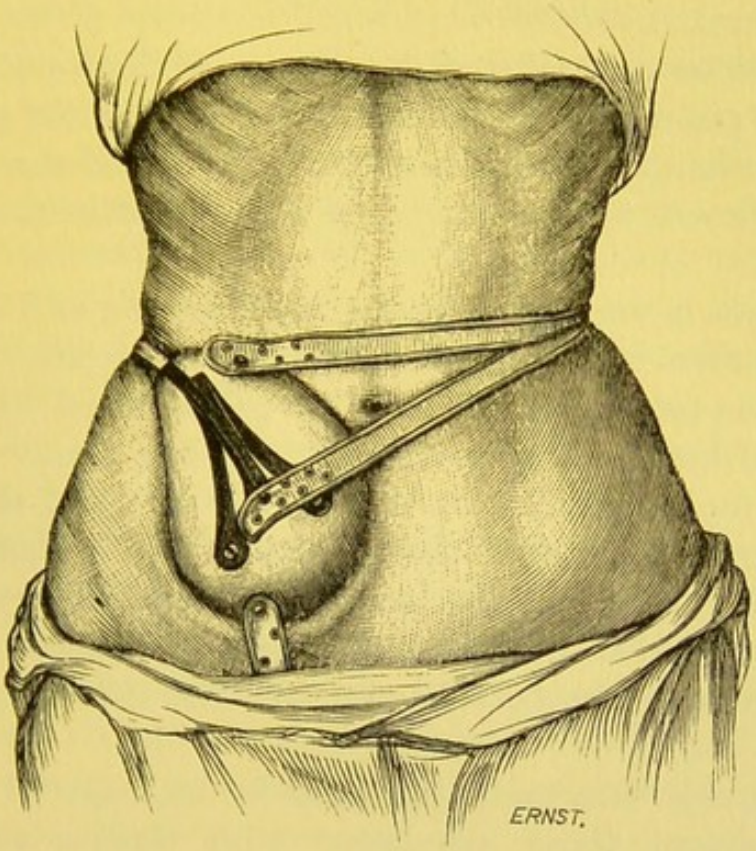


Fig. 7.

after many trials, by Mr. F. Gustav Ernst. This instrument, which is illustrated in the accompanying woodcut, has proved very satisfactory. Its advantages are that it combines efficiency with lightness (weight 6 ounces), and is therefore not objected to by the patient, as are some of the more cumbersome appliances which have been recommended. This truss attains its object by means of two springs, a main and lever spring. The former, which exerts a direct backward pressure, is attached to a centre pressure plate, taking

its bearings in the lumbar region, carefully avoiding all pressure on the spinous processes of the vertebræ. This spring passes some little distance above the crest of the ilium, and dips down the abdomen well below the limit of the movement of the kidney. To the distal end of this (the main) spring is fixed a lever spring, which is attached to the lower part of the kidney plate, giving a direct upward and outward lift. The apparatus is attached by a small body and under-strap, and does not show in the dress or make any alteration in the figure.

It must be remembered that many of these patients are thin, and are extremely intolerant of any points of pressure ; they therefore require most careful fitting, and must be prepared to devote several sittings to the accomplishment of this object.

The truss is only worn during the daytime, and is applied by the patient herself before rising in the morning. She lies in the recumbent position, with her pelvis raised on a pillow, and then, having gripped the affected loin firmly with the hand of the same side, the thumb in front and the fingers behind to assure herself that the kidney is in position, she applies the truss. If she has not got the kidney into its proper position before the instrument is applied, she is at once warned of the fact by the pain and discomfort which ensue.

Treves, who has used this truss for all cases of movable kidney except those associated with torsion symptoms, speaks most highly of its utility. He states that, in 95 per cent. of the cases in which it has been employed, it has proved successful. He also states that, in a large proportion of cases, the truss may be given up after eighteen months to two years.

Champneys also testifies to its efficacy in certain cases, and finds it most useful in patients suffering from some pelvic lesion, such as prolapsus uteri, for whom nephrorrhaphy is so often unsatisfactory.

Perhaps a very accurately fitting abdominal belt, stiffened with whalebone, is more suitable for patients with very lax

abdominal walls and marked enteroptosis. It should be fixed on to the corsets above, and carried well down over the iliac crests below to prevent it from slipping upwards.

Treatment during the Acute Stage.

During the paroxysm or crisis, the pain is of so severe a nature, and the shock often so pronounced, that the patient will of necessity assume a position of recumbency.

The pain must be relieved by the application of hot flannels to the affected loin, combined with a hypodermic injection of morphia if necessary ; a purge may be administered, and the tympanites treated by the injection of hot turpentine enemata. This will make the patient very much more comfortable, and, in the majority of cases, under this simple treatment, the attack will pass off in from four to five hours. Bruce Clarke (*Trans. Chir. Soc.*, 1902) has, however, pointed out that the kidney may remain permanently displaced, and complete atrophy ensue.

Occasionally it has been noticed that mere bimanual examination of the loin has resulted in the kidney slipping back into the renal fossa, and a complete subsidence of all symptoms quickly followed. The organ, however, is as a rule so tender, that direct manipulation with this object in view is greatly resented by the patient, or rendered impossible by the pain to which it gives rise.

We think that, in such cases, an anæsthetic should be administered ; and the relaxation of the abdominal muscles so produced, combined with a little bimanual manipulation, will often, in some way, alter the relations of the kidney, and allow it to slip from between the hands back into its proper position in the loin. This purpose is better accomplished by placing the patient in the Trendelenburg position.

In any case, it is a method certainly worth trying, as the acute distension of the renal pelvis with urine, and the extravasation of blood into the parenchyma of the organ, must produce permanent ill effects if allowed to continue for any length of time.

If the methods indicated do not prove successful, and the symptoms remain unabated after a period of five or six hours has elapsed, we think that the question of immediate lumbar exploration must be given careful consideration, and, if decided upon, that this should be combined with nephrorrhaphy, although the engorged state of the kidney would render proper renal fixation a somewhat more difficult matter at this stage.

The subcapsular hæmorrhages, occasionally seen during operation in an acute case, render abundant evidence of the severity of the local condition, and an explanation of the intense pain caused by the great intra-capsular pressure.

CHAPTER VIII

NEPHRORRHAPHY

Nephrorrhaphy.—If, from a careful consideration of the points mentioned above, an operation has been decided upon, there are two objects which must be attained in order to secure a successful result :—

(*a*) Replacement of the kidney in a suitable position in the loin ;

(*b*) Efficient fixation in that position.

No part of the right kidney, which in the great majority of cases is the organ affected, normally lies above the level of the twelfth rib, as we have pointed out in the anatomical section. The latter merely passes downwards and outwards in relation to the upper pole and superior part of the convex border of the kidney. Therefore, in ordinary circumstances, the gland must be fixed at this level.

If it is placed too high up in the hypochondrium, it will soon be pressed downwards and loosened by the liver ; and, on the other hand, if it is fixed too low, the pressure of the corsets at the waist line will be above the greatest antero-posterior diameter of the kidney, and will not only cause pain by direct pressure, but will quickly force down the kidney and loosen it from its artificial attachments.

But although we have given the level at which the kidney usually lies, this is a point which is subject to great variation in different individuals, and every case must, therefore, be judged on its own merits at the time of operation.

If the liver is slightly enlarged and prolapsed, it is useless to attempt to force the kidney up to what may be regarded as

its normal level, because no amount of suturing will fix it there permanently. Again, if the kidney itself is enlarged, the same objection will hold good. It must be placed as high as the space in the lateral vertebral recess at the disposal of the surgeon will allow, care being taken that no tension on the renal pedicle is produced, or considerable pain for several months after operation will ensue. It must also be remembered that the hilum of the kidney is directed considerably forwards as well as inwards, and therefore that the posterior renal surface must not be placed quite flatly on the posterior abdominal parietes, the area of fixation being situated on the outer part of the posterior surface, and the posterior portion of the rounded convex border of the kidney.

Although large numbers of operations for the radical cure of movable kidney have been proposed and practised, they differ not so much in principle as in the details of technique, and may all be placed in one of two great classes :—

(A) Those seeking to fix the kidney by the production of a process of granulation and suppuration, which results in the formation of much perinephric scarring and cicatrization ;

(B) Fixation by suture—

(i.) Simple suture.

(ii.) Partial decapsulation of the kidney in addition to suture.

The former method is usually accomplished by slinging the kidney more or less into position by means of large gauze bands (Senn's operation). In one method it is proposed to paint the tunica propria with acid carbol. liquefact. in addition (Carwardine's operation).

The gauze bands are removed at the end of three weeks, and the patient is kept in the recumbent position for about one month in all.

That anyone can knowingly produce suppuration in the loose fascial planes around such an important organ as the kidney is almost incredible in these days of modern aseptic surgery. One would have thought that methods of this description would long ago have been relegated to the present

position of such barbarous procedures as the injection methods for the radical cure of recurrent hydrocele.

In the operation of simple suture, the kidney having been exposed from the loin, three or more sutures are passed through its posterior surface without reflection of the capsule. Each suture is buried for a length of about ¾ inch within the kidney substance, and penetrates about ½ inch into the thickness of the organ. These sutures are passed through the cut edges of the deeper layer of muscles (internal oblique and transversalis), and tied sufficiently tightly to ensure firm apposition of the renal surface and the posterior abdominal wall.

Various suturing materials are used, and of these kangaroo tendon, silk, chromicized catgut, and the patient's own tendons may be mentioned. Kangaroo tendon possesses many advantages, and proves the most satisfactory in actual practice, lasting as it does for two or three years, or even longer, and producing little if any irritation of the surrounding tissues. Silk, although its simple and easy sterilization by boiling is a great advantage, is not suitable for passing deeply into the renal parenchyma.

Unless fairly thick strands (size No. 2 or 3) are used, there is a great tendency for them to cut through the renal parenchyma as the sutures are tightened. Indeed, in some unusually friable kidneys, probably in the earlier stages of patchy interstitial nephritis, no hold at all, even with catgut, can be obtained with deep sutures.

Moreover, the employment of silk sutures in this way is frequently followed by deep suppuration.

Troublesome sinuses are common complications of this accident, and these are extremely difficult to close. In some cases, it is necessary to reopen the wound, and remove the infected sutures at a later date. The kidney is found surrounded by dense fibrous tissue, shows much scarring and puckering of its surface, and is usually firmly anchored in position. The sutures themselves are often embedded in the renal substance, and impregnated with lime salts.

The suppuration often comes on about the fifth or sixth

day, is usually a staphylococcic infection, and is characterized by much lumbar pain, and a slow gradual rise of temperature and pulse-rate, with bulging of the affected loin. Sometimes the wound, which has healed originally by first intention, may break open again many months after the initial procedure, and a sinus persist until the offending ligature is discharged.

If silk is used, it is perhaps a better plan to pass it through all the layers of the lumbar *parietes*, and to bring it out through the margins of the skin incision. It can then be removed in about ten to fourteen days, but, in our experience, suture for this period of time only is certainly not sufficient, the adhesions formed not being strong enough at this date to resist any sudden strain or movement of the patient without the additional support of the sutures.

Chromicized catgut, although in other ways very satisfactory, is not resistant enough for this purpose.

Vulliet, of Geneva, used tendons of the erector spinæ freed at one extremity through a second lumbar incision. This method lengthens the time of operation, is somewhat complicated in its performance, causes unnecessary bruising of the tissues, and possesses no manifest advantages over the use of kangaroo tendon.

In the second variety of the suturing method, in which partial decapsulation is employed in addition, the essential part of the procedure is the placing of a bared area of renal cortex of variable extent in direct contact with the fasciæ and muscles of the posterior abdominal wall, and the fixing of the kidney in that position by some form of suturing, until such time as firm adhesion has had time to result.

The sutures may be passed through the capsule of the kidney only, or may include a small piece of the renal cortex.

Arbuthnot Lane divides the reflected capsule into a number of small ribbons, to each of which a ligature is tied, and the latter are then passed through the deeper muscular layers of the incision and secured.

Fullerton has described a more complicated method, in which a flap of the tunica propria is thrown upwards, passed

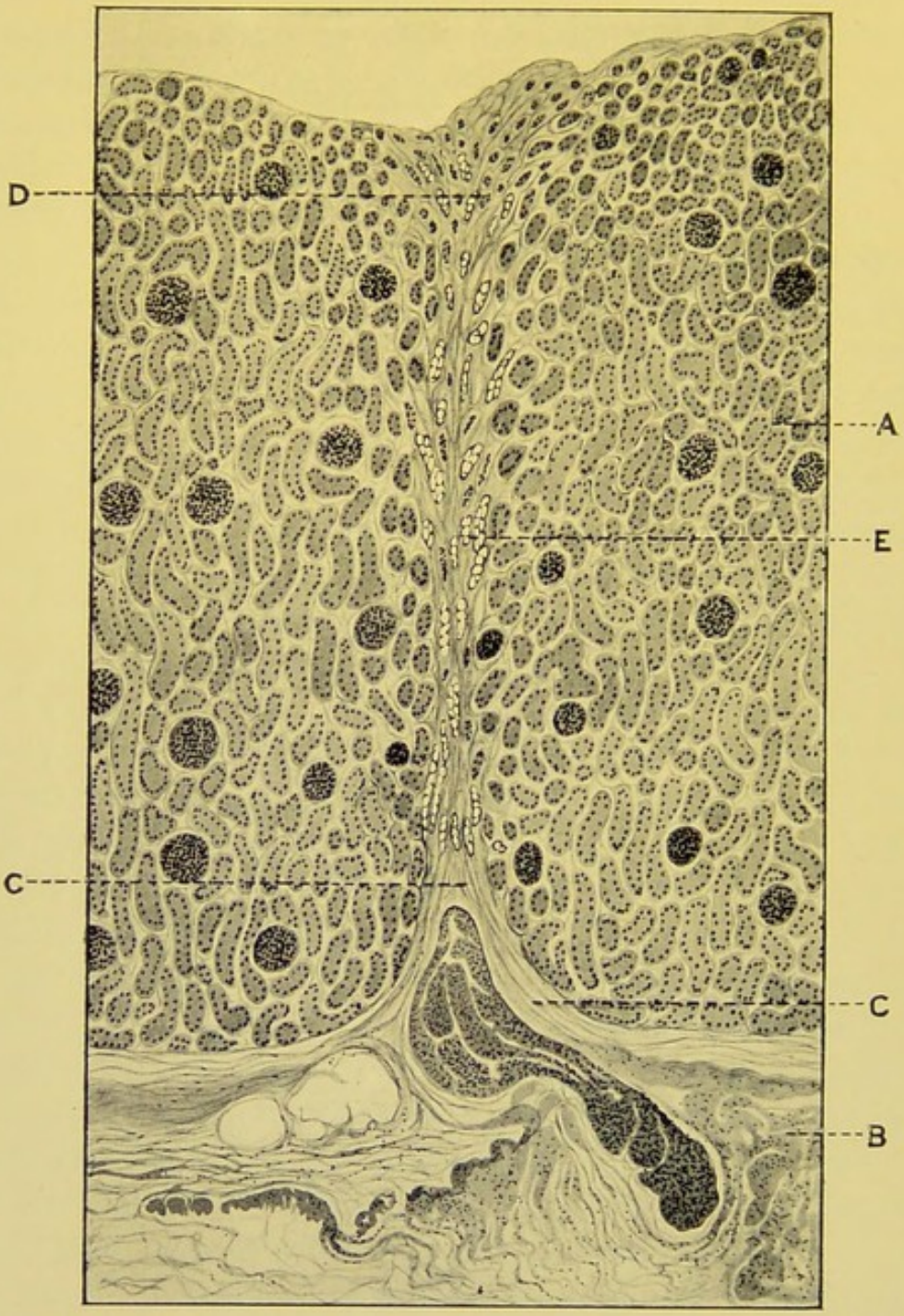


FIG. 8.—SEMI-DIAGRAMMATIC DRAWING OF SECTION TO SHOW IMPERFECT FIXATION OF CAT'S KIDNEY SIX WEEKS AFTER OPERATION OF SIMPLE SUTURE.

A, Renal cortex; B, lumbar parietes; C, spike of fibrous tissue; D, fan-shaped expansion of fibrous tissue; E, clear spaces representing position of degenerated tubules.

over the external arcuate ligament, and fixed, additional sutures uniting the capsule at the margins of the denuded surface to the lumbar fascia laterally.

We would agree with Goelet in condemning the use of suspension sutures, passed either through the periosteum of or actually round the last rib. There is always an appreciable risk of wounding the lower margin of the pleural sac by their use, or even of including the subcostal nerve in their grasp, and by them one attains nothing that cannot be secured by simpler and safer methods.

The kidney will be firmly fixed by newly formed adhesions, and, if the latter are not present, no number of suspension sutures will take their place. The argument usually brought forward in their favour is that their use renders a higher position of the kidney possible, but this we entirely fail to see.

We have compared the results of these two methods by operations done upon cats, and careful post-mortem examinations made at intervals of one to sixteen weeks after operation. In these subjects, there was no doubt that the partial decapsulation method was far superior to that of simple suture, nor do we think that any greater degree of permanent damage was done to the affected kidney by the former operation.

In the simple method, three silk sutures (size No. 1) were passed deeply through the renal cortex : one at the junction of the upper with the second quarter, one through the centre, and one through the junction of the upper three-quarters with the lowest quarter of the posterior surface of the kidney. All intervening fat having been removed as completely as possible, each end of the sutures was passed through the internal oblique and transversalis muscles of its corresponding side of the incision, a short distance from their cut margins. This deeper layer of muscles was then brought together by fine silk (size 00), and, when this had been done, the deep kidney sutures were tied, and the superficial layers of the wound closed by interrupted sutures in the ordinary manner.

Fair macroscopic union was obtained in about six weeks, but, on cutting sections of the affected kidneys and their attached muscles, it was seen that adhesions had resulted only at the sites of suture, and that the intervening portions of renal surface, lying in direct contact with muscle and fascia, showed no signs of fibrous adhesion or granulation tissue. At the points of suture, bands of well-formed fibrous tissue were found penetrating deeply into the renal cortex and intermediate zone of the kidney. At first narrow and well defined, these bands, as they were traced inwards, were found to spread out into somewhat fan-shaped expansions, and as the point at which the silk sutures actually pierced the renal tissues was reached, a certain amount of small, round-celled infiltration became evident.

Within this zone of fibrous tissue could be seen the remains of the crushed urinary tubules, the epithelium either completely shed or remaining in various stages of degeneration, and here and there rounded spaces alone representing the previous position of tubules. The portion of renal tissue so destroyed formed only a minute fraction of the whole, and, in the main, the change appeared to be a purely local one, as, with the exception of the terminal fan-shaped expansion, there was apparently little or no tendency for the fibrous tissue to spread out into the surrounding renal substance.

Sound union therefore took place at only three points, and one can readily understand how these bars of fibrous tissue would stretch, if any constant strain were thrown upon them.

In the decapsulation series, the greater part of the posterior renal aspect was bared by an "I"-shaped incision through the tunica propria. The two lateral flaps so formed were reflected laterally, and, all intervening fat having been removed, the kidney was fixed to the posterior abdominal wall by eight fine silk sutures (size 00).

These sutures picked up the capsule of the kidney only, and were arranged laterally, four on each side. Both ends of each lateral suture were passed through the cut internal

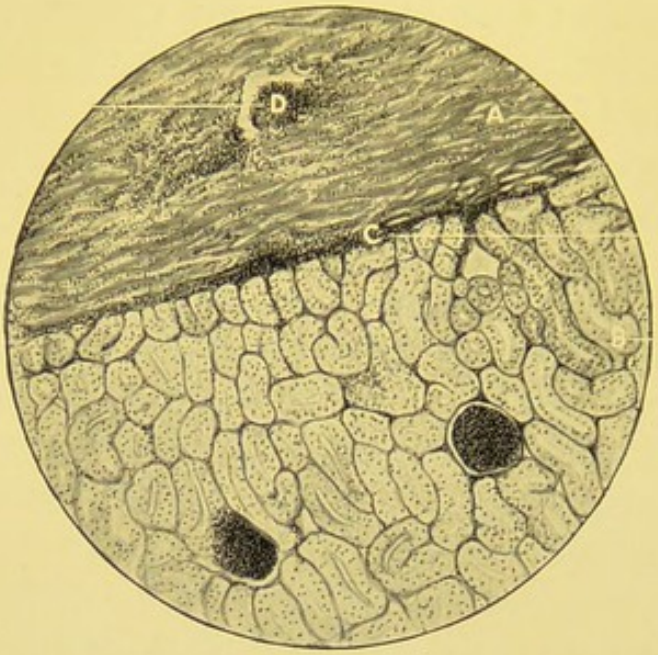


FIG. 9.*—DRAWING OF MICROSCOPIC SECTION TO ILLUSTRATE FIRM FIXATION OF A CAT'S KIDNEY SIX WEEKS AFTER THE OPERATION OF PARTIAL DECAPSULATION AND SUTURE. (ZEISS $\frac{1}{6}$ INCH. HÆMALUM AND EOSIN.)

A, Lumbar parietes; B, renal cortex; C, round-celled infiltration; D, clump of round cells in neighbourhood of silk suture.

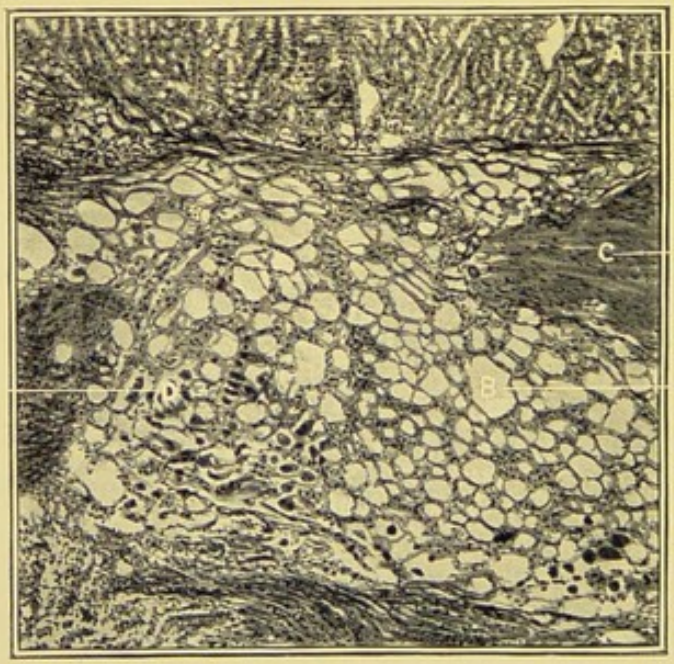


FIG. 10.*—DRAWING OF MICROSCOPIC SECTION TO SHOW FAILURE OF FIXATION DUE TO IMPERFECT RESECTION OF CAPSULA ADIPOSA. CAT'S KIDNEY SIX WEEKS AFTER OPERATION. (MAGNIFICATION $\frac{2}{3}$ INCH. STAINED BY PAPPENHEIM'S METHOD.)

A, Renal cortex; B, capsula adiposa; C, lumbar parietes; D, giant cells.

* We are indebted to the *Practitioner* for the use of these blocks.

oblique and transversalis muscles of their own side at some distance from the free margin, and the incision in these muscles closed by fine interrupted silk before the kidney sutures were tightened, the two ends of each ligature being tied together. Within a period of three to six weeks, this method resulted in extremely satisfactory macroscopic and microscopic union.

Sections through the kidney and attached layer of muscle showed that a new thick capsule of dense fibrous tissue had been formed. From this newly formed capsule of young fibrous tissue, small round cells could be traced downwards into the renal cortex for a depth of four to eight layers of tubules. In places, where the sutures had accidentally included small portions of renal cortex within their grasp, the invasion was considerably deeper, but in no place had the renal destruction been so complete as in the former method. The renal epithelium was extremely vacuolated in these situations, but there were no actual empty spaces.

Some of these sections showed extremely well the importance of the complete removal of all intervening fatty tissue. In some places where this had not been completely resected, no attempt at union was shown ; but, in others, a very weak result was obtained by invasion of the areolar meshwork of the fat with inflammatory small round cells, some giant cells, and young fibrous tissue.

With reference to the operation of partial decapsulation for some cases of acute nephritis with threatened suppression of urine, it is interesting to note that an imperfect collateral circulation, between the cortical vessels of the kidney and those of the lumbar parietes, was actually established in the decapsulation series of experiments. The renal artery of a cat, the corresponding kidney of which had been partially decapsulated and fixed two months previously, was injected at low pressure with carmine gelatine. Microscopic sections of the affected region showed a fair number of the capillary vessels in the lumbar tissues filled with the injection.

Comparing the results of the two operations, we can confidently assert that that of decapsulation secures by far the

more efficient fixation, and that, although it causes degenerative changes in a slightly larger area of renal tissue, these changes do not appear to progress to the extreme degree seen in the simple method. There is no evidence, clinical or experimental, that the renal changes produced by decapsulation nephrorrhaphy pass onwards into a generalized chronic interstitial nephritis.

We describe, in some detail below, the operation which we regard as giving the most satisfactory results, although we do not claim for this, or any other operation, infallibility in the human subject.

In this, as in other surgical procedures on the kidney, much abdominal pain and discomfort often result in the succeeding forty-eight hours from tympanites, but this can be lessened by careful preparation of the patient's bowels beforehand, as if for abdominal section. Moreover, a distended ascending colon often bulges into the lumbar wound during the course of the operation, and, besides increasing the risk of wounding the peritoneum, also prevents a clear view of the renal pedicle being obtained, and it may be found necessary to pack it out of the way. For this purpose, a small Cripps's abdominal pad will be found most useful, as it takes up so much less room than the ordinary flat sponge, which at the best is a very cumbersome thing.

It is usually sufficient to give ol. ricini ʒvi. on the two evenings prior to the day of operation, and one or more enemata on the actual morning. In addition, small doses of strychnia by the mouth, during the preceding few days, may be found useful. Chloroform is the most satisfactory anæsthetic to employ, because, by securing greater relaxation of the abdominal muscles, it enables the assistant to apply more efficient pressure from the front, whilst bringing the kidney into the wound.

The patient lies upon the sound side in the semi-prone position, with a sand-bag under the loin so as to open up the interval between the last rib and the crest of the ilium on the affected side. This space in some patients may be

extremely limited. The incision, which should be 4 or more inches in length, depending on the fatness of the patient, commences above in the posterior renal angle at the outer border of the erector spinæ, and passes downwards and slightly outwards towards the crest of the ilium. The upper angle of the incision should be about ½ inch below the lower margin of the last rib. As the twelfth rib is not infrequently rudimentary, and is occasionally absent, it is safer to count the ribs from above downwards, and so to avoid the risk of opening the lower recess of the pleural sac. The incision should be carried through the almost vertically running fibres of the anterior margin of the latissimus dorsi and the posterior free border of the external oblique, until the transverse fibres of the lumbar origin of the internal oblique are exposed. Two lateral flaps are then made of all the tissues so far divided by a few lateral sweeps of the knife through the loose areolar tissue separating the muscular layers, until the surface of the internal oblique is bared for an extent of about ¾ to 1 inch on each side of the incision. The internal oblique and transversalis are then divided in the line of the original incision. It is not advisable to split the muscles in the direction of their fibres, as a satisfactory exposure cannot be obtained by this means, and the risk of a lumbar hernia, occurring in an aseptic case, is so small that, for practical purposes, it can be neglected. All bleeding-points are now picked up and ligatured with fine silk, and the deeper part of the wound sponged out, and exposed by the insertion of a pair of large retractors if necessary.

In these cases, in which a large amount of circum-renal fat is the exception, the post-renal fascia can be picked up with dissecting forceps and incised, and then the perinephric fat broken down with the finger until the postero-external surface of the kidney comes into view. If the kidney is very movable some difficulty may at first occur in localizing it, and firm, steady pressure from the front in an upward and backward direction by the assistant's clenched fist will greatly expedite matters. The kidney may have to be sought for quite low down in the iliac fossa.

Having found the kidney, it is wise, before proceeding further, to ligature and remove all fat that will be likely to intervene between the posterior aspect of the kidney in its new position and the lumbar parietes ; because not only will this prevent proper fixation, but also, having a very poor blood-supply, its vitality will be impaired by the tearing process, and in consequence the presence of these tags will favour the occurrence of suppuration. Owing to the lengthened renal pedicle, no difficulty, other than that occasioned by the free mobility of the organ, will be met with in bringing the kidney out on to the loin ; but, before doing this, some estimate of the space in the upper part of the vertebral recess at the disposal of the surgeon should be formed. The object to be attained is to place the kidney at its normal level in the loin, or, failing that, to fix it as high as space will allow.

The kidney must not be subjected to any downward hepatic pressure, nor any tension put upon the renal pedicle. If careful attention is not paid to these points, the operation will fail.

When the kidney has been brought out on to the loin, a careful examination of it should be made, and any aberrant artery likely to cause ureteric obstruction divided if thought necessary, or any other abnormal condition present rectified.

If any suspicion as to the presence of stone exists, the renal pelvis and calyces must be opened, and explored by the finger, either by an incision into the convex margin of the kidney, or by a direct opening made into the pelvis of the latter, should it be dilated.

An incision into the pelvis does not cause the loss of blood that a free incision into the renal parenchyma occasions, and allows of a more thorough exploration ; whilst, if it is sutured with fine chromicized catgut, it is not more likely to produce a urinary fistula.

The renal vessels of a kidney, which has originally occupied a position on the normal level, will be seen to pass inwards and upwards. If they are observed to run directly inwards,

this is good evidence that the renal artery arises from the aorta at a lower level than usual, and consequently the kidney must not be fixed so high as it otherwise would be.

The process of partial decapsulation is effected by an "I"-shaped incision through the tunica propria, the perpendicular portion of the "I" being situated well towards the outer part of the posterior surface of the kidney.

A sharp knife and a light touch are necessary for this procedure, otherwise the incision will be carried into the renal cortex, and a certain amount of unnecessary oozing will be the result. The two lateral flaps, so marked out, separate quite readily, and should be turned outwards and laid flat upon the surface of the kidney. The denuded area should have a long diameter not less than two-thirds of the long axis of the kidney, and its breadth should be about 2 inches or slightly less. The sutures of fine silk (size 0 or 1) should now be passed by means of a rounded intestinal needle ; eight, as a rule, are sufficient, and should be arranged as shown in the accompanying figure.

The three lateral sutures on each side take up, by means of an in-and-out movement of the needle, two layers of capsule, no portion of the renal cortex being included in their grasp.

The two polar sutures take up only one layer of the capsule, and are situated respectively immediately above and below the decapsulated area.

The kidney is now replaced in the renal recess, and the sutures are passed through the lumbar parietes, taking up the internal oblique and transversalis muscles only.

The polar sutures traverse both edges of the muscular layer, but the lateral sutures are passed ¾ to 1 inch away from the edge of the incision of their own side. Each end of a lateral suture is passed separately, so that, when the ends are tied together, the suture may include a sufficient piece of the muscular layer to ensure a firm grip. The object of passing these sutures at some distance from the free incisional margin is that they may exert a straight instead of an oblique pull, and may not tend to diminish

the breadth of the decapsulated area. None of these renal sutures are tied until the cut margins of the internal oblique and transversalis have been brought together by interrupted sutures of fine silk. When this has been done the

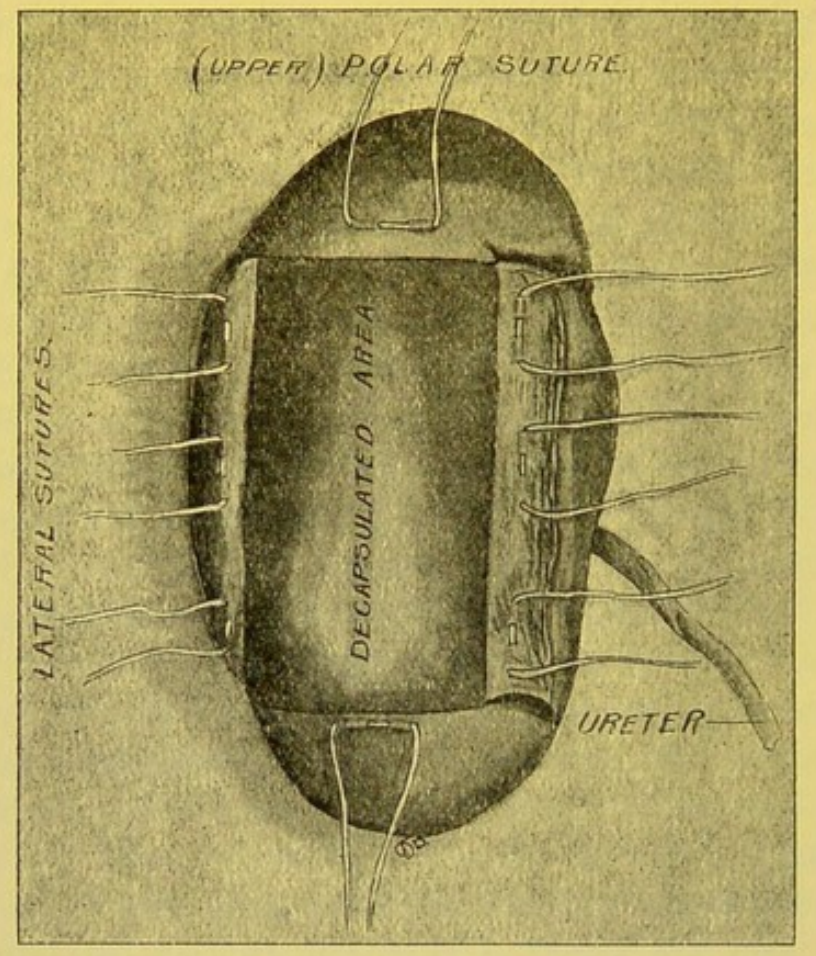


FIG. 11.—PARTIAL DECAPSULATION OF KIDNEY, SHOWING METHOD OF INSERTION OF SUTURES.

kidney is pressed firmly up into the loin from in front by the assistant's hand, and the renal sutures gradually tightened.

It is obvious that the final position of the kidney depends upon the relative level of the decapsulated area on the posterior renal surface, and the level at which the uppermost suture passes through the edges of the incision.

The normal position of the right kidney requires that the lower two-thirds of the kidney should be decapsulated, and that the upper polar suture should be passed through the upper angle of the incision.

The superficial muscular layer is approximated by another row of interrupted sutures of fine silk, and then the skin incision is closed by sutures of fishing gut. No drainage is necessary, unless the renal pelvis has been opened, when a rubber tube should be inserted. This can usually be safely removed in a few days, and the sinus allowed to close.

The patient should be kept in bed for at least three weeks after operation, should spend the succeeding three weeks on a couch, and be prepared to live a quiet life, avoiding all forms of active exercise, for the next three to six months. We feel convinced that some cases of nephrorrhaphy fail, because the patient is allowed to get up and about before the newly formed adhesions are sufficiently strong to hold the kidney.

Immediate Results of Operation.—The mortality of nephrorrhaphy is so small as to be almost negligible, and when a fatal case does occur it is due, as a rule, to some accident, such as embolism.

This cannot be regarded as an intrinsic effect of nephrorrhaphy, but rather as a result which may occur in the course of almost any surgical procedure.

Treves gives the mortality as not exceeding 1 per cent. Schède also places it at 1 per cent. ; Keen, 2·9 per cent. In a continuous series of ninety-eight cases of movable kidney, operated on in St. Bartholomew's Hospital during the years 1895-1905, there was no fatal case.

Ultimate Results of Operation.—Keen has recorded a series of 116 cases, at a period of not less than three months after nephrorrhaphy, and found that 57·8 per cent. were cured, 12·9 per cent. were improved, and 19·8 per cent. remained *in statu quo.*

P. Fiori, reviewing a series of thirty cases with regard to the relief of symptoms, found that such intrinsic renal conditions as albuminuria, hydronephrosis, etc., and vesical or biliary symptoms, were cured in 100 per cent. of his patients.

In the relief of pain and vague gastro-intestinal symptoms, he was apparently not nearly so successful.

In forming an opinion as to the result of nephrorrhaphy, two points must be investigated :—

(*a*) The relief of symptoms ;

(*b*) The efficient fixation or otherwise of the kidney.

The following statistics were compiled from a continuous series of sixty-three cases of nephrorrhaphy operated on in St. Bartholomew's Hospital, from the year 1899 to 1905.

Of these, it was found possible to follow out and personally examine forty-one, and the investigation was conducted upon the lines indicated above.

Failure to trace the others was due to the fact that almost all of them had changed their addresses in the interim, and, as is so common in hospital patients, had left no record of their subsequent movements.

One case only, so far as we could ascertain, had died, death being due to an intercurrent pulmonary affection, having no relation to the patient's renal trouble.

These patients were examined at periods varying from one to seven years after operation, and the results placed into one of four groups :—

(i.) Cured ;
(ii.) Greatly improved ;
(iii.) Improved ;
(iv.) *In statu quo.*

In no case was the patient worse than before the operation.

The present condition of the patients was most carefully compared with the symptoms complained of by them at the time of their previous admission into hospital, and no elastic interpretation was given to the word "cure." The word is used in its strictest sense, and any patient complaining of slight occasional neuralgic pain in the scar, or an aching pain or feeling of weakness in the loin after a hard day's work, was placed in the "greatly improved" class.

Of the cases operated on, and personally investigated (41 in all), 12 were cured, 8 greatly improved, 12 improved, and 9 remained *in statu quo*. So that approximately 30 per cent. were absolutely cured and 49 per cent. improved by the operation.

But on dividing these cases up into the two classes of acute and chronic, very striking results were obtained.

Of the "acute cases" (24), no less than 11 were cured, 5 greatly improved, 3 improved, and 5 were *in statu quo.*

This gives a percentage of 45 per cent. cured, and 33 per cent. improved. In all the latter cases, the symptom complained of was occasional dull aching pain in the posterior renal angle, and, in no instance, had there been a recrudescence of the acute symptoms.

Of the 5 cases *in statu quo*, in 3 the kidney was as freely movable as formerly, and in 1 a subsequent diagnosis of chronic gastric ulcer was confirmed at the operation of posterior gastro-jejunostomy.

So that, if this case of mistaken diagnosis is omitted, we have a right to expect that 55 per cent. of the acute cases will be cured by an efficient operation, and an additional 25 per cent. so improved that an occasional dull ache in the loin, occurring after prolonged exertion, will alone remain.

In the chronic cases, however, the results are unfortunately far from satisfactory.

Of a total of 17 cases, 1 only was cured, 3 greatly improved, 9 improved, and 4 remained *in statu quo.*

This gives a percentage of 6 completely cured, and 70 improved.

Of the cases *in statu quo*, in 1 the kidney was not fixed, and in 2 the pain was certainly pelvic in origin, but the failure in the fourth case remained totally unexplained.

It is a curious fact that in 5 cases, in which the affected kidney was as freely movable as formerly, the patients were certainly improved.

But in one of these, there had been no pain during the first year after operation, so that it is reasonable to suppose that the kidney had for a time been anchored, but had subsequently broken loose again.

It would seem as if this was but another example of how important a part suggestion, combined perhaps with

a skin incision, plays in the practice of medicine and surgery.

The following case is an example of the importance of not attributing failure to an operation, without a careful reinvestigation of the patient.

A young woman, æt. 26, was operated on in 1903 for a freely movable right kidney of the acute variety. For the first two and a half years after nephrorrhaphy, she remained perfectly free from all symptoms referable to her kidney, then once again she began to have lumbar pain.

When seen in 1907, she complained of typical post-renal aching on the left side, combined with occasional subacute pain in the umbilical region, usually accompanied by a feeling of epigastric distension and vomiting. On examination, the right kidney was found firmly anchored in position, but, in the middle line, immediately above the navel, a floating left kidney was found. The latter could be manipulated with ease into the right side of the abdomen. It was lying with its long axis transversely, and its hilum looking directly upwards.

A left nephropexy was performed, and when seen two months later, the patient expressed herself as being quite free from pain, and her former gastric disturbances.

The after complications of nephrorrhaphy are fortunately few, and are not of a serious nature.

Deep quiet suppuration (staphylococcic) occasionally occurs, especially in those cases of simple fixation in which deep sutures of thick silk have been employed as suturing material. Of the rest, some must be ascribed to faulty technique, and to the tearing and bruising of the capsula adiposa, which should be as extensively removed as possible. Lumbar hernia may occur, but is decidedly uncommon.

We have seen, in one case, jaundice coming on on the third day, but it was only a slight attack, and passed off completely within a week.

Sometimes a patient may complain of occasional shooting neuralgic pain in the lumbar wound ; this, however, passes off

in a few months. In one case, we have seen considerable œdema of the right leg, for which no cause could be assigned, there being no evidence of thrombosis. This symptom disappeared in about three months, but was accompanied by severe pain along the course of the sciatic nerve, which proved intractable to all forms of treatment up to the time the patient was lost sight of twelve months later.

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