Painful Symptoms.—The pains most often caused by movable kidney are: (1) Pain and tenderness in the kidney itself. (2) Pain of a dull, dragging character low down in the back, a pain comparable to that commonly attributed to uterine retrodisplacement. (3) Frequent and painful urination. It is characteristic that these pains should be increased by exercise, and should be more severe during the menstrual period. It is evident that any or all (except the first) may be attributable to conditions other than nephroptosis. Therefore it is essential that they should be known to disappear with reposition of the kidney, and to reappear with its prolapse before we can be sure of any connection between the pain and the renal mobility.

Nephroptosis, with Symptoms directly Referable to the Kidney.—Here we enter upon a more definite field of investigation. If the kidney is tender and painful, if the tenderness is relieved by reposition of the organ, if there is renal colic, or if the tender kidney is enlarged or adherent in an abnormal position, we have direct physical evidence that the symptom is due to the nephroptosis. Even more characteristic is the *intermittent hydronephrosis* due to movable kidney. This condition in its fully developed form is unmistakable. The patient comes with history of a tumour in the flank. This tumour gradually grows larger during a few days or weeks and then suddenly disappears. There is an interval of a few days and then the tumour once more begins to grow. It is usually very painful and tender, and its growth is often attended by renal colic, while its disappearance is signalled by relief of the pain and accompanied by the discharge of an excessive quantity of urine. In other cases the kidney does not fill sufficiently to give a perceptible tumour, but there are repeated attacks of renal colic without passage of stones or evidences of pyelo-nephritis. Examination then reveals a movable kidney, swollen and tender during paroxysms.

Intermittent *pyonephrosis* may also occur.

The outcome of these obstructive cases is that of hydronephrosis.

Diagnosis

If the kidney is only slightly movable this may be detected by ballottement and the other methods already described (p. 512). A floating organ may be discovered almost anywhere in the abdomen. As a rule, it is not difficult to distinguish a floating kidney from other abdominal tumours. The very mobility of the organ, the fact that it may be replaced in the loin, together with its general contour, and the sickening sensation, similar to and yet not the same as the ovarian sensation, caused by pressure upon it, are sufficiently characteristic. Tumours arising from the ovaries or uterus may be distinguished by their pelvic attachments. To distinguish a movable kidney from a distended gall-bladder, Morris proposes the following criteria: (1) The enlarged gall-bladder as well as the kidney is a frequent cause of *movable* abdominal tumour. (2) History of jaundice. (3) The tumour caused by an enlarged gall-bladder can, in almost every case, at all times be felt, whereas a movable kidney (unless also enlarged) cannot. (4) Variability in the size of the tumour goes for nothing unless associated with sudden diuresis. (5) A calculous gall-bladder feels much harder than a movable kidney. (6) The radius of mobility of the gall-bladder differs from that of the kidney. Morris also mentions the fact that the two conditions often coexist, and that inflation of the colon for the purpose of pushing the kidney outward and the gall-bladder upward is a most unreliable means of diagnosis, since the hepatic flexure of the colon may be displaced downward and inward when either affection exists. The ultimate method of diagnosis in a doubtful case is exploratory incision. Exploratory aspiration cannot be too strongly condemned.

But the discovery of a movable kidney by no means completes the diagnosis. It is equally important to ascertain whether the symptoms are due to the nephroptosis or to something else. In some cases there can be no doubt that the kidney is at fault. If a hydronephrosis, a pyonephrosis, or an adherent organ is discovered, here is a pathological condition demanding treatment. Then there are the tender kidneys and those cases whose symptoms are temporarily relieved by rest and reposition of the displaced organ. These form a doubtful class, and merit the most minute examination and the closest watching, of which the palliative treatment of the disease forms an important part. The majority of them are complicated by some neurotic tendency, enteroptosis, or gastro-intestinal or pelvic disease. Their judicious treatment is peculiarly difficult. Finally, there are the cases in which no test can show a direct connection between the renal ptosis and the symptoms.

Treatment

In deciding upon the proper course of treatment for any individual case of movable kidney, the surgeon must bear in mind the following facts:

1. In many cases nephroptosis produces no symptoms.
2. In many instances nephropexy, while it retains the kidney in place (which it does not always do), either fails to relieve or aggravates the neurotic or dyspeptic symptoms attributed to the renal mobility.

In view of these facts we must hesitate to elect nephropexy, a treatment which, though surgically a success, may prove clinically a failure, or worse than a failure. Mechanical treatment—supporting the kidney by a suitable belt—may always be experimentally employed in doubtful cases. But to have recourse to surgery is a grave matter. Not because of the danger or discomfort connected with the operation, for the former is almost nil, the latter inconsiderable, but because in most instances the patient is distinctly neurotic, and, while the influence of the operation *per se* may be beneficial, it may also be injurious. In short, the knife is no proper instrument for a faith cure. Its brilliant successes should not blind us to its failures. Yet where palliative measures fail, and the symptoms are apparently dependent upon the renal mobility and require relief, there is no choice. An operation is then surely the lesser evil. So we may conclude that *the treatment of subjective symptoms due to renal mobility is palliative; surgical measures should be reserved for the treatment of hydronephrosis and other similar pathological conditions that cannot be relieved without them, and for those cases that do not respond to persistent, intelligent palliative treatment.*

Palliative Treatment.—The broad lines of palliative treatment are:

1. To remedy digestive and menstrual derangements.
2. To regulate exercise so as to avoid overfatigue.
3. To improve the general vitality and combat neurasthenia by overfeeding, massage, hygiene, electricity, and tonics, and
4. To apply an abdominal supporter.

Much emphasis is placed upon the kind of belt or corset employed to support the abdomen. Edebohls[1] reviews the opinions of various writers upon this subject, even to that of Gurtzburg, who "administers a yeast ferment with the object of producing meteorism, and thus sustaining the prolapsed kidney." This is an extreme example of the fallacious impression that a support must be worn solely for the purpose of retaining the kidney in place, and that, this accomplished, the cure is assured. Nothing could be further from the truth. As a matter of fact, it is the patient's general condition that should be attacked primarily, the local condition only secondarily. Many a case of movable kidney is cured by hygiene, diet, and exercise, while the kidney remains as loose as ever. Moreover, in applying a belt or a corset the effort must be made to support all the abdominal viscera, not the kidney only. It is not conceivable that any form of pad should hold the kidney in place, and

[1] Med. Record, 1901, lix, 690.

therefore it is wiser to dispense entirely with pads and to support the abdominal contents *en masse*. For this purpose the modern straight front corset may be employed. Some women find that this article, if applied in the recumbent position, acts as an admirable supporter. If this fails a snug elastic abdominal belt should be tried. And all the while the systemic treatment must be attended to.

Surgical Treatment—Nephropexy.—Nephropexy or nephrorrhaphy is the operation of fixing the prolapsed kidney against the abdominal wall. With abdominal or transperitoneal nephropexy we need not concern ourselves. The operative treatment of hydronephrosis and adherent kidney will interest us in another chapter. Here we need dwell only upon the operation of lumbar nephropexy and its consequences.

The preparation of the patient and the incision in the abdominal wall are made according to the usual rules (p. 637). When the fascial capsule of the kidney is reached it is incised and the kidney laid bare by blunt dissection. The kidney must now be fixed in its proper position. Harris states that the persistence of pain after operation is often due to squeezing of the kidney, which has been replaced by the surgeon in a paravertebral niche too small to contain it. If replacement is not easy, it is certainly legitimate to fix the organ in any available position; but in most cases it is quite possible and eminently proper to replace the kidney well up under the ribs with only its lower half protruding below them. Then arises the question of fixation. Quite a variety of methods have been employed, which may be classified as follows:

1. Suture ..... { *a*. Without decortication. *b*. With decortication.
2. Support ..... { *a*. By means of the fascia. *b*. By means of cicatricial tissue.

Suture without Decortication.—The obvious way to fix a loose kidney is to remove the greater part of its fatty envelope, and then to attach the organ by 2 or 3 sutures passed through the fibrous capsule, the parenchyma and the parietal muscles. The sutures may be slowly absorbable (chromicized catgut or kangaroo tendon) or silk.

In transfixing the kidney the sutures may be applied along the convex border (Hahn, Bassini, Albarran) or in the posterior surface (Morris). They may be made to transfix the fibrous capsule only (Hahn, Bassini) or the kidney substance as well (Albarran, Morris). The sutures should not be tightly tied lest they cause necrosis of the kidney substance within their grasp. It is useful to scarify the fibrous capsule in order to promote adhesions (Albarran).

Suture with Decortication.—On account of the frequent relapses following nephropexy, as performed in the early days, it seemed doubtful whether simple suture suffices to hold the kidney in place. Accordingly Tuffier suggested that the fibrous capsule be split and turned back along the convex border of the organ, and the sutures be passed through the parenchyma itself. His example has been widely imitated. In some cases the sutures were found to cut through the kidney, and therefore the majority of those who employ decortication apply the sutures to the reflected edges of the fibrous capsule. Dr. J. F. Baldwin [1] carries the capsule flaps into the belly wall between bundles of muscle fibres.

Fascial Support.—Hahn, who was the first to perform nephropexy (in 1881), endeavoured to hold the kidney in place by suturing the fatty and fibrous capsule below the organ. Seven of his 27 cases relapsed, and the operation has been thereby discredited; but Harris [2] has recently suggested a similar operation which he claims has given perfect results. He excises the perirenal fat and sutures the two layers of the fascial capsule together, so as to obliterate the cavity in which the kidney moves, while still permitting the organ a mobility comparable to that of the normal kidney. He counsels opening the peritoneal cavity to the outer side of the colon in case the suturing cannot otherwise be carried out. Andrews [3] counsels carrying the fascial layers out through the parietal incision.

Cicatricial Support.—Every nephropexy by suture is performed with the expectation that firm adhesions will form between the kidney and the abdominal wall, and so prevent any further prolapse of the kidney. But in view of the nervous hyperesthesia of most of these patients many surgeons, of whom I am one, object to suturing the kidney or stripping back its capsule, or in any way injuring it unless something is to be gained thereby. Hence the attempts at obtaining a fascial support, and hence also the advantage of obtaining a cicatricial support without sutures. Jaboulay was the first to employ gauze packing to support the kidney. Senn [4] scarifies the posterior surface of the kidney, applies a sling of iodoform gauze about its lower pole, and stuffs a strip of the same material below the kidney between it and the perirenal fat, thus forming a gauze platform upon which the kidney rests. Since 1892 I have employed a similar method and have found it eminently satisfactory.

Results of Nephropexy.—The earlier nephropexies were so uniformly followed by relapse that many physicians opposed the operation on the ground that a permanent cure was *never* accomplished by operation; but recent statistics tell an entirely different story. Morris has performed 98 nephropexies with one death ("cardiac thrombosis in a stout female whose kidney was incised and explored before being fixed"), and only "a few" relapses after operations performed according to "a plan different from the present methods." Edebohls [1] reports 193 cases (68 bilateral) with 3 deaths and 2 known relapses. All of my own cases have been successful.

[1] J. of the Am. Med. Ass'n, 1899, xxxiv, 177.
[2] *Op. cit.*
[3] *Ibid.*, 1900, xxxv, 877.
[4] *Ibid.*, 1897, xxix, 1190.

But nephropexy may be regarded from another point of view. In a very considerable proportion of cases the patients have complained of more pain after the operation than before. This may be due to one of several factors; perhaps the pain did not commence in the kidney, and therefore was not relieved by operation, but was rather intensified by the shock and disappointment; or perhaps it was due to adhesions or kinks of the ureter which were not relieved by the surgeon; or perhaps the kidney was replaced high up in the loin in a niche from which it had descended because there was not sufficient room for it (Harris), and where it is continually compressed. However this may be, I have had only one patient complain of a recurrence of pain. Nephropexy was performed upon her as a lesser evil than exploratory abdominal section with which she was threatened by another surgeon. Her various neurotic symptoms, which had existed for years, immediately disappeared. Five years later they returned, and she underwent at the hands of various surgeons the extraction of several teeth, drainage of the antrum of Highmore, excision of the inferior dental nerve, nephrectomy (the kidney was found firmly adherent), vesico-vaginal fistulization, an infinite variety of other treatments, all to no avail. It has been interesting to find two reports of her cure, the one by a dentist, the other by a physician. Finally, exploratory laparotomy was performed a year ago. A normal appendix was removed—and she has remained better ever since, though far from well. She has recently been poisoned by a rectal injection of boric acid, but survived!

Choice of Method.—An ideal nephropexy should be free from mortality, should fix the kidney in place, and should incur the least possible risk of subsequent pain. In the matter of mortality there is no preference among the various methods. None of them is dangerous if performed by a competent surgeon upon a patient free from grave organic disease. Relapse is not to be expected after any operation, provided the fatty capsule is removed so as to allow direct adhesion of the kidney to the muscle. There is no need to split the

[1] Med. Record, 1901, lx, 635.

fibrous capsule. Experience has proved that nephropexy is quite as successful without decortication as with it. But pain is the surgeon's bugbear. In these neurotic patients it is quite conceivable that pain may be due to forcing the kidney too high in the loin, to attaching it too firmly (as by decortication or numerous sutures) in any position, or to the presence of silk sutures. Therefore the ideal operation is to reef the fascial capsule, after removal of the perirenal fat, so that the kidney is left relatively free in a confined space. But the capsule-reefing operations lack the confirmation of time, and, therefore, I prefer to support the kidney by packing gauze beneath it, a procedure certain to hold the kidney in place and likely to leave it surrounded by less adhesions than any of the suture methods. On the other hand, if the kidney has to be incised for hydronephrosis or stone, it is obviously appropriate to retain it in place by suture through the reflected capsule.

CHAPTER XXXV

INJURIES TO THE KIDNEY—ANEURYSM OF THE RENAL ARTERY

SUBPARIETAL INJURIES—RUPTURE

The subparietal injuries of the kidney are often classified as contusions and ruptures; but inasmuch as with every rupture there is contusion, and with almost every contusion at least a partial rupture, while clinically contusion and rupture exhibit the same symptoms and demand the same treatment, they need not be distinguished.

Subparietal injury of the kidney, though more frequent than any other form of renal trauma, is rare. Among 13,455 autopsies there occurred only 31 instances of ruptured kidney (Morris and Herzog[1]). Güterbock,[2] however, encountered 36 ruptured kidneys among 925 autopsies, and 9 such cases among 9,500 patients admitted to St. George's Hospital. Among 198 cases collected by Tuffier, 136 occurred in adult men, and in only two were both kidneys injured. Two hundred and eighty-one of Küster's 306 cases were males. Of 272 in which the particulars are stated, 142 occurred on the right and 118 on the left side, 12 being bilateral (Morris).

The kidneys may be contused by a variety of accidents, such as kicks, buffer accidents, falls, and even simple muscular effort. The lower ribs may be broken and driven into the organ, and many of the accidents are explicable only on the theory that the kidney is burst by the impact of the floating ribs compressing it against the spine.

Morbid Anatomy

Subcapsular Hemorrhage.—Morris relates two instances of extravasation of blood under the fibrous capsule of the kidney, caused by slight muscular exertion and producing severe pain. Calculus was suspected, but nephrotomy revealed only a subcapsular hematoma,

[1] Morris, *op. cit.*

[2] Die chirurgischen Krankheiten der Harnorgane, Leipzig u. Wien, 1898, iv, 900.