GOELET (A.H.)
X
Acknowledged

METHOD OF SUTURING THE PROLAPSED KIDNEY.[1]

BY AUGUSTIN H. GOELET, M.D.,

OF NEW YORK,

Professor of Gynæcology in the New York School of Clinical Medicine; Gynæcological Surgeon to the Metropolitan Hospital for Women and Children.

I PRESENT herein a technique for fixation of the kidney that I have employed with satisfactory results for the past three years. During this time—since September 14, 1900, when I first made use of it—I have done by this method 171 consecutive nephropexies on 134 patients, in thirty-seven both kidneys at the same time, without a death and without a failure to secure sufficient fixation. I make it a point to follow up my cases and submit them repeatedly to examination after operation. In only one of my cases within the past three months I have discovered, upon recent examination, that the left kidney, which was fixed with its fellow on June 23, is not entirely immovable. The patient is a very thin subject, and the kidney can be palpated and moved upward, but the movement downward is restricted, so that the result may be regarded as satisfactory.

The explanation of the incomplete fixation in this case is that the patient's condition was most unfavorable for operation at the time it was undertaken, and there was unusual retching and vomiting following the anæsthetic, both at that time and some ten days later, when an abdominal section was done for intrapelvic disease.

There are several points I find essential for success with this as well as any other method of technique employed for this condition, namely,—

(1) The patient should be carefully prepared so as to obviate or minimize the disturbance produced by the anæsthetic and consequent retching and vomiting following the operation.

[1] Read before the Surgical Section of the New York Academy of Medicine, October 12, 1903.

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(2) Particular care should be taken to completely detach the colon from the kidney, so as to obviate subsequent dragging upon it when the bowel becomes distended, which will either tear it loose or cause pain.

(3) Reattachment of the colon to the kidney must be prevented. This can be done by packing a gauze drain under and in front of the kidney and resorting to early evacuation of the bowel.

(4) The sustaining sutures must be inserted under the fibrous capsule in a manner to obviate tearing or cutting through that structure when they are tied, and the suture material must be one that does not soften, stretch, or absorb, as this would permit the kidney to drag upon its attachment before it is firm. For the same reason the sutures should not be tied to the muscles, but should be brought out upon the surface of the back and tied as described in the technique below. Nor must the sutures be removed until sufficient time is allowed for firm attachment.

(5) The kidney must be restored by the operation to its normal position, and should not be attached lower down than normal, where it may become compressed by the corsets or clothing around the waist.

(6) The detached, redundant fatty capsule must not be permitted to become insinuated between the kidney and the structures to which it is desired to have it adhere. As this may occur after closure of the wound, I favor the packing of gauze around the lower pole of the kidney, which is retained for forty-eight hours.

(7) The patient must be kept strictly on the back during the period of confinement to bed when both kidneys are involved; or should be turned only on the affected side when one kidney has been subjected to the operation; and she must not be permitted to get up earlier than three weeks.

(8) The operation should be resorted to before the health of the patient is seriously impaired and before the kidney has become seriously disabled or diseased.

(9) Conditions dependent upon the prolapse must receive attention as well, and should be corrected after operation.

Technique of the Operation.—The patient when anæsthetized is placed prone upon the table, with an air-pillow under the abdomen, which increases the costo-iliac space by bending the spine forward and forces the kidney up into position. A vertical incision is made through the skin and fat down to the first layer of muscles, beginning just below the last rib and extending downward parallel to the outer border of the erector spinæ muscle for about three and a half inches. The thin fascia or sheath covering the first layer of muscle is divided with scissors to the extent of the incision above and below; and the muscle beneath (the latissimus dorsi) is separated in the direction of its fibres by means of blunt hooks and held apart by broad retractors. (Fig. 1.) Keeping to the outer

FIG. 1.

Author's blunt hooks.

side of the erector spinæ muscle, the fascia attached to its border is penetrated and separated to the limit of the incision above and below by the blunt hooks also, and its margin included in the broad retractors (Fig. 2). This exposes the

FIG. 2.

Author's universal retractors.

quadratus lumborum muscle, which is carefully drawn aside and included in the retractor on the spinal side of the incision. Then, with blunt hooks the transversalis fascia is penetrated near the upper angle of the wound and split downward by traction upon the blunt hooks. This avoids wounding the iliohypogastric nerve and its accompanying vessel which crosses obliquely the line of incision in front of the quadratus lumborum muscle.

The margins of this fascia are also included in the broad retractors. The fatty capsule surrounding the kidney is exposed beneath this fascia and bulges up into the wound as soon as it is divided. A loop of intestine will usually protrude with this fat, and the operator must be careful to avoid it in opening the fatty capsule to expose the kidney.

The kidney is now located by inserting the finger and sweeping it around over the surface of its fatty investment, and will usually be found up in its normal position. The fatty capsule is dragged downward and opened with scissors well up towards the upper angle of the incision and well over towards the spine so as to avoid opening into the peritoneal cavity or wounding the intestine which bulges up into the wound, and the incision is extended in a vertical direction downward upon the finger as a guide. The margins of the fatty capsule on each side are seized with T-forceps, and traction is made upon them to bring the kidney up into the wound. In adjusting the T-forceps to the outer margin of the fatty capsule care should be taken not to include the intestine or peritoneum.

If the peritoneum is inadvertently opened in exposing the kidney, no harm will result if it is immediately closed by a running suture of fine catgut. The incision then to expose the kidney is to be made further over towards the spine. The accident should not occur if the kidney is in position and is properly located before the incision into its capsule is made.

The fatty capsule is detached from the kidney with the finger, aided by blunt-pointed scissors, where particularly resisting bands of adhesion are encountered. The lower pole of the kidney is freed first, then traction upon the fatty capsule will bring it up into the wound. If the kidney cannot be delivered through the incision by traction upon the capsule, the patient is rolled downward upon the air-pillow, which brings its pressure more directly upon the border of the ribs and forces the kidney up into the wound. To aid delivery of the kidney, it may be grasped with a pad of gauze held between the fingers and thumb.

It is not always necessary to deliver the kidney through

the incision in order to detach the fatty capsule and insert the sustaining sutures; and it consumes more time. When, therefore, complete detachment can be readily accomplished without doing so, this part of the technique may be omitted.

The fatty capsule should be completely detached from the kidney around both poles and on each side back to the hilum. Thus complete detachment of the colon and duodenum in front is effected, and behind, the kidney is left bare of its fatty investment for subsequent adhesion to the muscles at the back.

The pelvis and ureter are always carefully explored for stone.

The fibrous capsule is not split or detached from the kidney, nor is its surface sacrificed. I have found this to be quite unnecessary. Firm adhesion of the kidney with its fibrous capsule intact can be invariably secured if the kidney is held immovably in contact with the opposing structures for a sufficient length of time. To accomplish this, however, the suture material should be one that does not stretch or become absorbed, and it must be inserted and tied so that the suture loop does not become loosened by cutting into the tissues. We have in silkworm gut a material that meets these requirements, and to render it pliable it is boiled and preserved in a 3 per cent. solution of lysol. My record of 171 nephropexies by this method without a failure to secure fixation shows conclusively that stripping off the fibrous capsule or further mutilation of the kidney as by sutures which transfix the parenchyma is quite unnecessary.

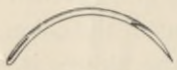
The sustaining sutures, two in number, are inserted upon the posterior aspect of the free border of the kidney. One, the lower, is inserted at about the junction of the middle and lower thirds of the organ, and the other at about its centre or midway between the poles. The suture is threaded into a small, full-curved needle one inch long, and it is bent sharply at the eye of the needle and twisted tightly to avoid tearing the capsule as it is drawn through (Fig. 3).

The sutures are introduced in this manner, viz.:

The needle is inserted first from above downward in a

direction somewhat obliquely inward to the long axis of the kidney, and penetrates only beneath the fibrous capsule for about half an inch, and the suture is drawn through; then it is inserted transversely a little below the point of exit of the

FIG. 3.



Author's kidney needle.

first insertion, penetrates beneath the fibrous capsule, about half an inch, and the suture is drawn through; then it is again inserted obliquely from below upward at a point opposite the first insertion, about an inch from it, and the suture is carefully drawn through (Fig. 4). The needle is removed, and the two ends are clasped temporarily with a hæmostatic forceps.

The second suture is inserted in a similar manner just above the first.

Thus, it will be seen that there are three insertions of the suture under the fibrous capsule and two bridges of suture exposed on the outer side of the fibrous capsule. It is upon these two bridges of exposed suture that the strength of the suture depends. In testing this suture, it will be observed that the strain upon it is in a direction parallel to the surface of the kidney and its capsule, and not at right angle to it, as is the case with the transverse suture and all other forms of sutures employed for the purpose of sustaining the kidney. This suture will resist a very considerable strain upon it without cutting out, very many times more strain than the transverse suture which penetrates the parenchyma or any suture inserted through the detached fibrous capsule, and it does not mutilate.

Before replacing the kidney into its normal position, the redundant fatty capsule behind is trimmed off with scissors or torn off, and that in front also, but here care is necessary to avoid encroaching upon the peritoneum or bowel. The fat about the lower pole is not removed, but left to form a cushion for the kidney to rest upon.

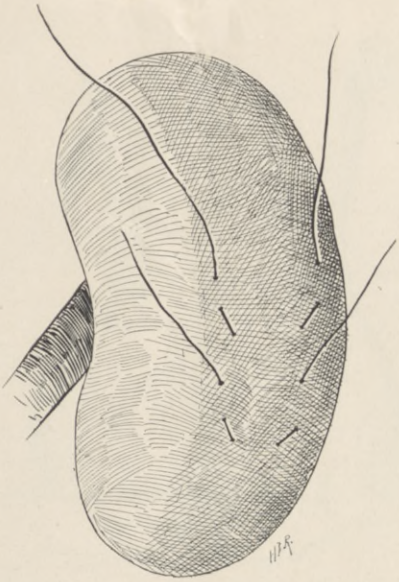


FIG. 4.—Author's suture inserted.

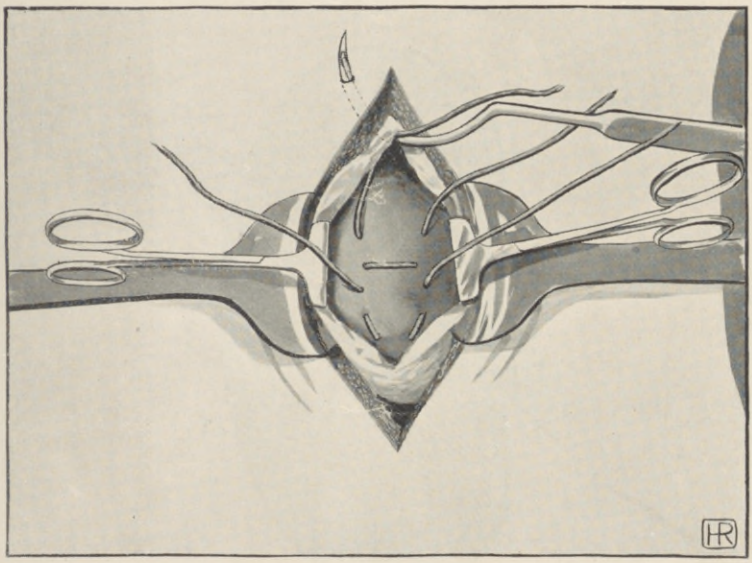


FIG. 5.—Showing suture in position and method of carrying the ends of the suture through the structures of the back and bringing them out on the surface at the upper angle of the wound.

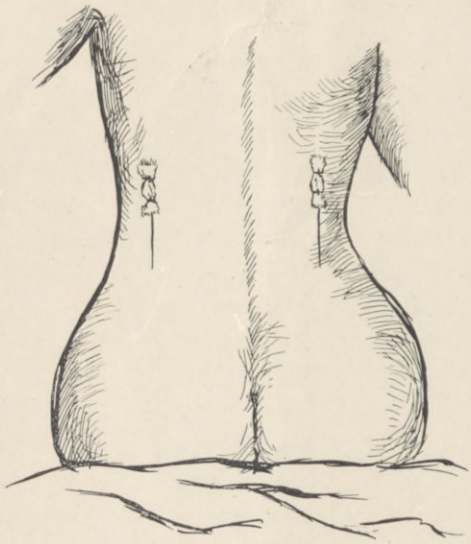


FIG. 6.—Sustaining sutures tied over fold of gauze to prevent loosening of the suture loop.

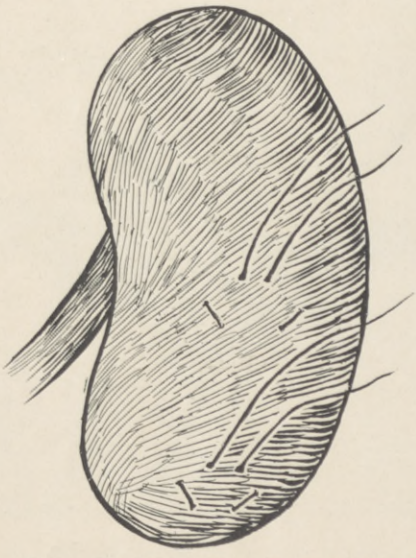


FIG. 7.—The Brödel suture, for comparison.

The ends of the sustaining sutures that have been inserted into the kidney are carried through all the structures of the back and brought out on the surface at the upper angle of the incision,—a long, curved, perineal needle with eye near the point being utilized for this purpose (Fig. 5). The sutures are tied over a fold of several layers of gauze placed lengthwise to the incision at its upper end. This forms a cushion for the suture-loop to rest upon and prevents the sutures from cutting through the skin and consequent loosening of the loop (Fig. 6). When tied, these sutures bring the kidney up into its normal position, with its upper pole under the ribs.

A gauze drain is now packed about and under the lower pole of the kidney, forcing back the fat that has not been removed and the bowel which bulges up below the kidney, and its end is brought out at the lower angle of the wound.

The wound is closed by uniting the divided superficial fascia and upper borders of the muscle with a running catgut suture, and the skin is united with a subcuticular suture. A bountiful supply of loose, aseptic gauze is applied next to the wound, and over this is placed a thick pad of absorbent cotton covered with gauze, and this is held in place by adhesive strips and a binder encircling the body.

In many cases where the fatty capsule is thin or not redundant, I dispense with the gauze packing and drain, closing the wound without it, and this method has succeeded quite as well as where the gauze drain was employed.

After-Care of the Wound and of the Patient.—When drainage is employed, the dressings are removed at the end of twenty-four hours, as they are usually found soaked and make the patient uncomfortable. At the end of forty-eight hours the gauze drain is removed and the dressing renewed; after this the dressing is renewed when necessary.

The sustaining sutures are not removed until the twentieth day, or the day before the patient gets out of bed. The exposed portion of the loop of each suture on one side of the gauze cushion is cut, and the suture pulls out readily, adhering to the gauze when it is lifted off. A simple dressing of gauze is applied afterwards.

When renewing the dressings, the patient should be turned on the affected side, to obviate dragging on the freshly attached kidney; and, if both kidneys have been fixed at the same time, she should be turned preferably on the right side, since it is the right kidney that is usually most displaced; but in those cases where the left kidney at the time of operation has been found to be the larger, she should be turned on that side in renewing the dressing. During the time of convalescence, while in bed, she must be kept upon the back, or turned only on the right side, if it was the right kidney that had been fixed.

The only other suture that resembles this, which I first described in the *Medical Record* of June 1, 1901, and repeatedly since (*Philadelphia Medical Journal,* October 26, 1901; *American Medicine,* December 28, 1901; *International Medical Magazine,* March, 1902), and which I first employed on September 14, 1900, and the second time, October 18, 1900, is the Brödel suture, first used by Cullen, of Baltimore, October 26, 1900, a description of which was first published by Brödel in *American Medicine* of August 2, 1902 (Fig. 7).

The essential differences between the Brödel suture and the one which I have just described are as follows:

(1) The apex of the triangle formed by the suture is above, the ends emerging on the surface of the kidney near together. In my suture the apex of the triangle is below, the ends of the suture emerging on the surface more apart from each other, because they are brought out and tied on the external surface.

(2) The sutures are placed at a greater distance apart, the lower suture at the lower pole; and they include less area of surface. My suture does not include the lower pole, which is left normally free, and it includes a larger area of surface.

(3) The suture material is silk, while mine is silkworm gut.

(4) The sutures are tied to and buried in the muscles, while mine are brought out upon the surface and tied over a pad of gauze.