In 1947, Hamilton Stewart described a method of dealing with those patients who had hydronephrosis in whom lower polar vessels were a factor in the ureteropelvic obstruction. Subsequent reports in the British literature indicated that other urologists accepted the procedure. The operation has been almost completely disregarded in North America. We present our experience with the Hamilton Stewart nephroplasty because, in selected cases, it fulfills the ideals of surgery in the relief of obstruction at the ureteropelvic junction associated with lower polar vessels.

![Diagram of ureteropelvic obstruction]

These ideals may be enumerated as follows: (1) conservation of kidney tissue by preservation of blood supply; (2) satisfactory emptying of the kidney; (3) reduction in size of the dilated renal pelvis; (4) improvement in function; (5) avoidance of infection introduced by kidney drains or splint catheters; (6) a low risk of extravasation and fistula formation; (7) minimum risk of recurrence of obstruction; and (8) a clinically feasible operation.

In the infant, the kidney is arched upon itself so that the two poles approach each other closely over the enclosed pelvis. If a lower polar vessel is present, it is close to the main renal artery and, in this position, is unlikely to produce obstruction to the outflow of urine. As the child grows, the poles diverge. The lower polar artery becomes separated from the main renal artery and, in its new (lower) position, may produce obstruction (Fig. 1). Thus, a lower polar artery may not cause obstruction in the infant but may do so in childhood or adult life. Although lower polar arteries are fairly common, hydronephrosis from obstruction by such a vessel is relatively rare.

**THE OPERATION**

The Hamilton Stewart operation is based on the principle that moulding of the kidney will bring the aberrant renal vessel back into close relationship with the main renal artery, where it will no longer produce obstruction. Any of the recognized loin incisions may be used. After exposure of the kidney, the lower polar vessels, the renal pelvis, the ureteropelvic junction and the upper ureter are carefully dissected out. In most cases, once the pelvis and ureter are freed from the vessels, distension of the pelvis and kidney is relieved. Hamilton Stewart advocated aspiration of the urine by a needle passed obliquely through the kidney or pelvis, if the hydronephrosis was gross or if the tension in the kidney persisted after the above dissection. We prefer to open the pelvis to make sure that there is no associated intrinsic obstruction at the ureteropelvic junction or in the upper ureter. The capsule is reflected from the front of the upper and lower poles of the kidney and is left attached at the convex margins. The kidney is grasped in both hands, the upper and lower poles are brought together until the kidney becomes ball shaped. When distension has been relieved, the thinned-out pliable kidney is easily held in its new shape by ribbon catgut or fascial lata strips sutured on the convex surface. Traction is now exerted in the long axis of the ureter, drawing the pelvis below the aberrant vessel, which now lies close to the main renal artery. The pelvis is plicated.
Fig. 2.—Method of plication of the redundant pelvis to produce an efficient ureteropelvic pump.

by rows of interrupted catgut sutures, care being taken that the sutures do not pass into the lumen of the pelvis (Fig. 2). To produce an efficient ureteropelvic pump, it is essential to reduce the redundant pelvis to a normal size.

On several occasions, we could not reshape the kidney in this way. Aberrant vessels running to both upper and lower poles, congenital malrotation of the whole kidney or of the lower portion on its long axis may prevent this moulding.

Successful treatment of hydronephrosis depends upon an accurate diagnosis of the cause or causes of obstruction. Only by removal of all of the obstructive factors can complete relief of stasis be obtained. We feel that an integral part of the procedure is a search for an associated intrinsic obstruction; this is done through an incision in the renal pelvis before the kidney is moulded into its new position. If there is any suggestion of associated intrinsic structure, we are, with increasing frequency, doing some sort of pedicle graft of the renal pelvis to relieve it. The graft is done after the kidney has been moulded into its new shape instead of, or associated with, plication of redundant pelvis. The kidney is now replaced. A soft-tissue drain is left in the perinephric space. A nephropexy is not necessary.

Materials and Methods

This paper is based on 25 Hamilton Stewart nephroplasties carried out in 24 patients before the end of 1964. These 25 procedures comprised 13.9% of operations done on our service during this period for the relief of hydronephrosis due to ureteropelvic obstruction. The Hamilton Stewart procedure was done on six more patients but these cases were not included because the follow-up was too short. Duration of the follow-up in these 24 patients is as follows: two years—one, three to four years—four, four to five years—seven, five to six years—five, six to seven years—two, seven to eight years—two, eight to nine years—two, and nine to 10 years—one.

The ages of patients at the time of operation ranged from 5 to 62 years. The presenting symptoms were those usually encountered in hydronephrosis due to ureteropelvic obstruction, namely, loin pain, fever, urinary frequency, dysuria, hematuria, ureteral colic, gastrointestinal symptoms or loin mass. Hydronephrosis was an incidental finding in one patient.

Using the criteria derived from the survey of the Canadian Academy of Urological Surgeons, the degree of hydronephrosis before operation was minimal in one, moderate in six and advanced in 18 kidneys. Using the same criteria, the impairment of renal function was minimal in 20, moderate in four and advanced in one kidney.

Of the 25 kidneys operated upon, 24 had an aberrant or lower polar vessel. The aberrant vessel was associated with a stricture of the upper ureter in four, with ureteropelvic stricture in three, with bands of adhesions in three, and with an obstructing isthmus of one horseshoe kidney. One patient had intrinsic obstruction without a polar vessel. In this patient, the procedure was done to drain the grossly dilated, dependent lower calyces in a solitary kidney.

Nephroplasty was done alone in 15 patients. Because of associated obstruction, nephroplasty was combined with other procedures in 10 kidneys. The associated procedures were: Culp—four, Foley—one, Finney—three, David Davis—one, and the division of the isthmus of a horseshoe kidney—one.

Figure 3 shows advanced hydronephrosis of the left kidney. A lower polar vessel obstructed the ureteropelvic junction. There was associated intrinsic stricture of the left upper ureter. The obstruction was demonstrated in the isotope renogram.
to be good when the recheck pyelogram showed improvement and the patient was clinically well. The result was fair if the recheck pyelograms were not improved and the patient was clinically well. Using these criteria, the results were good in 20 patients (the procedure was carried out on both kidneys in one patient), fair in three and poor in one. The one poor result in a bizarre and complicated situation of renal injury, following external trauma, was due to failure to recognize an associated intrinsic ureteropelvic stricture. When the patient returned with recurrence of pain two years after the Hamilton Stewart nephroplasty, a Culp procedure was done without disturbing the curled-up kidney. The patient has made a splendid recovery. It is significant, we believe, that none of these kidneys have come to secondary nephrectomy and that, during a long follow-up, none of these patients has yet developed hypertension.

Figures 5 and 6 show complete relief of obstruction at the ureteropelvic junction. Again, the kidney was not touched.
obstruction and dilatation two weeks after operation. The improved pyelogram in Fig. 6 is a typical result. It also illustrates one of the disadvantages of the operation. If a tumour arises in one of these kidneys later on, the new calyceal pattern might make early diagnosis difficult. Figures 7 and 8 illustrate an unusual end pattern, with calyces medial to renal pelvis.

The preoperative and postoperative films (Figs. 9 and 10) illustrate two features. In this patient the rows of plicating sutures are still visible five months after surgery. More important, the grossly dilated dependent lower calyces, seen in Fig. 9, are now adequately drained. In certain patients, this
Fig. 10—Same patient as Fig. 9 five months after Hamilton Stewart nephroplasty. Two points should be noted: The rows of plicating sutures are still visible, and the grossly dilated dependent lower calyces are now adequately drained.

procedure can be used to provide adequate drainage of dilated, dependent lower calyces even when there is no lower polar vessel. In our opinion, this is the only procedure that will give adequate drainage of these dependent lower calyces in some situations.

Nine patients had urinary-tract infection before operation. After operation the infection responded to urinary antiseptics in all; no evidence of residual urinary infection was detected. The postoperative result was considered to be good in eight of these nine patients.

DISCUSSION

Although the operation was first described in 1947 it has been largely disregarded in North America. We feel that it is an excellent procedure in selected cases of ureteropelvic obstruction. It seems safe and sure. No renal tissue is sacrificed. Extravasation of urine and fistula formation should not occur. It is particularly suitable for the far-advanced hydronephrotic kidney with calycectasis. It may be used in conjunction with other pyeloplasties. Although there are other methods of swinging lower polar vessels away from a point of obstruction without sacrificing them, there are two features of the Hamilton Stewart procedure that enhance its effectiveness: First, the "rolled-up" position promotes good drainage of dilated dependent lower calyces; second, plication of the dilated, often atonic, pelvis reduces its capacity to normal, restoring good drainage and promoting an effective ureteropelvic pump.

There are three disadvantages: It may be technically impossible to carry out the procedure; the resultant distortion of calyceal pattern may make more difficult the diagnosis of a tumour that may arise in the kidney at a later date; and the possibility that interference with renal blood supply might cause hypertension. This complication has been feared by many but has not to date been recorded.

SUMMARY AND CONCLUSIONS

Hamilton Stewart pyeloplasty was carried out 25 times on 24 patients who were followed for two to 10 years. The only
early postoperative complication was a staphylococcal wound infection that prolonged one patient's hospital stay to 30 days. The average hospital stay was 13.2 days. Following operation all 24 patients were asymptomatic. Failure to recognize an associated intrinsic obstruction brought one patient back two years after initial operation. All of the patients have remained normotensive. The urine of all has remained free of infection, including nine who were infected preoperatively.

REFERENCES


RÉSUMÉ

La méthode de néphroplastie de Hamilton-Stewart est basée sur le principe que, en remaniant le contour du rein, on peut amener l'artère polaire inférieure à proximité de la principale artère rénale où elle ne risque plus de provoquer d'occlusion. On l'a décrite, en 1947, comme la méthode destinée à traiter les cas d'hydronéphrose dans lesquels les artères polaires inférieures constituaient un élément d'occlusion urétéro-pélvienne. Cette méthode a été négligée en Amérique du Nord. Les auteurs exposent leur expérience chez des malades qui ont été suivis pendant une période variant de deux à 10 ans. Il s'agit d'une excellente intervention dans des cas choisis d'occlusion urétéro-pélvienne. On n'y sacrifie pas de tissu rénal. L'extravasation de l'urine et les fistules ne devraient pas survenir. Les auteurs ont étendu son application de deux façons: ils l'ont employée de concert avec d'autres néphroplasties où existe une occlusion intrinsèque; ils la conseillent également comme étant la meilleure méthode de favoriser un drainage convexe des calices inférieurs, dilatés. L'opération présente cependant trois inconvénients. Il peut être impossible de l'effectuer, techniquement parlant. La distorsion affectant la forme des calices peut rendre plus malaisé le diagnostic d'une tumeur rénale qui surviendrait ultérieurement. On craignait que la circulation rénale ne fut susceptible d'entraîner de l'hypertension, mais cette complication n'a jamais été notée.

OPIUM ADDICTION AND SURGERY

Not unexpectedly, certain features of surgical practice in the Far East are peculiar to the area. One of these is the frequency with which one finds opium addicts among one's patients. Opium addicts pose special problems as surgical patients—particularly the Münchhausen syndrome, management of their addiction while undergoing surgery, associated pathology, administration of anesthesia, and as operative risks.

Opium is taken in many forms. In the traditional manner chandu, prepared by evaporating a filtrate of the sun-dried latex of opium poppy, is smoked in a long-stemmed pipe. A charge of chandu in the small pipe bowl lasts only for a few puffs and several pipes are usually smoked during the course of a day. The residue in the pipe is recovered as dross and taken by mouth. A minority of addicts take opium as morphine by subcutaneous or intravenous self-administered injection. Addicts commonly adhere to the same routine.

Realizing that a significant proportion of our patients were habituated to opium, we did a prospective survey of opium addicts in our practice, directing particular attention to the mode of presentation, incidence of surgical pathology, nutritional status, coincident disease, response to surgery, and special features of postoperative management. Between August 1963 and April 1964, 3924 patients over the age of 18 years were admitted to this surgical unit. Of these, 50 (1.25%) took opium in some form. This was determined by direct questioning, noting certain stigmata of opium addiction, evidence from relatives, or observing that relatives were supplying the patient with opium. By and large, patients confess to their addiction with disarming candor. —Tinkler, L. F. and Baratham, C.: Opium addiction and surgery, Brit. J. Surg., 53: 576, 1966.