

## Surgical aspects of human kidney transplantation

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### UROLOGICAL ASPECTS.

The technique we follow to get the reestablishment of urinary continuity is the same one we described in 1965<sup>1, 2</sup>. It takes care in preserving the urine excretion tract of receiver, that is the performance of a pyelo-pyelic anastomosis; in the meanwhile, anatomical and functional unit subsists by preserving its innervation and vascularization structures but specially respecting its two essential anatomical and physiological mechanisms: functional pyelo-ureteral sphincter and vesico-ureteral valvular mechanism. All these qualities clarify not only the excellent functional results we get (touching excretion tract motorial physiology) and have been demonstrated by radio-cinematography series, but also the quite total absence in our series of any immediate or late urinary complication.

From the operative technique point of view, it is essential however to remember that middle ureteral pedicle should be respected and that anastomosis performance requires at all magnifying glass of 2X, even though in our last two cases and in pursuit of a better reliability we used operative microscope of 20X. The needle must be as thin as possible and the closure is done by 6 or 7/0 chromium catgut quite secure continuous suture. Mucosal ectropion must be avoided. These previously illustrated points are essential principles. Is a fact that this above illustrated technique reaches additional complexity than ureteral reimplantation in bladder and surgeon is required to show a higher degree of meticulousity and accuracy.

### COMPLICATIONS.

We have performed 70 kidney transplantations using the following techniques:

A reno-ureteral transplantation (cause: recipient excretion tract anomalies) with submucous vesico-ureteral anastomosis, stenosis and ureteral reflux verified 5 months later from operation.

In one case, the cadaver origin renal grafting showed a pyeloureteral duplication: the two ureters were anastomosed to upper and inferior calix in accordance of recipient pelvis (with ligature of middle calix) without any early or late complication after a six years control period.

Among our 68 cases of renal transplantation with pyelo-pyelic anastomosis (the last one was subjected to operation one month ago and the first one was performed about 8 years ago) we have not observed any signs of necrosis in urinary tract; nor fistulae and not even a simple urinary postoperative leakage, neither ureteral reflux. We never used ureteric catheterization and in no cases was catheterization needed. Absence of necrosis is not any astonishing fact, since there exists an adequate vascularization due to the middle ureteral pedicle, which was respected (constant artery or arteries); likewise it occurs about immunological necrosis for the excretion tract is the own one of the recipient. At any hypothetical event, if it would appear at remaining portion of pelvis or calices, perforation might be enough protected by intrasinusal fatness or by renal parenchyma valves. We have not either to be surprised in view of urinary fistulae absence, and this for two reasons: first, we carried out anastomosis performance keeping up the above illustrated essential principles; and then pyelo-ureteral physiologism is immediately restituted. Stenosis is, from practical point of view, impossible to be encountered by reason of the extent of anastomotic opening.

Absence of reflux is obvious.

It is a significant fact that statistic data concerning vesico-ureteral anastomosis do not give reference about ureteral reflux, being however this one a really notable complication which could, at least, destroy the kidney or perhaps it would get to persisting status of pyelonephritis. We all know that there is not any one anti-reflux technique able to reach satisfactory results in a 90 % proportion. We believe that the elected technique is responsible the most of majority of complications.

#### VASCULAR ASPECTS. TECHNIQUE.

We have successively left behind the classical techniques of renal vein with internal or external iliac anastomosis; we were moved by the kidney pelvic localization, it was not well fixed, it lay up on iliac psoas with the risk of flexions and renal pedicle torsion, and, moreover, renal vein had then its outflow backflow in external iliac one.

In one case of our series, the indication of an external iliac vein valve resection at anastomosis performing originated an almost 3 cm, length thrombus, fixed on the bleeding cut surface of resected valve.

We are now systematically performing the « reno-caval » anastomosis, always extraperitoneal, as we emphasized in 1965, in children and aged people (Starlz performs it only in children and always transperitoneal).

The advantages of this reno-caval anastomosis in opposition to the classical reno-iliac one are:

- Better and more physiological venous circulation.
- Easier to execute because performed on a superficial plane.
- The inferior member venous flow is maintained.
- Wide anastomotic opening without any risk of stenosis.
- Facilities for supernumerary veins anastomosis. These are not to ligate.

We always start from the venous anastomosis and the arterial one is carried out end-to-end with internal iliac artery, realising or not the transposition of this one, or end-to-side with common iliac artery, in order to the spontaneously adopted kidney position.

In performing arterial anastomosis we use a 2X magnification.

Terylene 6/0 is the adequate suture material.

We perform the vascular operative time under local hypothermia by continuous surface irrigation.

Both kidneys, either the right one or the left other, must be inverted, i.e., the upper pole must be placed at inferior level and vice versa.

So renal vein will be better directed to caval vein and renal artery to iliac one.

#### IMMEDIATE VASCULAR COMPLICATION.

In three cases of haemorrhage in immediate postoperative period, there have been two deaths; the third patient was saved adding a suture point. None arterial or venous obstruction. One case of infarct in a parenchyma area supplied by a polar artery which was not anastomosed led us to secondary nephrectomy.

#### SUMMARY

An operative technique respecting the total receiver urinary tract (ureter and renal pelvis) by using a pyelo-pyelic anastomosis and avoiding any kind of catheterization has

been used in our series of patients. No complications were observed: no fistulae, nor urinary infection or stenosis neither dehiscence or reflux.

Concerning vascular chapter, systematic reno-caval anastomosis, easier to perform and giving better results on venous circulation, was elected instead of venous reno-iliac anastomosis. Preference is to right kidney, specially if from cadaver. Which-ever elected kidney may be, it is placed in right iliac fossa and always in inverted position. The same technique is applied for kidney homotransplantation from adult people to child.

According to the author's experience, these directions offer a greater surgical safety. So we can reach the conditions the best in renal homotransplantation from haemo and urodynamic viewpoint, dismissing the risk of those postoperative complications which frequently appear when using the up to-day known techniques, cause of immediate and sometimes late failure of renal transplantation.

#### RIASSUNTO

Una tecnica operatoria che rispetta tutto il tratto urinario del ricevente (uretere e pelvi renale), grazie all'uso di un'anastomosi pielo-pielica, e evitando qualunque tipo di cateterizzazione è stata usata in una serie di nostri pazienti. Non si sono riscontrate complicanze, fistule, infezioni urinarie, nè stenosi, nè deiscenze, nè reflussi.

Quanto poi all'aspetto vascolare, invece dell'anastomosi reno-iliaca si è preferito eseguire un'anastomosi cavo-renale, di routine, di più facile esecuzione e che dà miglior risultati sul circolo venoso.

Si dà inoltre la preferenza al rene destro, soprattutto se proveniente da cadavere. Qualunque sia il rene scelto, viene localizzato nella fossa iliaca destra sempre in posizione invertita. La stessa tecnica viene utilizzata per l'omotrapianto da adulti a bambini.

Secondo l'esperienza degli AA. questi metodi offrono il più ampio margine di sicurezza sul piano chirurgico. In tal modo si possono realizzare le migliori condizioni per un omotrapianto renale dal punto di vista emodinamico e urodinamico, evitando il rischio di complicanze post-operatorie a causa di immediato e a volte ritardato fallimento del trapianto renale, che spesso insorgono usando le tecniche di routine fino ad oggi.

#### BIBLIOGRAFIA

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2. *Human renal Homotransplantation. New surgical technique*. Urol. Int., 23: 201, 1968.