CALYCEAL FISTULA: A PROBLEMATIC, BUT TREATABLE, COMPLICATION OF RENAL TRANSPLANTATION

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Summary.- OBJECTIVE: Calyceal fistula is a rare complication of renal transplantation that may lead to graft loss. This article reports a case of functional recuperation of a graft that seemed condemned to failure.

METHODS: 31 year old male patient, submitted to living donor renal transplant, in which was necessary to ligate a superior polar artery found during donor nephrectomy, due to its short length. This resulted in development of a calyceal fistula, unsolved with conservative treatment by percutaneous drainage. A new surgical intervention revealed a large upper pole area of necrotic tissue, corresponding to the obliterated artery irrigation zone.

RESULTS: Debridement and calyceal suture were performed and a posterior pyelography confirmed fistula closure. Presently, he is asymptomatic, with stabilized graft function.

CONCLUSION: Calyceal fistulas are complications of difficult resolution. However, the present case demonstrates that with an appropriate treatment it is possible to save a graft with no apparent solution at the first place.

INTRODUCTION

Calyceal fistula is a rare complication of renal transplantation, which may lead to graft disfunction or failure. It is generally caused by a polar or segmental artery occlusion, with subsequent necrosis of its irrigated tissue. Diagnosis is made through clinical examination and imaging. Treatment efficacy depends of location and necrosis extension. The authors present a case-report of an upper pole calyceal fistula successfully treated with surgery, with a brief review of the existing literature.
CASE REPORT

A 31 year-old male patient, with chronic renal failure due to IgA nephropathy, diagnosed 4 years earlier, was submitted to living-donor kidney transplant after a 6 month period of dialysis. The donor was his 55 year-old father, with 2 matching HLA in AB and 2 in DR.

The left kidney was donated. It had a main artery, visualized on an angiographic magnetic resonance imaging (MRI) done previously. However, an accessory superior polar artery was seen during recovery, which was ligated due to its short length, becoming unfit for reconstruction. Cold ischemia time was 55min. The ureteroneocystotomy was done over a 6Fr double-J stent.

A quadruple immunossuppressive regimen was administered (daclizumab, cyclosporine A, mofetil mykofenolate, prednisolone). In the post-operative period, there was a delay in graft function recovery (creatinine: 8-11mg/dl) with the need of dialysis in the following 15 days. Immunosuppressive values were in therapeutical range (cyclosporine A: 298ng/ml). The Tc99m-DTPA graft scan, taken on the second day, showed good renal perfusion with the exception of the superior pole. At day 7, the patient started to feel graft pain. Doppler ultrasound showed good graft perfusion and a normal resistivity index (IR<0.8), but increased arterial sistolic-diastolic acceleration and venous drainage speed, suggesting arterial-venous fistula, later excluded by angiography. Percutaneous biopsy revealed an acute tubular necrosis with no evidence of acute rejection. Graft ultrasound showed a minor renal pelvic dilation (12mm) and a large peripheral hypoechoic collection, later confirmed by computed tomography (CT) scan (Figure 1). It also showed double J stent dislodgment, descending completely to the bladder. For this reason, ultrasound guided percutaneous drainage of peri-renal liquid was performed. Biochemical analysis revealed the presence of urine. A nephrostomy tube was placed, and an antegrade pyelography showed good ureteral contrast elimination but superior caliceal leakage, suggestive of caliceal fistula (Figure 2) Conservative treatment was decided, with free draining nephrostomy and bladder catheters. There was pain resolution and fast recovery of graft function (creatinine: 1,8-2,2mg/dl).

After 3 weeks of nephrostomy placement, a new pielography revealed persistant superior polar leakage, reason why surgery was performed. An extensive necrotic area in the postero-medial aspect of the upper pole was seen, precisely at the point of polar artery ligation during graft recovery (Figure 3). Polar nephrectomy with superior calix suture using 2/0 Vicryl® was done. Parenchymal closure was performed with biologic sealant (Floseal®). The free draining nephrostomy catheter was also kept in place and after a 3 week period, a new pielography showed no contrast exteriorization, thus confirming complete fistula closure. The catheter was removed.

FIGURE 1. Abdomino-Pelvic CT: Peri-renal hypoechoic liquid collection

without renal function or diuresis modification noticed. Since discharge, there was a record of fungal urinary infection (C. parapsilosis) successfully treated with fluconazole. Presently, the patient is asymptomatic, with stabilized graft function (creatinine: 2.6 mg/dl), and serum immunosuppressive dosage maintained in therapeutic values (cyclosporine A: 137 ng/ml).

DISCUSSION

Renal transplantation is unique in treating chronic renal failure, because it is the one that offers best life quality and highest life expectancy, along with being economically more satisfactory than hemodialysis. However, it is not a treatment without complications, both medical and surgical. Although there has been a progressive reduction in surgical complications rate, these may become particularly important, and even lead to graft failure or patient death. They occur in individuals debilitated by renal failure and immunosuppression, justifying urgent diagnostic and therapeutic measures.

Among urologic complications, fistulas and obstructions are the most common, with incidence rates of 4.8% (1,2).

Urinary fistulas are the most frequent in the first post-operative month (1,3,4). They may occur at any level of the excretory apparatus, from the caliceal-pelvic system to the uretero-vesical junction, being more common in the latter with a 82% frequency (1).

Caliceal fistulas are rare. Gutierrez-Calzada et al mention a 1.1% incidence rate in a 543 patient series (5). Van Poppel et al show a 0.27% incidence in their work (6). They essentially result from parenchymal ischemia produced by thrombosis of polar or aberrant segmental arteries (4,5). They may also result of an accessory hilar artery thrombosis in a graft with multiple arteries (5), although Besaran et al did not find any relation between the incidence of urological complications and the number of graft arteries (7). In our case, it resulted from polar artery ligation during graft recovery (2). Despite this, the premature double-J stent dislodgment may have produced a renal pelvic dilation and overpressure, which may have contributed to fistula formation.

Clinically, caliceal fistulas manifest by fever, graft pain, and scrotal, major labia or ipsilateral inferior limb oedema. However, they may be completely asymptomatic, and diagnosed simply by diuresis reduction due to graft malfunction (2). In the present case, there was only graft pain and renal function recovery delay.

Diagnosis is based on clinical examination and imaging. Ultrasound is an effective method for detection of peri-graft collections such as urinomas, but it does not identify the precise leaking location (4). The scintigraphic renogram is a good indicator of graft’s perfusion and viability but, like ultrasound, it is unable to detect the leaking point (3); for this purpose, radiographic contrast studies are ideal. Some centres prefer retrograde studies, although these increase the risk of infection and may prove unsuccessful. Reasons may lie in the inability to catheterize the ureteroneocystostomy or in stenosis at this point or even at the ureteral level (3,8), reason why they are not used in our department. Excretory urography is equally effective but generally not indicated due to renal function deterioration in these patients (3). Antegrade pyelography is the preferred method. It allows fistula characterization, has minimal infection risk (3), does not change renal function and allows therapeutic intervention if necessary (8).

According to Ngatchou et al, MRI is another useful method. It gives the same information of conventional imaging and has the advantage of less morbidity, reducing global costs (8). In our case, the presence of a peri-graft collection at ultrasound, which confirmed to be an urinoma, allied to a polar artery ligation during recovery, raised the possibility of urinary fistula of ischemic origin. An antegrade pyelography confirmed such suspicion.

Treatment depends on location and extension of necrosis. Although the classical treatment for a caliceal fistula is a surgical one, several authors prefer conservative measures through percutaneous drainage (2,3,4,8). The underlying principle is that urine deviation from the leaking point facilitates its healing (8). Even if it has an extension unsuitable for conservative treatment, urinary diversion prevents graft function deterioration allowing for a better performance status and safe surgical intervention (3,8).
According to the review made by Ngatchou et al, most authors recommend percutaneous nephrostomy drainage during 4-5 weeks. However, the same author reports a case of a healed fistula after 23 days. In our case, a 3 week period of external diversion proved to be unsuccessful. In such situations, or in cases of high output fistulas, surgical treatment is indicated, although other authors defend surgical treatment as soon as the diagnosis is made (6). Partial nephrectomy is performed, with necrotic tissue debridement and caliceal closure, complemented by covering with parietal peritoneum or lyophilized dura-mater sealed with fibrin (5). In the present case, we closed the calyx with Vicryl® reinforced with thrombin sealant (Floseal®). Riera Canals et al, on the other hand, report a successful case of fistula closure with N-butyl-2-cyanoacrylate. This is a skin superficial wound sealant, injected though a 4Fr catheter under fluoroscopic guidance, which in turn is introduced though a nephrostomy tube (9).

CONCLUSION

Urinary fistulas are a common complication of renal transplantation during the initial postoperative period. However, their caliceal location is a rare exception and possible treatment solutions are several times ineffective in that they do not prevent graft loss. Despite this, the present case proves that appropriate treatment may save a renal graft that seemed condemned to failure in the first place.

REFERENCES AND RECOMMENDED READINGS

(*of special interest, **of outstanding interest)