SKILL AND TALENT

Urinary fistula repair in a renal graft through a partial nephrectomy and omentoplasty


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Abstract

Objectives: We present the management with partial nephrectomy and interposition of the greater omentum in case of urinary fistulas in renal allograft.

Material and methods: We present a patient with necrosis at the inferior pole of the renal graft that affected calyceal system but with pyeloureteral vascularization preserved. The patient’s condition was satisfactorily managed with a partial nephrectomy of the necrotic renal segment and primary suturing of the collecting system with interposition of the greater omentum. We reviewed the cases published to date of partial nephrectomy in renal allograft, and examined their outcomes by analyzing the patient presentation, diagnostic tools, and surgical techniques used.

Results: There are few cases in the current literature that describe conservative surgical management of urinary fistulas caused by segmental necrosis after renal transplantation. Surgical approach using partial nephrectomy in these cases produces favorable outcomes in our experience and reported cases.

Conclusions: Despite its obvious surgical complexity, this nephron-sparing management is feasible and should be implemented in cases where the prior renal function and the quantity of healthy parenchyma indicate a favorable subsequent evolution for the renal graft.

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PALABRAS CLAVE

Trasplante renal; Complicaciones postoperatorias; Fistula urinaria;

Reparación de fistula urinaria en injerto renal mediante nefrectomía parcial y omentoplastia

Resumen

Objetivos: Presentar el manejo mediante nefrectomía parcial e interposición de epiplon en casos de fistula urinaria en pacientes receptores de trasplante renal.


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Introduction

The occurrence of urinary fistulas during the immediate or late postoperative period is a complication that occurs in approximately 2% of the patients receiving a kidney transplant in contemporary series, and it causes significant morbidity, being able to lead to graft loss. Similarly, segmental renal infarctions appearing in the transplanted organ cause an impairment of renal function in the recipient and, when they are long, they can lead to urinary leakage due to necrosis of the collecting system. The most common place of these infarctions is the lower pole of the kidney, affecting or not the pyeloureteral system, although they are described affecting other locations.

The management of fistulas of this etiology is variable, depending on factors of the graft and the recipient, with few cases in the literature in which a surgical approach with partial nephrectomy and repair of the collecting system is described. We report a new case of surgical management by means of partial nephrectomy of a urinary fistula due to necrosis of the lower pole affecting the calyceal system, with the peculiarity of the omental interposition for the reinforcement of the renal suture and the urinary tract one. We reviewed the cases published to date describing this surgical management, highlighting its presentation and diagnosis, as well as the characteristics of the surgical technique used in each case.

Clinical case

We report the case of a 61-year-old man, on renal replacement therapy with hemodialysis for a year for diabetic nephropathy with nephrosclerosis, receiving a deceased-donor kidney transplant dead at 74 from brain hemorrhage, with a cold ischemia time of 8h 15 min. The organ has 2 renal arteries, one of which has 3 mm and lower polar location, which is accidentally sectioned without possibilities for repair, and 3 renal veins. In the renal implant, there are no surgical incidents, and a good recoloring of the graft is obtained. The evolution of the figures of renal function after the transplant is favorable. On postoperative day 9, it has an output of abundant clear fluid through the drainage and the surgical wound, with biochemical analysis compatible with urine. In the scintigraphy, we can observe a urinary leakage and a collection of radiotracer in the flank. CT describes leakage of urine from the lower pole of the kidney (Figs. 1 and 2). We attempted to perform conservative management with percutaneous nephrostomy placement, and given the technical impossibility of a puncture of the collecting duct, we decided to perform surgical examination. During the surgical procedure, we can see an area of lower pole renal infarction (Fig. 3). We released the infarcted parenchyma of the renal pelvis, which is not affected, and partial nephrectomy of the necrotic segment was conducted. We placed a nephrostomy tube and the urinary tract was closed with 3/0 polyglycolic acid, checking the tightness of the closure and all the urinary tract into the bladder by means of puncture and instillation of saline under pressure in the urinary tract. Omental interposition after buttonhole opening in the peritoneum, on the partial nephrectomy bed (Fig. 4). The omentum was sutured to the kidney capsule with renal parenchymal sutures of reabsorbable synthetic polyester,
and we proceeded to the closure of the peritoneal button-hole on the omentum.

The patient has a good post-surgery evolution, with good diuresis and renal function and with normal ultrasound scan controls, so they are discharged. 10 months after the transplant, they present creatinine figures of 1.9 mg/dl, with 0.85 mg/dl urea.

Discussion

Although in the past 30 years, morbidity and graft loss due to urological complications have decreased, the number of urinary fistulas ranges between 0 and 8.9% in the different series, in most being close to 2%, which makes them one of the most frequent urological complications in patients recipient of a renal transplant, being able to be minimized by means of ureteral catheter placement during the implant.

Another complication that can compromise the renal graft function is the occurrence of segmental infarctions due to vascular complications of the renal transplant. Vascular complications range between 1 and 23% in the different series, segmental infarctions occurring in 4–42% of the cases, varying according to the diagnostic method used to discover them.

Most of these complications, both urological and vascular, are attributed to technical or surgical errors during organ extraction or implant. In the particular case of segmental infarctions of the graft, the etiology is usually multifactorial, there being known predisposing factors, such as ischemic time, presence of arteriosclerosis or aneurysms in vessels of the donor or the recipient, or kidney grafts with multiple arteries. The most common location of these infarctions is the lower pole of the kidney, affecting or not the vascularization of the ureteropelvic system. When these areas of ischemia are very extensive and deep, they can cause necrosis of the pylocaliceal or ureteral system and cause urinary fistulas. The management described in the literature for these fistulas is variable, ranging from conservative management with antibiotics and urinary diversion with double J or nephrostomy to transplantectomy. Aspects of the graft should be considered, such as its function and the size of the necrotic area and of the recipient such as the general condition and its comorbidities.

Although partial nephrectomy has proved to be a feasible alternative and with good results in cases of tumors in the kidney graft, few cases have been described in the contemporary medical literature with a surgical approach to urinary fistulas due to segmental necroses by means of partial nephrectomy and repair of the collecting system, although there are already previous reports with this management. In the 10 cases reported from 1995 to the present, 9 had a favorable short- and long-term postoperative evolution, with preservation of the renal function in the controls conducted up to 5 years after surgery, with a case of death from postoperative cardiopulmonary complications.

The clinical presentation was oliguria and febrile syndrome in the 2 cases of late presentation, occurring at 2 months after the surgery. In the cases of fistula, in the
immediate postoperative period, the clinic was urinary leakage through the drainage, occurring between day 9 and 17 after the transplant. In our case, the leakage occurred in the immediate postoperative period, on day 9, as a sudden increase of debit due to the drainage.

The usual diagnostic tests to confirm the fistula are doppler ultrasound of the renal graft to rule out collections, performed in all the cases reviewed, being able to be complemented with abdominal CT or scintigraphy and arteriography.

The location of the infarcted area corresponded to the upper pole in 4 cases and the lower one in 6 cases, with pyeloureteral necrosis in 3 of them. In 8 of the 10 cases there was more than one renal artery in the graft, this being one of the clearest predisposing factors for the development of segmental infarctions. In the remaining 2 cases, the ischemia was due to occlusion of subsegmental renal arteries, since there was single renal artery. In one of these cases, the cold ischemia time was 34 h, a well-known risk factor of segmental infarction of the graft. In our case, the renal graft had 2 arteries, one of them having been accidentally sectioned beyond repair, as a prominent risk factor for the onset of segmental infarction, whereas the cold ischemia time was low.

The surgical management in all the cases reported until now consisted of partial nephrectomy with primary closure of the collecting system. In 3 of them pyeloureterostomy being necessary with the homolateral or the contralateral ureter of the patient. In 8 of the 10 cases, the suture of the calyceal system and the renal parenchyma was reinforced, in 4 with parietal peritoneum, in 2 with lyophilized dura and fibrin, in one only with fibrin, and in another case with a PTFE patch. In 4 patients a double J catheter was left placed, while in another 4 the urinary tract was diverted with percutaneous nephrostomy. Our surgical approach was to divert the urine to protect the suture through a nephrostomy tube and close the urinary tract performing a suture reinforcement with the omentum. The omental pedicle graft has been previously described for the reinforcement of ureteroureteral and ureterovesical anastomoses in recurrent fistulas in renal grafts, with good results in the published cases. Given the good results reported, and taking into account the shortage of donors, the approach by partial nephrectomy seems appropriate in the cases of ischemic urinary fistula in the renal graft. This nephron conservative management must be applied in cases in which the previous renal function and the amount of healthy parenchyma indicate a proper kidney graft outcome despite the obvious surgical complexity.

Conclusions

Despite the small percentage of cases where they occur, urinary fistulas due to segmental renal graft necrosis are a source of significant morbidity and mortality. The factors that are associated with their presentation are partially known, so it is necessary to insist on careful surgical handling during extraction and implant of the graft to prevent vascular lesions, especially in multiple pedicles. The proposed treatment of this complication varies between the consulted series. Given the good results, management by means of partial nephrectomy of the graft must be considered in selected cases, being able to use different reinforcing materials of the urinary tract. The application of the omentum as reinforcement of partial nephrectomy in this context was satisfactory in our experience.

Conflict of interest

The authors declare that they have no conflict of interest.

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