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Imaging-Guided Percutaneous Transperitoneal Balloon Fenestration of Postrenal Transplant Lymphocele: A Case Report of Experience with New Technique

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Abstract

Renal transplantation is the treatment of choice for improved survival and quality of life in patients with end-stage renal disease. However, perirenal fluid collections are common surgical complications after renal transplant, with about 0.6 to 18% of patients developing a lymphocele. Conventional treatments include percutaneous aspiration and drainage, laparoscopic fenestration, and open surgical decompression stepwise. Recently, a new image-guided percutaneous transperitoneal balloon fenestration technique has been described as an alternative to the laparoscopic or surgical technique. We present the case of a 25-year-old male patient diagnosed with a lymphocele after 2 months of transplantation and no resolution of the lymphocele with percutaneous aspiration and drainage. We used this new technique under ultrasound and fluoroscopy guidance, which resulted in the resolution of the lymphocele at 1 month postprocedure. This case report highlights this new technique's potential role in successfully managing the posttransplant lymphocele in a minimally invasive manner.

Keywords
- NECT
- ESRD
- PTA

Background

Renal transplantation improves survival and quality of life of patients suffering from end-stage renal diseases (ESRDs). However, perirenal fluid collections are a common urological complication and may cause graft dysfunction. A lymphocele is a collection of lymphatic fluid around the transplanted kidney contained by pseudomembrane with a reported incidence of 0.6 to 18% in the literature.[1] The exact pathogenesis is yet to be confirmed; however, it is thought to result from disruption of lymphatic channels in the hilum or iliac fossa during the surgical procedure.[2] Most of the lymphoceles are small and asymptomatic and resolve spontaneously, while larger lymphoceles cause symptoms and usually present clinically 1 week to 6 months after transplant[3] and, therefore, require treatment to preserve the graft function. Treatment options, stepwise, include percutaneous aspiration and drainage, sclerotherapy with ethanol, laparoscopic fenestration, and open surgical fenestration. Recently, a novel minimally invasive image-guided percutaneous

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transperitoneal balloon fenestration has been described as an alternative to laparoscopic or open surgical fenestration.

Case Presentation

We present the case of a 25-year-old male patient who underwent renal transplantation for ESRD. After 2 months posttransplantation, the patient presented with rising serum creatinine levels to the transplant surgeon. A lymphocele was suspected based on non-contrast-enhanced computed tomography (NECT) abdomen findings, which revealed a large multiloculated perigraft fluid collection measuring $\sim 6 \times 6.2$ cm in the right iliac fossa near the lower pole of the transplanted kidney, causing a mass effect on the adjacent bladder (►**Fig. 1**). The diagnosis of a lymphocele was confirmed by analysis of the fluid from ultrasound-guided aspiration, which revealed increased lymphocytes and creatinine and urea levels similar to blood plasma. The patient was referred for a trial of percutaneous aspiration and drainage of the lymphocele. Ultrasound-guided percutaneous drainage was performed with a pigtail catheter; however, no resolution of the lymphocele occurred (►**Fig. 2**). The patient was then considered for laparoscopic fenestration in the next step; however, we initially chose the new image-guided percutaneous transperitoneal balloon fenestration technique because of the need for hospitalization and the risk of hospitalization complications from laparoscopic/surgical procedures.

An NECT was reviewed prior to the procedure to better understand the anatomical relations of the graft kidney and perigraft collection with the adjacent structures and decide the safest approach to the collection (►**Fig. 1**).

The procedure was performed under moderate sedation on an outpatient basis in a well-equipped angiography suite with care taken to maintain all aseptic conditions. Preprocedure antibiotics were administered. Ultrasound examination of the lower abdomen was performed to understand the relationship of the perigraft collection with adjacent structures such as the urinary bladder, bowel loops, and iliac vessels, and correlated with the preprocedure NECT. The lymphocele was filled with nonionic iodinated contrast for better visualization under fluoroscopy via the indwelling pigtail catheter in the collection (►**Fig. 3A**). A 4-Fr Neff percutaneous access set (Cook Medical, Bloomington, IN) was used to access the lymphocele using the paramedian approach. A 21-gauge introducer needle was placed into the lymphocele under ultrasound guidance by puncturing its ventral wall after passage through the intraperitoneal space and avoiding adjacent vessel injury. Two accesses were made in the superior and inferior aspects of the lymphocele. A 0.035-inch Amplatz curved support wire (Cook Medical) under fluoroscopic guidance was coiled in the collection (►**Fig. 3B**). Then, a 7-Fr introducer sheath (Cordis Corp., Miami Lakes, FL) was placed transperitoneally with the tip in the lymphocele. Following this, a 10×40 mm Mustang PTA balloon (Boston Scientific, Galway, Ireland) was advanced over the wire with the distal portion of the balloon centered in the fluid collection and the proximal portion outside the ventral wall of the lymphocele (►**Fig. 3C**). The position of the balloon was confirmed using ultrasound and fluoroscopy prior to inflation. Next, the introducer sheath was withdrawn, and the balloon was inflated at 8 and 12 ATM for 2 minutes each. Subsequently, the balloon was removed over the guidewire (►**Fig. 3D**). Postballoon fenestration, adequate drainage was seen, evidenced by the intraperitoneal contrast spill (►**Fig. 4**). All the sheaths and guidewires were removed under aseptic conditions at the end of the procedure. The indwelling catheter was locked and kept in the collection for 24 to 48 hours.

The patient was discharged on the same day following the procedure and called for follow-up examination after 1 week and then at 1- and 2-month intervals. Follow-up imaging was

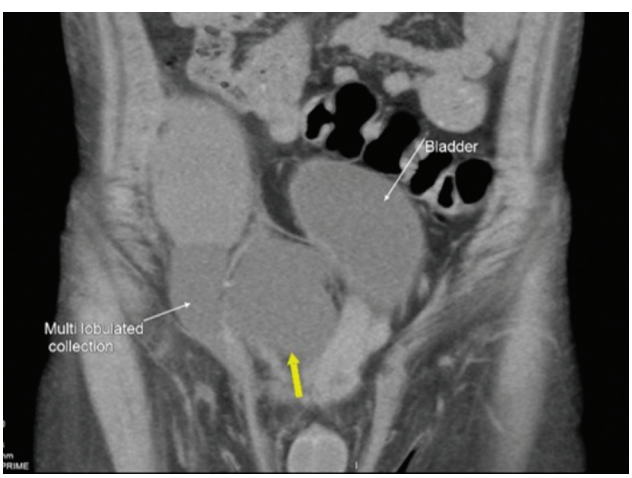

Fig. 1 A 25-year-old male patient with postrenal transplant status presented with rising creatinine. Noncontrast coronal computed tomography (CT) of the patient through the lower abdomen and pelvis before any procedure reveals large multiloculated perigraft fluid collection (*yellow arrow*) measuring $\sim 6 \times 6.2$ cm in the right iliac fossa extending to the pelvis and causing mass effect on the urinary bladder (*white arrow*) displacing it toward the left side.

Fig. 2 A 25-year-old male patient with postrenal transplant status presented with rising creatinine. The grayscale ultrasound image at the level of the right iliac fossa demonstrates nonresolution of the collection with the tip of the echogenic pigtail catheter (*white arrow*) within the collection.

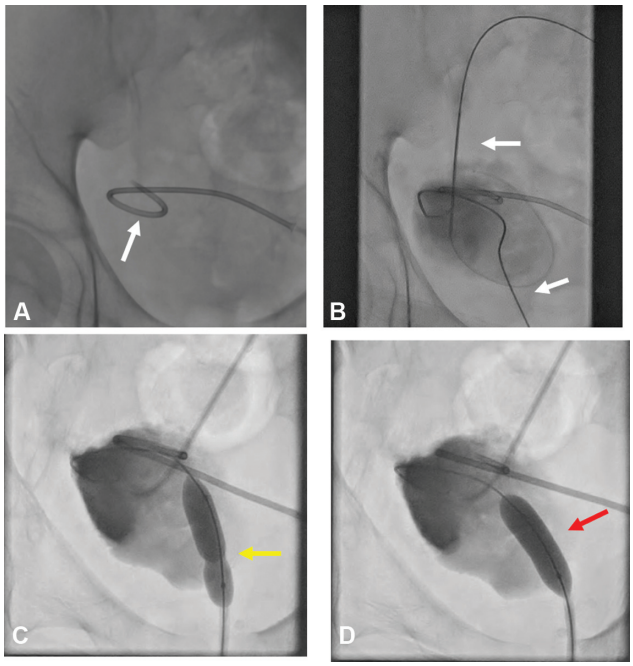

Fig. 3 A 25-year-old male patient with postrenal transplant status presented with a lymphocele. Fluoroscopic spot images demonstrate a pigtail (*white arrow*) in situ in the lymphocele through which iodinated contrast was administered into the lymphocele (**A**), 0.035-inch angled glide wire (*white arrows*) placed in the lymphocele via the Seldinger technique (**B**), angioplasty balloon advanced over the wire into the collection with distal portion of the balloon in the fluid collection and proximal portion outside the ventral wall of the lymphocele with constriction (*yellow arrow*) visualized at the level of ventral wall of the lymphocele (**C**), and further inflation of the balloon (*red arrow*) to enlarge the fenestration (**D**).

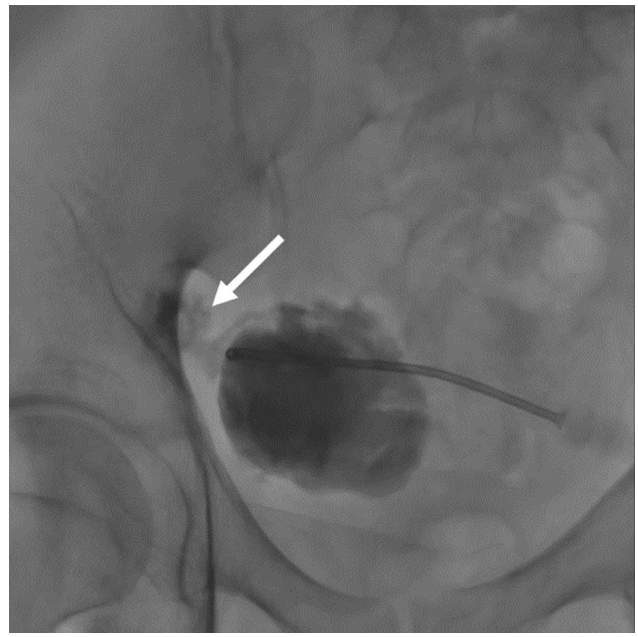

Fig. 4 A 25-year-old male patient with postrenal transplant status presented with a lymphocele. The fluoroscopic spot image obtained postballoon fenestration and balloon removal reveals contrast spill (*white arrow*) laterally outside the lymphocele. Note made of pigtail catheter seen in situ within the lymphocele.

done under ultrasound guidance to look for the resolution of the lymphocele. At 1 week postprocedure, the lymphocele was partially resolved and complete resolution of the lymphocele was observed at the 1- and 2-month follow-up visits (►**Fig. 5**).

Discussion

Postrenal transplant lymphoceles are common complications that increase the risk of graft dysfunction. Diagnosis is usually made in conjunction with clinical details, imaging features, and aspiration of the fluid. Unfortunately, there is no consensus regarding the optimal treatment method for lymphoceles. Treatment options include aspiration and drainage, sclerotherapy, and laparoscopic and open surgical lymphocele fenestration. Each modality has its own merits and demerits, for example, aspiration and drainage are associated with a high recurrence rate and increase the risk of infections, and laparoscopic and surgical options pose a greater risk of iatrogenic injury. The recurrence rate of percutaneous aspiration and catheter drainage is around 28% in the literature.[4] Open surgical drainage is associated with a complication rate of 4% and recurrence rate of 15% and laparoscopic fenestration is associated with a recurrence rate of 4 to 6% in the literature.[5]

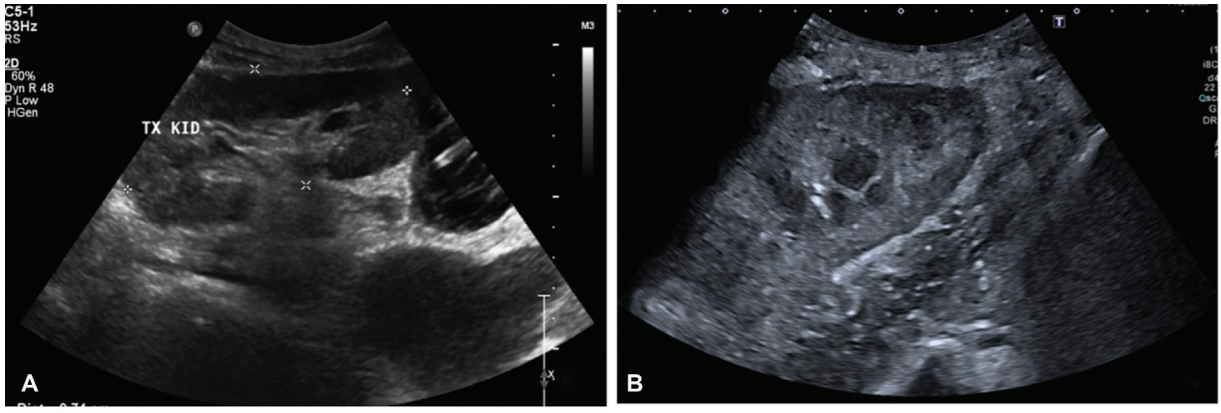

Fig. 5 A 25-year-old male patient with postrenal transplant status presented with lymphocele. Follow-up ultrasound (**A**) at 1 week postballoon fenestration shows persistence of the lymphocele (*white arrow*) and (**B**) at 1 month postballoon fenestration reveals resolution of the lymphocele.

Interventional radiology treatments, a minimally invasive option, can solve this dilemma by providing better resolution rates and avoiding the complications associated with surgical procedures. Gipson et al[6] introduced one such interventional technique of percutaneous transperitoneal balloon fenestration in 2013. They presented the case report of a 65-year-old African American man with ESRD who developed a perigraft lymphocele 6 weeks after surgery and presented with a progressive increase in serum creatinine levels. They initially managed the patient with image-guided aspiration and drainage, which failed. The patient was taken up for open surgical marsupialization. However, the surgery got complicated by ureteric injury and was aborted. Afterward, they chose the minimally invasive percutaneous balloon fenestration as the next step, which resulted in the resolution of the lymphocele at 3 and 5 months postprocedure.

In our case, we adopted the same technique to manage the posttransplant lymphocele and found promising results in resolving the symptoms and providing patient comfort. Although the technique is minimally invasive and less likely to cause complications, a careful review of preprocedure imaging investigations should be undertaken to understand the lymphocele relations with the renal graft, urinary bladder, bowel loops, and iliac vessels. Prior knowledge of all these details helps in better planning of the approach to access the lymphocele, the number of fenestrations to be made for adequate drainage, and avoiding injury to adjacent structures and vessels.

The advantages of balloon fenestration are similar to other percutaneous techniques, which include a minimally invasive technique, shorter recovery time, and avoidance of complication associated with laparoscopic and surgical procedures.

In conclusion, image-guided percutaneous transperitoneal balloon fenestration is a better alternative to laparoscopic and surgical technique in the management of postrenal transplant lymphoceles; however, large-scale studies with multiple patients are needed to evaluate the usefulness of this technique to consider it as the first-line management of lymphoceles.

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Conflict of Interest
None declared.

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