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Late-onset renal vein thrombosis: A case report and review of the literature



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ABSTRACT

INTRODUCTION: Renal vein thrombosis, a rare complication of renal transplantation, often causes graft loss. Diagnosis includes ultrasound with Doppler, and it is often treated with anticoagulation or mechanical thrombectomy. Success is improved with early diagnosis and institution of treatment.

PRESENTATION OF CASE: We report here the case of a 29 year-old female with sudden development of very late-onset renal vein thrombosis after simultaneous kidney pancreas transplant. This resolved initially with thrombectomy, stenting and anticoagulation, but thrombosis recurred, necessitating operative intervention. Intraoperatively the renal vein was discovered to be compressed by a large ovarian cyst.

DISCUSSION: Compression of the renal vein by a lymphocele or hematoma is a known cause of thrombosis, but this is the first documented case of compression and thrombosis due to an ovarian cyst.

CONCLUSION: Early detection and treatment of renal vein thrombosis is paramount to restoring renal allograft function. Any woman of childbearing age may have thrombosis due to compression by an ovarian cyst, and screening for this possibility may improve long-term graft function in this population.

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1. Introduction

Renal vein (RV) thrombosis² is a rare but dreaded complication of renal transplantation, which often causes graft loss.³ It is characterized clinically by sudden development of anuria accompanied by tenderness over the graft site.⁴ Traditionally, RV thrombosis is diagnosed through ultrasound with Doppler¹ and is often treated with anticoagulation or mechanical thrombectomy.⁵ Success is variable and is improved with early diagnosis and institution of treatment.⁴

Early RV thrombosis, which is defined as occurring roughly within the first two weeks post-transplant, has a reported incidence of approximately 0.4–6%.⁶ The development of late renal vein thrombosis is more rare with an incidence of 0.5–4% after the fourteenth post-operative day (Table 1). The most common causes of early RV thrombosis are technical errors including a kink in the renal vein, an anastomotic stenosis, diminished flow due to hypovolemia or intrinsic renal allograft vasculopathy, and post-operative hypercoagulability.¹ Late causes include those previously

mentioned as well as compression of the renal vein by a lymphocele or other fluid collection.^{5,7}

Simultaneous kidney pancreas transplant is the gold standard of treatment for Type I diabetic patients who have developed end-stage renal disease (ESRD) because it significantly increases survival.^{8,9} Yet, graft thrombosis can occur after this procedure and may result in failure of both grafts, particularly if the thrombosis occurs in the pancreatic vessels.¹⁰ Traditionally, the pancreas allograft is placed in one iliac fossa and the renal allograft is placed in the contralateral iliac fossa¹¹; however, occasionally the grafts may be placed within the same fossa to keep the opposite iliac

Table 1

Characteristics of early versus late renal vein thrombosis.

	Early RV thrombosis	Late RV thrombosis
Time course	Within 2 weeks post-transplant ⁶	Greater than 2 weeks post-transplant
Incidence	0.4–6% ⁶	0.5–4%
Causes	Kink in the renal vein Anastomotic stenosis Diminished flow ¹	Kink in the renal vein Anastomotic stenosis Diminished flow Compression of renal vein ^{5,7}
Prognosis	Poor	Very poor

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Fig. 1. CT imaging showing renal transplant (white arrow), renal vein stent (thin black arrow), and mass representing right ovarian cyst (thick black arrow).

artery and vein pristine, in case graft failure develops necessitating re-transplantation.

Here we present a case involving a young woman who underwent a simultaneous kidney pancreas transplant and subsequently developed very late-onset RV thrombosis due to incarceration of an ovarian cyst between the renal artery and vein.

2. Presentation of case

The patient is a 29 year-old female with a history of Type I diabetes and hypertension leading to end-stage renal disease in June 2011 requiring hemodialysis. The patient was placed on the UNOS list after completing her evaluation on November 3, 2011, for a simultaneous kidney pancreas transplant. A deceased donor kidney and pancreas from an 18 year-old became available with a negative cross-match, and she underwent simultaneous kidney pancreas transplantation with enteric systemic drainage. Both organs were placed at the right lower quadrant of the abdomen. The patient’s post-operative recovery was uneventful, and she was discharged home on post-operative day 8 with standard immunosuppression of tacrolimus, mycophenolate, and a steroid taper.

On June 30, 2012, she developed sudden, severe suprapubic pain and urinary retention along with nausea, vomiting and diarrhea. She was admitted to the hospital and labs revealed leukocytosis, hematuria, and elevated creatinine. Doppler ultrasound of the

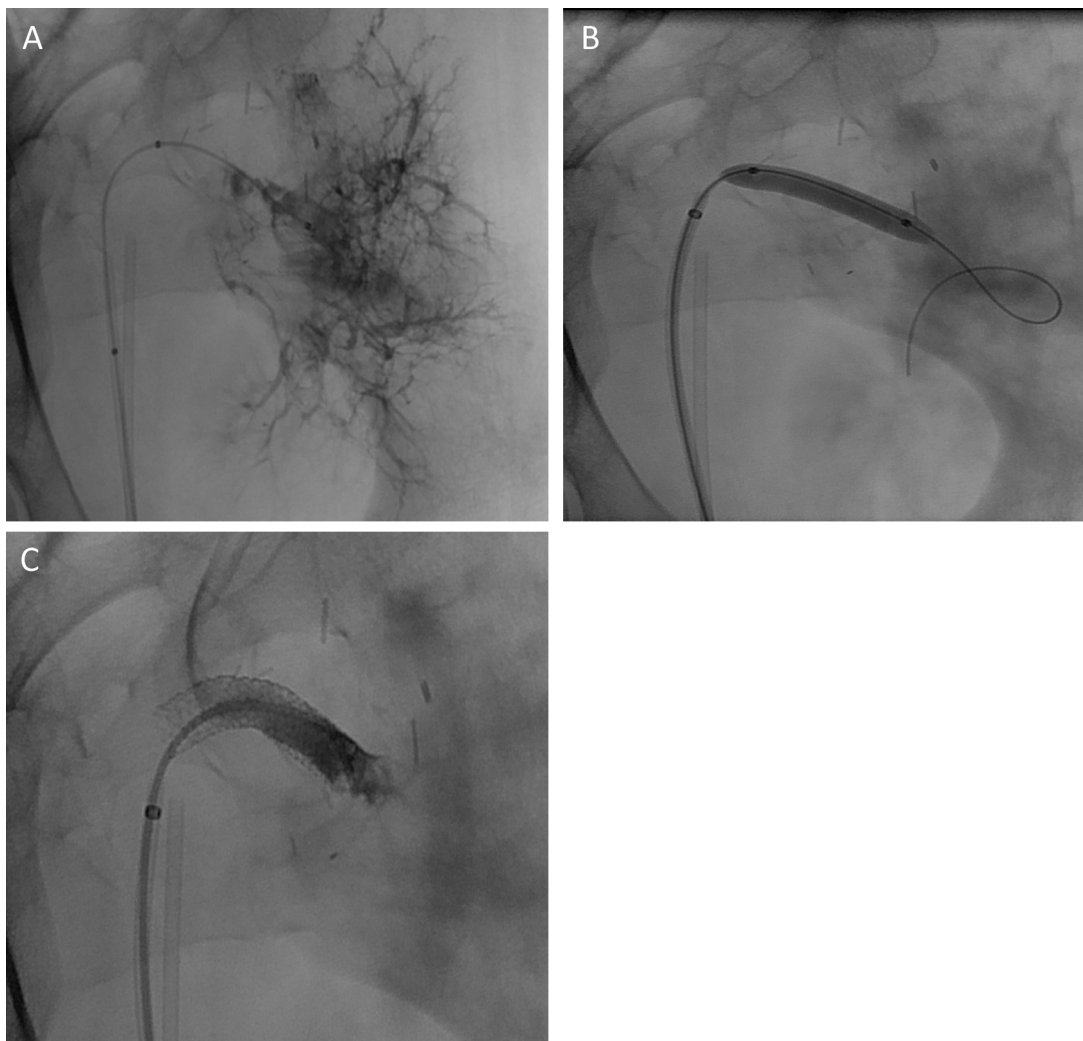


Fig. 2. Angioplasty (A and B) and stenting (C) of the transplant renal vein.

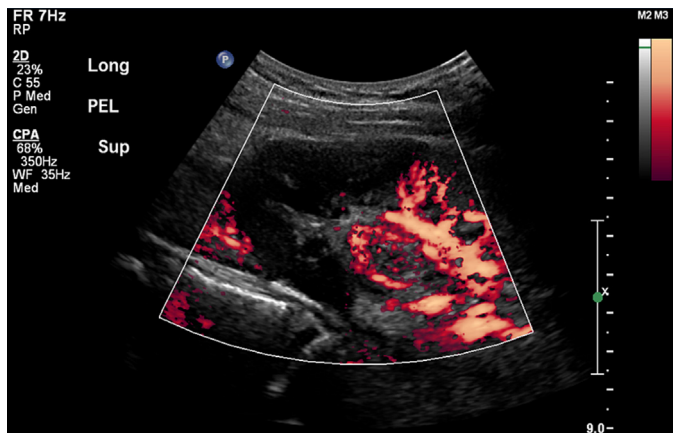


Fig. 3. Power Doppler trans-abdominal image at one week post-revascularization demonstrates absent flow to the upper pole of the transplant kidney, consistent with segmental infarction.

transplant kidney revealed thrombosis of the transplant renal vein with a large right ovarian cyst greater than 6 cm in diameter. The ultrasound findings were consistent with the CT image shown in Fig. 1. The patient was sent to interventional radiology where thrombosis and compression of the mid portion of the renal vein were discovered. She underwent emergent mechanical and chemical thrombolysis of the transplant renal vein and had a metal stent measuring 7 mm × 37 mm placed across the anastomosis (Fig. 2). She was started on anticoagulation therapy with heparin. The vein and artery had appropriate flow post-procedure.

Afterward she began complaining of severe right lower quadrant pain, nausea, vomiting and became septic with a fever of 101 °F. She remained anuric and required hemodialysis. Repeat renal ultrasound performed next day showed resolution of the transplant renal vein thrombosis, but 67% of the transplant kidney developed infarct (Fig. 3). The decision was made to take the patient to the OR for transplant nephrectomy. The abdomen was re-opened through the previous midline incision. A right ovarian cyst was noted to be incarcerated between the transplant renal artery and vein, compressing both vessels (Fig. 4). A transplant nephrectomy and right ovarian cystectomy were performed. The patient had an uneventful recovery. Her pancreas allograft continued to function very well throughout these events, so the patient was re-listed for a kidney transplant.

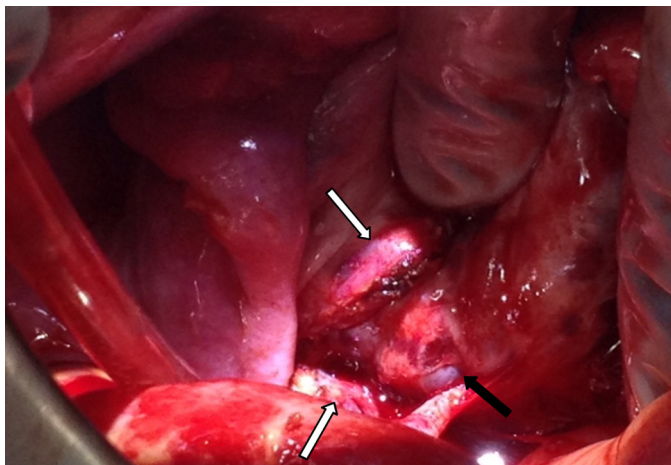


Fig. 4. A right ovarian cyst (black arrow) was noted to be incarcerated between the transplant renal artery and vein (white arrows), compressing both vessels.

3. Discussion

Renal vein thrombosis can be a devastating post-kidney pancreas transplant complication. Extremely early detection and treatment are paramount to preventing graft loss. Contributing factors include the increased incidence of venous thromboembolism in end-stage renal disease.¹² Here we described a new cause of renal vein compression in a female of childbearing age. The presence of an ovarian cyst in this patient may not be entirely unexpected considering that development of hormonal derangement is common in ESRD.¹³ Renal transplant recipients often have elevated estradiol and other gonadal hormones, which contribute to the development of ovarian cysts.¹⁴ The patient had a large cyst of more than 6 cm in diameter incarcerated between the renal artery and vein, which caused compression of both renal vessels leading to thrombosis of the renal vein.

Considering the high rate of allograft loss after RV thrombosis, the importance of prevention cannot be over-emphasized. Current literature does not support the routine use of pharmacologic prophylaxis to prevent RV thrombosis. Although pharmacologics may prevent spontaneous thrombus formation, there is potential for the development of lymphoceles and hematomas that can cause compression leading to thrombosis.^{15,16}

Prevention of renal vein compression from an ovarian cyst may be accomplished by careful screening in women of childbearing age, which would include a thorough gynecologic history, and possibly pre-operative ultrasound focused on identification of ovarian size and presence of cysts. Additionally, in patients undergoing simultaneous kidney pancreas transplants, the kidney may be placed on the contralateral side from the pancreas to avoid crowding and the increased potential for incarceration and compression.

Early detection of a compressive lesion causing RV thrombosis must be accomplished if treatment is to be initiated in time to save the graft. A strong clinical suspicion leading to early Doppler ultrasound imaging must be present to identify thrombosis due to compression. Effective treatment to relieve the compression may involve early re-exploration if one suspects it is due to a cyst, other solid lesion, or a lymphocele or hematoma. Resolution of the thrombosis may require urgent thrombectomy, renal vein stenting,¹⁷ and/or anticoagulation.

4. Conclusion

Early recognition of RV thrombosis via strong clinical suspicion correlated with imaging is paramount to achieving a good outcome in women of childbearing age who are renal transplant recipients, as they may have thrombosis due to renal vein compression by an ovarian cyst.

Conflict of interest

None of the contributing authors have any financial or personal relationships with people or organizations that could inappropriately influence work on this case report.

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None.

Ethical approval

None required.

Consent

Informed consent was performed and signed with the patient involved, and is available for review by request.

Author contributions

Jessica L. Hogan MD, first author, contributed to the study concept, data collection, data analysis, writing the paper; Stanton

J. Rosenthal MD, manuscript reviewer, contributed to the data analysis; Sri G. Yarlagadda MD, manuscript reviewer, contributed to the study concept; Jill A. Jones MD contributed to the data analysis and interpretation, data collection; Timothy M. Schmitt MD, Sean C. Kumer MD, Bruce Kaplan MD and Shenequa L. Deas MPH are the manuscript reviewers; Atta M. Nawabi MD, senior author and the manuscript reviewer, contributed to the study concept, data analysis, manuscript.

Key learning points

- Early detection of renal vein thrombosis is critical to graft loss prevention.
- Simultaneous kidney pancreas transplant is a gold standard of treatment for those with end-stage renal disease due to Type I diabetes mellitus.
- Female kidney transplant patients of childbearing age should be screened for ovarian cysts to avoid preventable renal vessel compression and to improve long-term graft function.

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