Case presentation
Transplanted kidney

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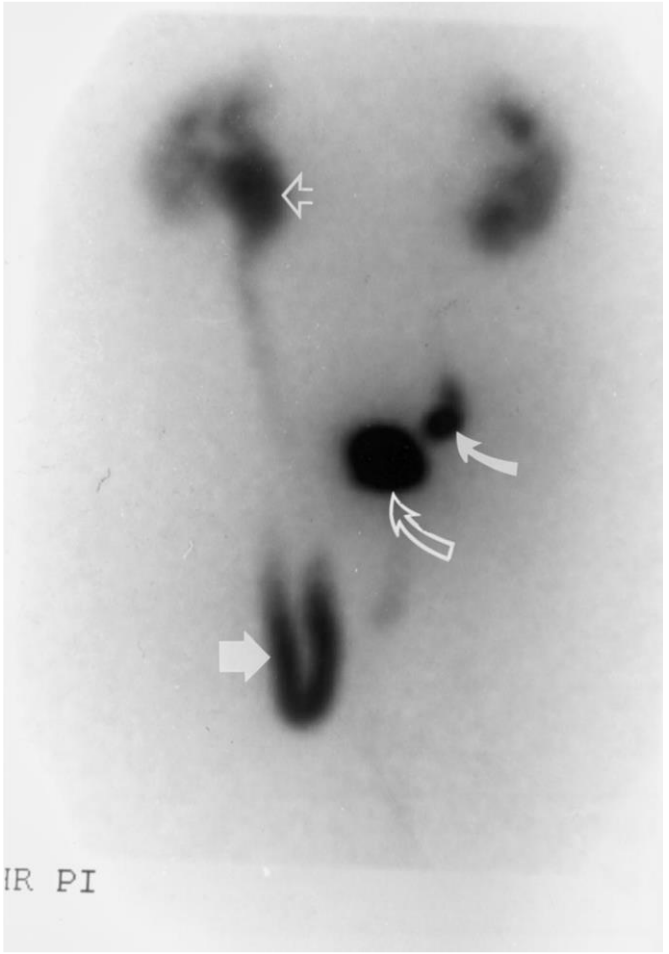
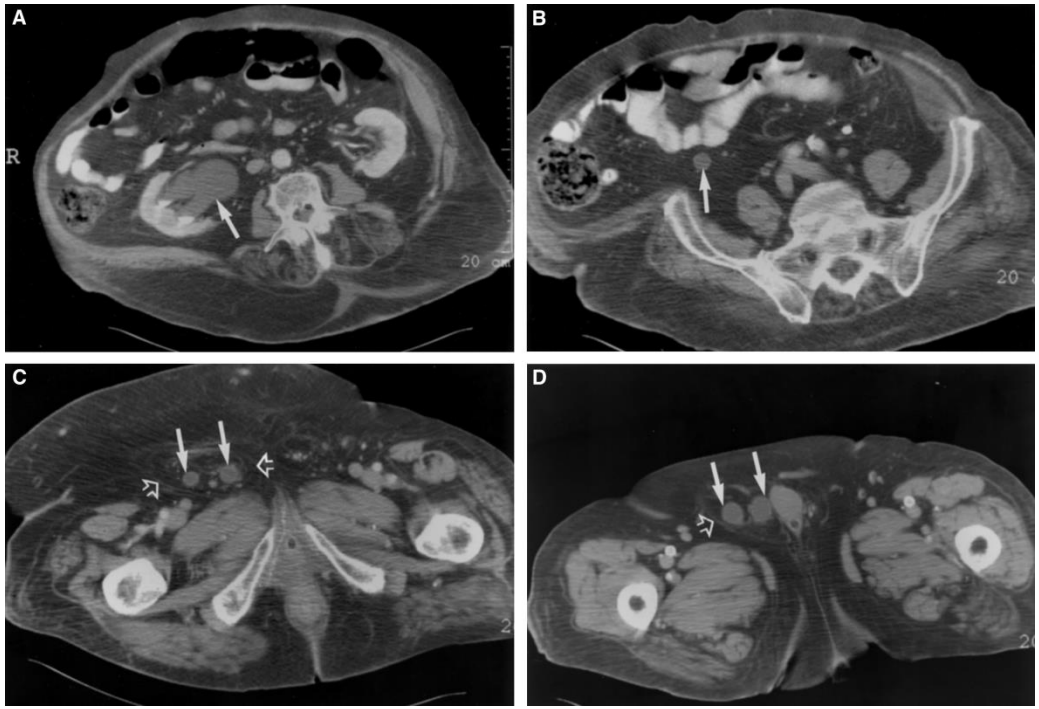
Clinical Nuclear Medicine • Volume 28, Number 8, August 2003 *INTERESTING IMAGES*

- An 81-year-old man with a past history of bladder outlet obstruction, transurethral resection of the prostate, and bilateral hydroureteronephrosis presented with fever and suspected urinary tract infection.

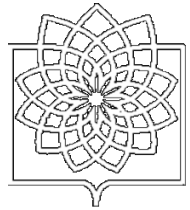
- Images from a Tc-99m (MAG3) renal scan showed dilatation of the right renal pelvis (open arrowhead) and a short segment of the distal left ureter (curved solid arrow). The distal right ureter was dilated (solid large arrow) and extended into and then out of a right inguinal hernia, below the level of the bladder (curved open arrow).





Images from a computed tomographic scan of the abdomen and pelvis performed with oral and intravenous contrast on the patient showed dilatation of the right renal pelvis (arrow, A) and of the right ureter (arrows, B–D). The redundant right ureter within the inguinal hernia was demonstrated twice in cross-section (arrows, C and D), corresponding to the U-shaped appearance of the distal right ureter in Figure 1. A hernia was visible surrounding the distal ureter (arrowheads, C and D)

Ureteral obstruction



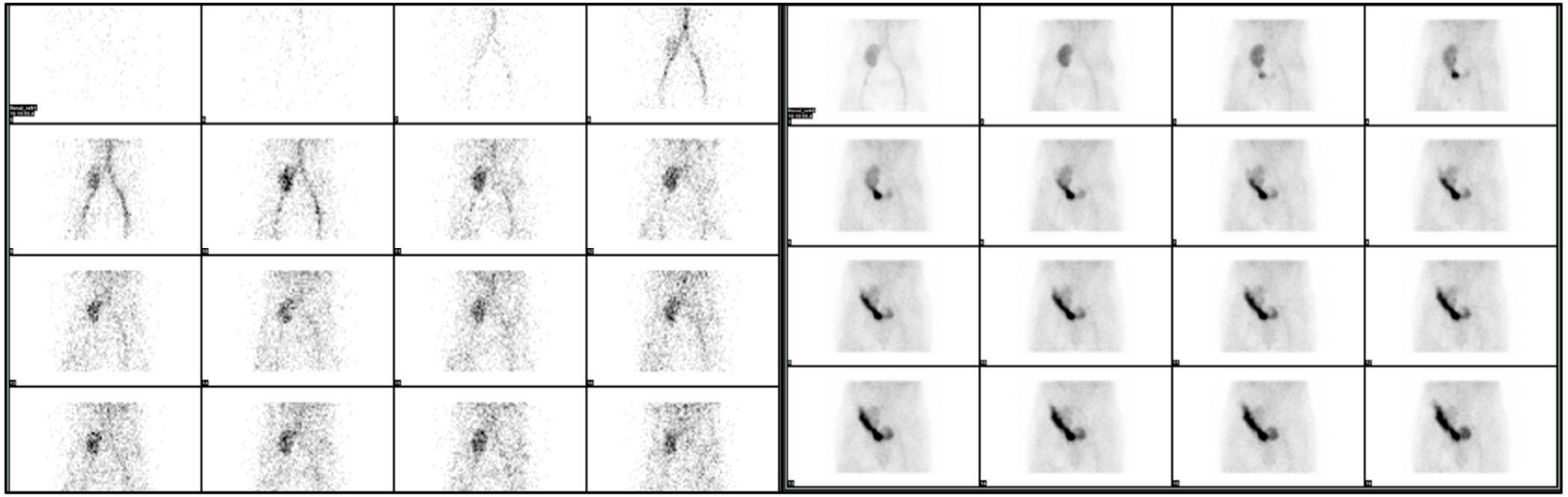
- Ureteral obstruction is the cause graft function, which occurs with the frequency of 5-10 percent in transplant kidney and usually seen in early post-transplant period related to ischemic stenosis, anastomotic problems, external compression of hematoma and lymphocele or technical failure.
- Late obstructive uropathy might be caused by fibrosis of the ureter related to microvascular damage, polyoma virus, ureterolithiasis and malignancy.

- ***Inguinal hernia is a rare cause of ureteral obstruction***

- Renal scintigraphy with ^{99m}Tc-DTPA showed a good overall accuracy in the detection of renal graft complications, leading to prompt clinical management and preventing further deterioration of renal function.
- Patients are usually referred for renography to assess the patency of the urinary tract on the basis of pelvicalyceal dilatation detected on ultrasonography, or a rising serum creatinine level.
- Ureteral obstruction is a relatively common complication of renal transplantation and it comprises almost half of postoperative urologic complications.
- ***A rare cause of obstructive uropathy is herniation of the transplant ureter into an inguinal hernia and it should be considered in the differential diagnoses of an obstructed transplant kidney.***
- We present for the first time in renal scintigraphy with ^{99m}Tc-DTPA, a rare case of late ureteral obstruction in a transplant kidney due obstructed herniation of the transplant ureter in a right inguinal hernia.

Case 2

26-year-old man, 6 days after the transplant, increased Cr level to 3.2



Urinary Leak

- Urinary leak is the **most common early urological complication** and usually appears within the first month.
- Its incidence is reported to range from 1.2% to 8.9%.

• Etiology

- Direct injury during the organ harvest or reimplantation.
- Ischemic necrosis caused by vascular compromise
- Nonwatertight anastomosis are the other reasons for urinary leak.

Urinary Leak

- **Symptoms** include fever, pain, swelling at the graft site, increased creatinine level, decreased urine output, and a cutaneous urinary drainage.

- The **diagnosis** of a urine leak after renal transplantation is often made by a combination of clinical findings and imaging studies.

- The **laboratory findings** may not be specific because serum creatinine values do not provide a consistent indication of a leak, as they do in cases of obstruction. A leak may result in ***some systemic reabsorption of urine*** and hence elevated serum creatinine often mimicking obstruction.

Urinary Leak

Imaging

- **US:** Urine leak may have anechoic or hypoechoic appearance with content of debris on US, differential diagnosis of such finding includes a lymphocele.
- **CT:** attenuation measurement does not help in differentiating between lymphocele and urine, because they both have simple fluid attenuation, which is lower than 10 HU. Hematoma attenuation is higher than those of lymphocele and urine, usually greater than 30- 40 HU.
- **MRI:** Lymphocele and urinary leak demonstrate low intensity on T1 signal and high intensity on T2 signal; thus, MRI is not able to differentiate between those.

Management

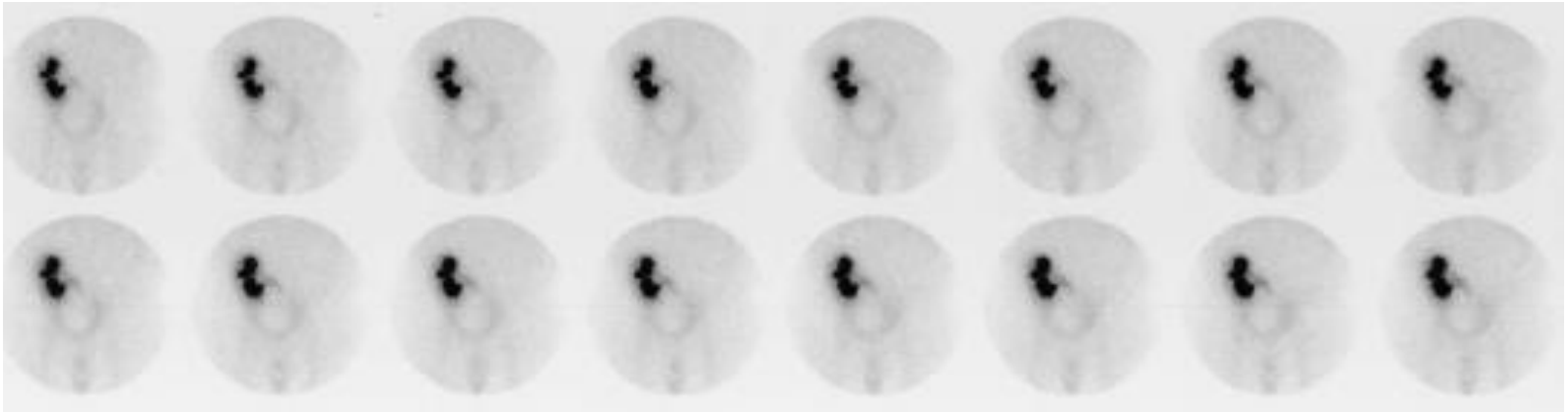
- Retrograde stent placement may be sufficient for small leaks from ureter; on the other hand, reimplantation is necessary for the larger ureteral leaks.

- Surgical repair may be necessary for larger leaks from bladder, whereas catheter drainage is sufficient for the treatment of small leaks.
- Enlarging perinephric fluid collection may result in mass effect on the kidney or collecting systems. Percutaneous or image-guided drainage is often sufficient for the treatment.

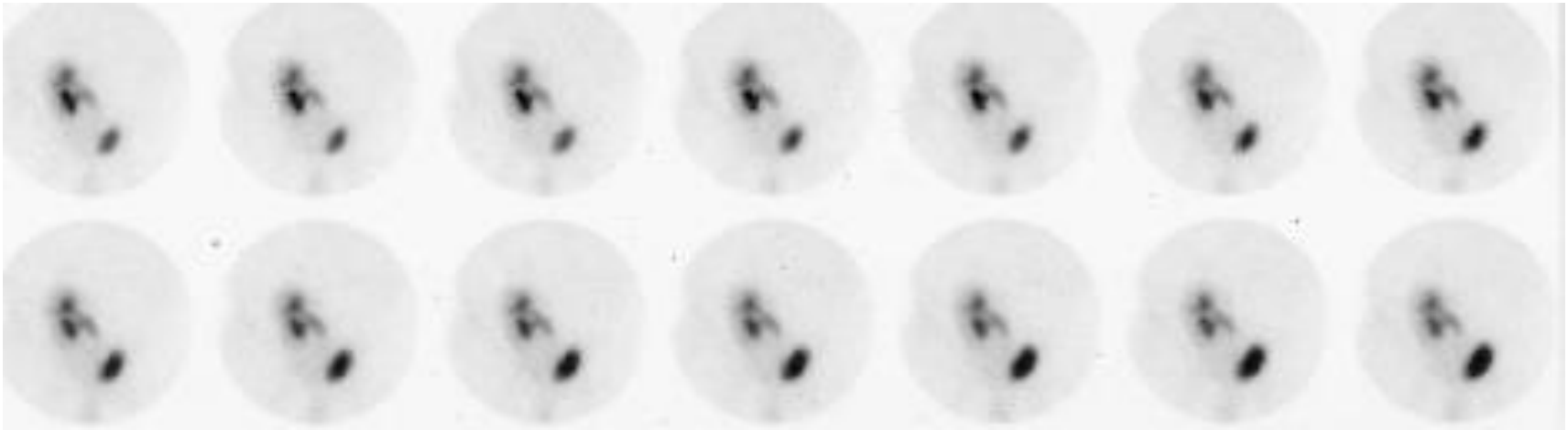
- **Early surgical exploration with ureteral reimplantation** is indicated for ***very early leaks, large leaks, or leaks that do not respond to conservative measures.***

Case 3

A 64-year-old man who underwent a living, unrelated donor renal transplant for focal segmental sclerosing glomerulosclerosis had an unremarkable postoperative course and recovered well. However, 30 months after the transplant, the patient presented with abdominal pain.



- **Lasix injection**

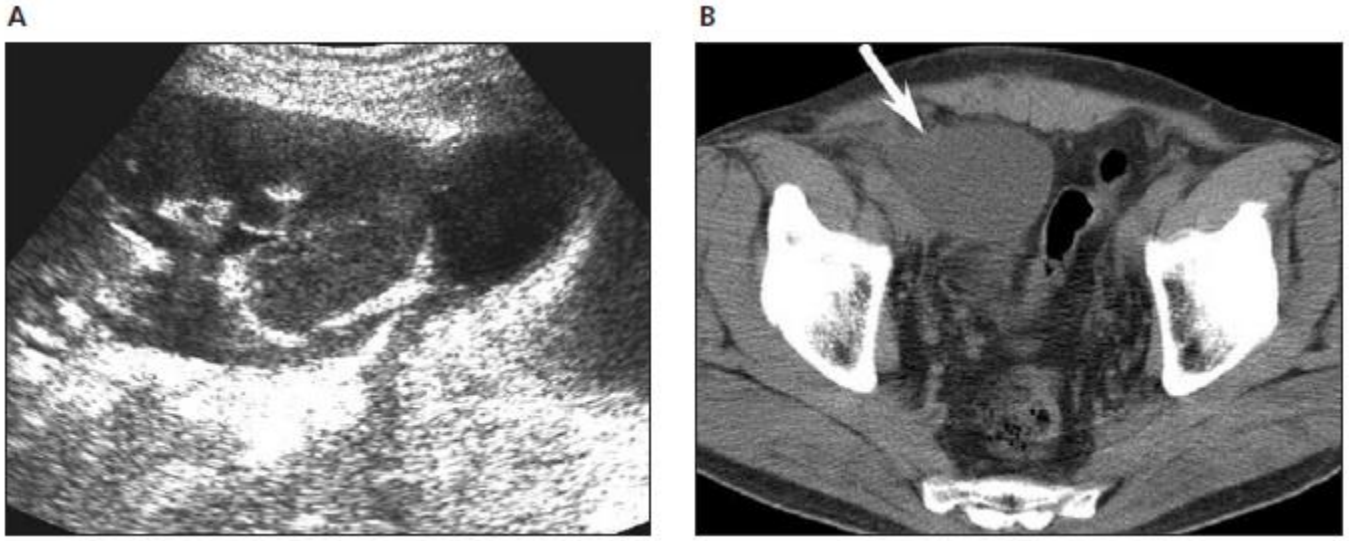


Differential diagnosis

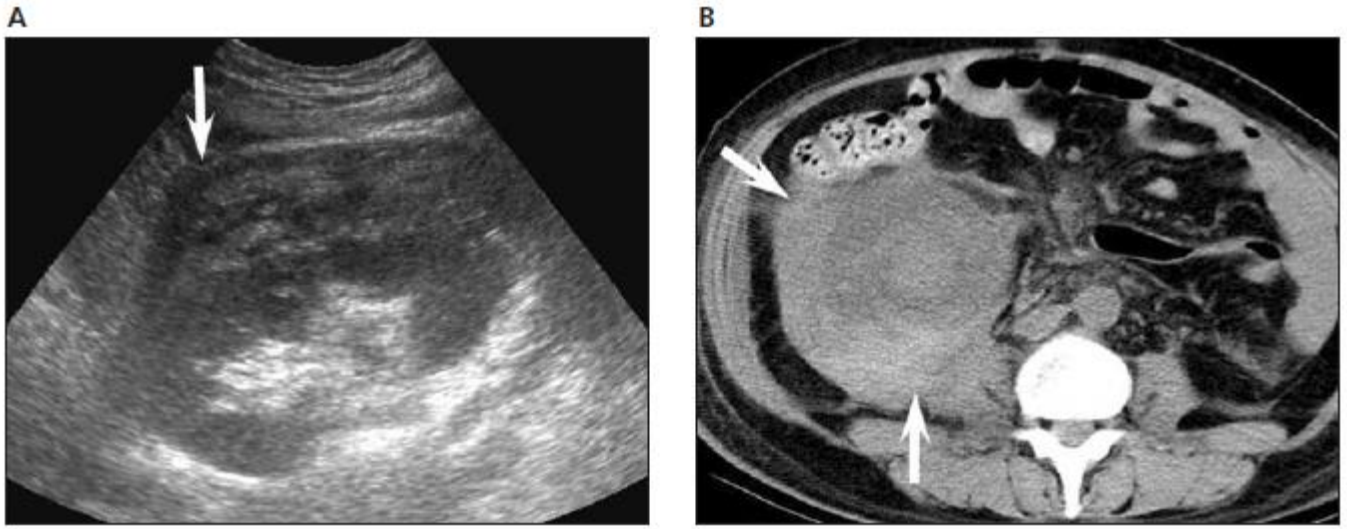
- Lymphocele
- Hematoma
- Abscess

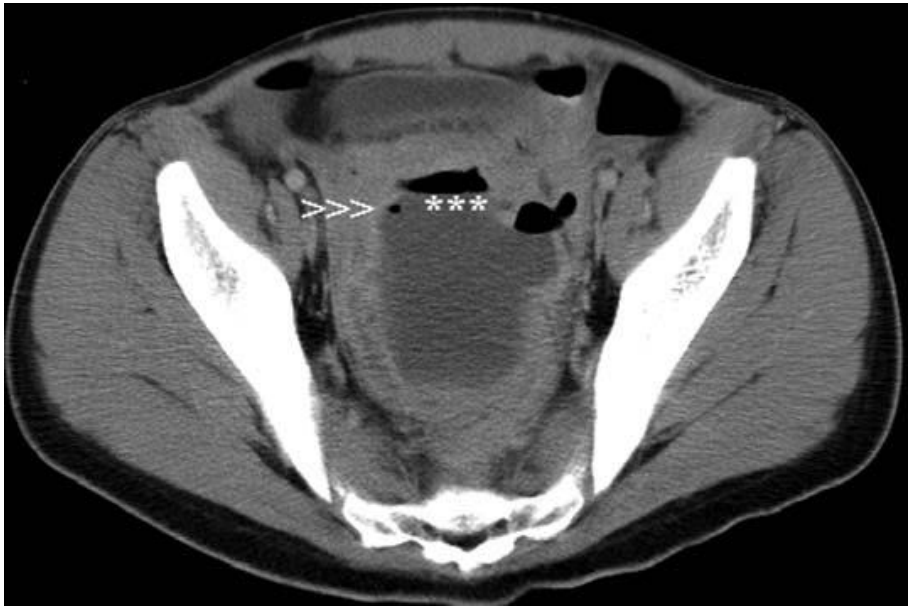
Nonenhanced CT show hydronephrosis (arrows) and a multiseptated fluid collection surrounding the renal transplant and in the pelvis.

A and **B**, Gray scale ultrasonography (**A**) and nonenhanced CT (**B**) show urinoma formation (arrow) around the transplanted kidney



Perinephric hematoma in a 48-year-old woman. **A**, Gray scale ultrasonography shows a slightly hyperechoic perinephric fluid collection (arrow), indicating presumed hematoma. **B**, Nonenhanced CT shows a perinephric hematoma formation (arrows) around t



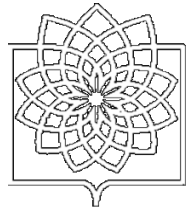


Abscess

Peritransplant Fluid Collections

- Peritransplant fluid collections include urinomas, hematomas, seroma, lymphoceles, and abscesses.
- Its occurrence rate is **high and reported up to 50%.**
- Their **size and localization** determine their clinical significance.
- Small hematoma and seromas are commonly expected in the first week after surgery.
- Abscesses and urinomas occur between first and third week after transplantation.
- Collections with **increase in size** are mainly because of urine leaks, abscesses, or vascular injuries.

Hematoma



- In the immediate postoperative period, hematoma formation is a common finding. Asymptomatic small hematomas can resolve spontaneously.
- Hematomas can be seen in patients on **anticoagulant therapy or following percutaneous biopsy.**
- Subcapsular hematomas, which are different from perinephric hematomas, may occur following trauma or graft biopsy. They may exert mass effect on the renal parenchyma, which can result in hypertension.
- Pressure effect on the graft and adverse effects on **arterial blood flow**.
- Compression of hematoma on the **collecting system** also can cause hydronephrosis.

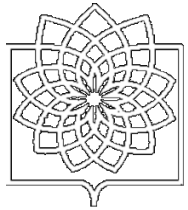
DX

- **US:** Heterogeneous perinephric collection on US.
- **CT:** Peritransplant fluid with an attenuation value around **30-40 HU.**
- **MRI:** Heterogeneous signal intensity varies based on the **age of the blood products.**

Managment

- Large hematomas should be surgically treated.

Lymphatic Complications



- **A lymph-filled collection without an epithelial lining, but surrounded with a fibrous capsule is called "lymphocele.".**

- Lymphocele occurs because of extensive dissection of the lymphatic vessels around the recipient's iliac vessels and dissection of the lymphatics around the donor kidney during the surgical procedure.

- Recent evidence showed that **other medical causes**, such as immunosuppressive drugs, DGF, coagulation abnormalities, diabetes, retransplantation, obesity, and rejection episodes, may also contribute to the formation of lymphoceles in transplanted patients.

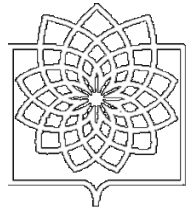
- The incidence of lymphocele in symptomatic transplants varies between 0.03 % and 26 %.
- In asymptomatic patients, the incidence is reported to be high, up to 34%.
- It is an early complication and can be seen any time between **2 weeks to 6 months** following transplantation; however, **peak incidence is at 6 weeks**.

Diagnosis

- **Fluid collections can easily be detected by US; however, findings are not specific for lymphocele diagnosis.**

- **US: Anechoic on US**
- **CT : Attenuation is lower than those of hematoma and abscess.**
- **CT attenuation measurement does not help in differentiating between lymphocele and urine, because they both have simple fluid attenuation, which is lower than 10 HU.**

Lymphocele most commonly occurs between the graft and bladder;



- It may cause hydronephrosis.
- Graft function may be impaired because of mass effect of lymphocele.
- Compression of the femoral vein may result in the edema of lower extremity, scrotum, labia, or abdominal wall.

Management

- Lymphatic disorders can resolve spontaneously.
- Most lymphoceles are detected incidentally and patients are asymptomatic. Their close follow-up by US is sufficient in most cases.
- Treatment may be necessary in the patients from 0.04% to 14.6%.
- If patient is **symptomatic or the volume of lymphocele exceeds 140 mL**, therapy is required.

- Effective treatment option is percutaneous drain placement with or without application of sclerosing agents.
- **It is not effective when lymphocele volume is larger than 500 ml** then open or laparoscopic surgery is treatment of choice. Lymphoceles may reoccur.
- Recurrence rates are lower with sclerosing agents.

Thanks for your attention and patience