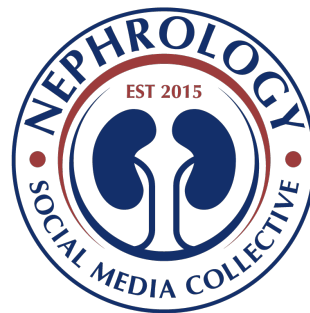
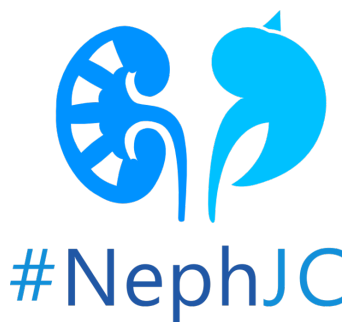




Nephrology Fellow Clinical Compendium



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Disclaimer- This guide is intended as an overview with salient details only. In order to provide high quality patient care it is important to maintain close and appropriate supervision.

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Chapter 2: Native and Transplant Kidney Biopsy: The Procedure

By Sam Kant [@kantsm](#) and Krithika Mohan [@krithicism](#)

Indications

- Reduced kidney function with no apparent cause especially if acute
- Reduced kidney function in the setting of particular disease such as an autoimmune disorder
- Unexplained hematuria
- Significant/nephrotic range proteinuria
- AKI in kidney allograft
- Protocol transplant biopsies

Contraindications

(Some of these are relative contraindications)

- Increased bleeding risk (thrombocytopenia, on anticoagulation, on antiplatelets)
- Uncontrolled hypertension
- Small hypoechoic kidneys
- Solitary kidney
- Anatomical anomalies
- Hydronephrosis
- Active infection
- Multiple cysts
- Altered mental status - Uncooperative patient

Prerequisites

- Blood type and screen - Reserve packed red blood cells (PRBCs) as per institute policy
- Complete blood count - hemoglobin (Hb) > 9 g/dL, platelet > 100 K/uL, white blood cell count (WBC) - normal
- Coagulation screen (PT/INR)
- Urinalysis - If suggestive of urinary tract infection (UTI), consider urine culture to rule out UTI
- Ultrasound or kidney ultrasound bladder (KUB) film- to rule out anatomy anomalies.

- No subcutaneous (sc)/ intravenous (IV) heparin (for 12 hours). Hold aspirin (usually for 7 days), clopidogrel/ticagrelor/prasugrel, depending on the history/timing of CAD/ACS (usually for 5-7 days) and oral anticoagulants (48 hours for most direct oral anticoagulants (DOACs))

The Procedure:

- Make sure patient has an intravenous access
- Make sure systolic blood pressure (SBP) is < 160 mmHg
- Consider DDAVP (0.3 mcg/kg infuse over 0.5 hr) before biopsy if patient is uremic (such as severely elevated BUN) or high risk for bleeding (can be given after if needed). Assess use of desmopressin (DDAVP) on a case by case basis. It has decreasing effectiveness with each dose. Be careful of hyponatremia with DDAVP (monitor serum sodium levels).
- Ultrasound and computed tomography (CT) guided biopsies are usually performed in prone position with support under the abdomen to help elevate closer to the surface of the back.
- Can be performed in sitting or lateral decubitus in patients who cannot prone (immobility, ascites, intubated).
- Percutaneous biopsy in native kidney is performed on the inferior pole of either kidney while in graft is performed on superior pole.
- If contraindications to percutaneous biopsy present, transjugular or open surgical kidney biopsy can be performed. However, many of the bleeding risks still persist with these methods.
- Using a 16 gauge needle will result in adequate sampling and minimal complications .
- Usually 2 cores of 1.5 - 2 cms are sufficient for optimal reading.
- Transfer the cores to appropriate fixatives -
- Formalin - for light and electron microscopy
- Michel solution - for immunofluorescence

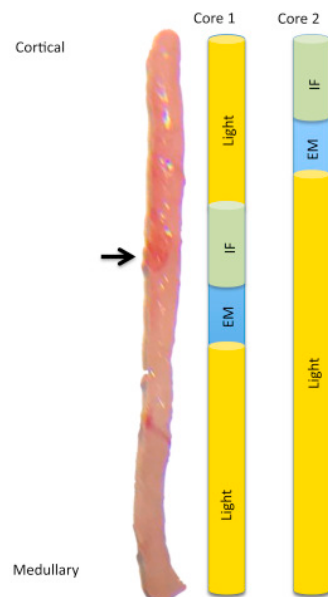


Figure-[https://www.ajkd.org/article/S0272-6386\(18\)31102-8/fulltext](https://www.ajkd.org/article/S0272-6386(18)31102-8/fulltext)

- After biopsy is performed, hold pressure on the biopsy site for at least 10 minutes, then transfer patient to desired position SLOWLY and bedrest for a minimum of 4 hours.

Post biopsy care:

- Place post -biopsy orders, followup exam and repeat CBC in 4 hours, then follow your institution's protocol
- Stacking the urine: each time the patient urinates a sample will be kept in the plastic UA container, helpful if fist urine is bloody and then can see it clear up
- All specimens should be sent to pathology and optimally every biopsy should be reviewed by pathologist for adequacy.
- If STAT read is required, please call pathologist directly.
- Counsel patient on no hard physical work for 48-72 hours to allow appropriate clotting and scab formation.
- If patient calls clinic with pain after discharge near site of biopsy patient should be brought in to the ER or clinic for further evaluation as this could represent a dislodgement of the clot at the site of biopsy and be at risk of bleeding
- Imaging for bleed includes kidney ultrasound or CT scan, in severe cases of bleed consider interventional radiology (IR) consultation if embolization is needed

Complications Associated with Kidney Biopsy with [approximate incidence](#)

Transient Microscopic Hematuria	3.5%
Requirement for blood transfusion	0.9%
Requirement of angiographic intervention to control bleeding	0.6%
Requirement for nephrectomy for controlling bleeding	0.01%
Death	0.02%

Important articles on kidney biopsy practices:

- [Video](#) showing ultrasound images during a kidney biopsy
- S. Brachami et al. World J Nephrol 2014 [Kidney biopsy practice: What is the gold standard?-](#)
- J. Hogan et al. CJASN 2016. [The Native Kidney Biopsy: Update and Evidence for Best Practice](#)
- I. Ahmad *Semin Intervent Radiol* 2004. Biopsy of the Transplanted Kidney
- D. Moledina. CJASN 2018. [Kidney Biopsy-Related Complications in Hospitalized Patients with Acute Kidney Disease](#)
- W. Whittier. CKJ 2018. [Comparison of native and transplant kidney biopsies: diagnostic yield and complications.](#)
- Randy L Luciano et al *AJKD* 2019 [Update on the Native Kidney biopsy : Core curriculum 2019](#)