

Percutaneous renal biopsy protocol

Department of Nephrology, St George Hospital, Kogarah

A. Pre Procedure

1. Ensure the patient has **ceased vitamin K antagonist (warfarin)/ antiplatelet agents and NSAIDs** for 7 days prior to the procedure and **direct oral anticoagulants (e.g. rivaroxaban, apixaban)** 3 days prior to the procedure. In urgent situations, the duration of medication abstinence can be reduced and will need to be discussed with the respective nephrologist.
2. Check the results of the most recent **blood tests**. FBC, APPT, INR, EUC should ideally be done within 2 weeks of the biopsy (closer to the date if INR needs to be done after withholding warfarin)
3. Patients on warfarin requiring an urgent biopsy will need **warfarin reversal** using fresh frozen plasma or Prothrombinex (after hematology consultation) with or without vitamin K.
4. If the **APTT is prolonged** and not explained by a known exposure to medication like heparin or a medical condition, the patient may need further hematological tests to assess their risk of bleeding. The following tests may be required: repeat coagulation test (PT, INR, APTT), APTT mixing studies, fibrinogen, thrombin time, lupus anticoagulant, von Willebrand studies, coagulation factors 8,9,11 and 12. These tests will take 2 to 4 weeks to be reported and hence the biopsy planning should account for this. A **hematologist** opinion is strongly recommended for guidance.
5. If GFR is less than 30 ml/min, **desmopressin** premedication should be considered, to reduce the risk of uremic bleeding (see below). This should be discussed with the nephrologist before use
6. Medical **history and vital signs** should be documented prior to the procedure. **Relative contraindications** include untreated urinary tract infection, uncooperative patient, severe hypertension ($\geq 160/95$ mm Hg systolic) not controlled by antihypertensive agents, coagulopathy, thrombocytopenia (platelet count $< 50 \times 10^9/L$), anticoagulants and antiplatelet drugs, renal neoplasm, multiple cysts, obstructed kidney and a solitary kidney.
7. **Blood pressure** must be controlled, preferably to $< 140/90$ mm Hg
8. **Signed consent form** to be obtained or sighted (if already done)
9. Check patient **allergy** for drugs (esp. local anaesthetic agent, topical iodine and chlorhexidine)
10. Oral anxiolytic agents (e.g. lorazepam 1 to 2 mg) can be considered for certain patients at the physician's discretion but is often not needed. The medication is ideally administered an hour before the procedure
11. Once the biopsy site has been confirmed with ultrasonography and marked, a **Checklist level 2** is to be completed in the electronic medical record (under Adhoc charting)



B. Equipment

1. Procedure trolley
2. Biopsy tray
3. Fenestrated Sterile drapes (XF12)
4. Sterile gown
5. Sterile gloves
6. Disposable Biopsy gun (16 G, lengths 10 cm for transplant kidney or 16 cm for native kidney)
7. Spinal tap needle
8. No 11 Scalpel blade
9. 10 ml syringe x 1
10. Lignocaine 1% - 10 ml
11. Drawing needle x 1
12. 23g needle x 1
13. 26g needle X 1
14. Sterile gauze x6
15. Chlorhexidine or povidone iodine antiseptic for skin preparation
16. Cutifilm island dressing
17. Blue/White incontinent sheet
18. Indelible marking pen
19. Sterile probe cover and sterile ultrasonography gel
20. Specimen collection jars obtained from the ANATOMICAL PATHOLOGY department (formalin x 1, glutaraldehyde x 1, saline or Eagle's x 1). The renal registrar will organize this.
21. Portable ultrasound machine (organized by the renal registrar)
22. Dissecting microscope (brought by the renal registrar from Anatomical Pathology)

C. Procedure

1. The renal biopsy should be performed with imaging either ultrasound or CT guidance. It is performed by either a renal advanced trainee or consultant at the Day Medical Infusion Centre (DMIC) or in the ward,



or by the Radiologist at the Radiology department. Occasionally the procedure may be performed bedside in one of the other wards.

2. The last renal biopsy at the ACU should be performed before 12 noon to enable safe discharge of the patients by the same day following a minimum of 4 hour observation period
3. The nursing staff are required to assist the proceduralist and to follow the post biopsy patient observation protocol.
4. The renal advanced trainees are routinely **supervised** by a renal consultant (**Dr Partha Shanmugasundaram or Prof Ivor Katz**).
5. The skin is prepped with Chlorhexidine and/or Iodine, depending on allergies
6. Lignocaine (1%) is instilled in the skin and subcutaneous tissues down to the level of the renal capsule – 10 to 20 ml
7. Under imaging guidance, cores of renal tissue are obtained and divided under the dissecting microscope for immunofluorescence (transported in saline or Eagle's solution), light microscopy (formalin), and electron microscopy (glutaraldehyde).
8. Usually this **requires 2-3 passes**. The **procedure should be stopped** after **4 passes** in the case of a native kidney and after **3 passes** with a transplant kidney. Decision on further passes should be discussed with the supervising nephrologist.

D. Desmopressin premedication

This is a synthetic analogue of arginine vasopressin, known to reduce the risk of uremic bleeding. The drug is marketed in the trade names **Minirin** and **Octostim**.

The dose is **0.3 mcg/kg diluted to 50mL** with normal saline and administered over 30 minutes one to two hours before the biopsy. Doses may be repeated at 12-hour intervals for prolonged bleeding.

E. Care of the patient following the biopsy

Please refer to the post renal biopsy patient observation protocol

F. Care of the biopsy specimen and data collection

1. The renal registrar or resident will transport and submit the biopsy specimen(s) to Anatomical Pathology along with a duly filled pathology request form.
2. The request form should be signed by the patient for Medicare billing purposes



3. The dissecting microscope should be returned to Anatomical Pathology and signed off in the microscope loan register
4. The portable ultrasound machine should be returned to 4W ward after ensuring it is properly cleaned
5. The renal registrar should complete the renal data collection sheet in RISCDOC following the procedure

G. Discharging patients following renal biopsy

1. If there are no complications observed, the patient can be discharged from DMIC **at or after 4 PM the same day, after a minimum observation period of 4 hours**, with instructions to avoid strenuous exercise for two weeks following biopsy i.e. contact sports, aerobics, and heavy lifting
2. The patient should **see their General Practitioner or present to the Emergency Department** if any of the following occur: hematuria, loin pain or fever.
3. If the patient was prescribed **anticoagulant / antiplatelet therapy** prior to the biopsy, ensure that they have been given a clear plan of when these medications should be recommenced, and in the case of Warfarin, when and where they should have their INR monitored. These medications can be usually started 48 to 72 hours post procedure, and in some situations, based on anticoagulation needs or bleeding risk, this duration can be less or more. A discussion with the treating nephrologist should be considered in these special situations. If **dialysis** is required it should be heparin-free for up to 48 hours after the biopsy.
4. While the standard procedure is to discharge patients on the same day after at least 4 hours of observation, **some patients may need to be observed overnight**. Some examples of such situations, but not limited to these, include:
 - a. Patient has to travel far following discharge
 - b. An anxious patient
 - c. Where the anticipated risk of complication is higher or there is clinical concern e.g. more than 4 passes at the biopsy, mildly abnormal coagulation profile, poor BP control, anemia, acute kidney injury and low GFR

Note: The decision to observe the patient overnight is at the discretion of the admitting consultant and should be **documented in the appointment request form**, where possible. In this case, a Recommendation for Admission (RFA) form should be sent or faxed, at the time of referral, to the admissions office and copied to the DMIC (fax 91131923).