Guidelines on Renal Biopsy

Renal Unit
Royal Hospital for Sick Children
Yorkhill Division

Please Note: These guidelines have not been assessed using the AGREE (Appraisal of Guidelines for Research and Evaluation) criteria. This will take place at the next review of this guideline.
1. Introduction

This guideline has been developed by clinicians within the Renal Unit at Yorkhill. This document is intended for use by clinicians and nursing staff. This guideline is based on current best evidence and clinical practice.

Before the biopsy is carried out, scans should show that both kidneys are normal in size and are functioning. A blood test is also done to check that blood clotting is normal.

The biopsy is usually done with sedation and under a local anaesthetic, but in some cases it may be performed under a general anaesthetic in the operating theatre.

The kidneys lie on either side of the spine just below the muscles of the back. The technique involves inserting a needle down through the back muscles and into the kidney (usually the left), and the removal of some very small pieces of kidney. An ultrasound scanning machine is used during the procedure to ensure correct positioning of the needle.

The pieces of kidney are then examined under the microscope and by other special techniques. The results are of great help in identifying any problem with the kidneys.

After the biopsy the blood pressure and pulse rate are monitored closely, the urine is tested, and the patient is kept in bed for at least 6 hours. There will be some discomfort (usually minor) in the back at the biopsy site. There may occasionally also be some bleeding around the kidney or blood in the urine.

Once fully awake after the biopsy, the patient is encouraged to drink to help flush away blood from the kidney. Until then, intravenously administered fluids are continued.

Most children can go home on the afternoon or evening of the test, though some may need to stay in hospital overnight.

Vigorous activity is discouraged for 1 week after the biopsy.

The final results of the biopsy will be available in about 1 month, although provisional results may come sooner.

If the discomfort, pain, or blood in the urine persists following discharge from hospital, please phone the ward (0141 201 0200) or alternatively ask your own doctor’s advice.
The procedure is very safe, but like all tests carries some risk of complications including damage to the kidney. You should discuss the risks with your consultant or the doctor performing the biopsy prior to the test.

2. How To Organise a Renal Biopsy

2.1 Elective Cases

- **Find a Patient!!!** (two at a time is reasonable – three is pushing it in the ward)
  - Ensure they have had their investigations especially an ultrasound as they need to have two kidneys before being biopsied

- **Getting a Date**
  - Check patient’s Consultant Availability Mon-Fri, am or pm
  - It is best to avoid Mondays as this involves patient being admitted on a Sunday
  - Phone Lorraine Sweeney, Anaesthetic Administrator Ext 80194 (Theatre Reception), to get details of available theatre lists (worth asking Lynda Lawson first for the email of available theatre lists (not scheduled lists) she gets sent weekly as forewarned is forearmed)
  - Provisionally book suitable theatre list
  - If no suitable dates, cancel all your plans for the next two weeks – you’re going to be busy.
  - Try speaking to Dr Galea for a slot on the Wednesday rheumatology list
  - Try Nan McIntosh, Schiehallion Nurse Practitioner (pg 2234), as there are occasionally slots there.
  - Speak to Mr Stuart O’Toole as he can sometimes offer a slot on the Friday of his on-call week but that doesn’t come up too often.
  - Failing all that try pleading with Jane Peutrell, Anaesthetist looking for available slots.

- **Book a radiologist**
  - Go to X-ray department and check Dr Watt’s Diary with his secretary who lives in reception.
  - Email him (andrewwatt@yorkhill.scot.nhs.uk) and ask if he can do the scan or provide someone to do so – tell him his diary is empty!!!
  - When date identified HISS a request for US-RENP, specifying that it will be in theatre and on which day

- **Confirm date with Consultant and Laura Kerr/appropriate list holder**

- **Pathology**
  - Phone pathology on ext 80398 (or go and visit Bobby in the pathology office) and let them know your date, give patient details
  - Electron Microscopy and Immunofluorescence, generally for native kidneys, needs a pathology technician present

- **Send for Patient**
  - Ask ward clerkess Christine to send for the patients and add them to the theatre list via HISS

- **Admit Patient**
  - Clerk in
  - IV Cannula
  - Bloods for FBC, Coag, Group & Save, U&Es
  - Fast patient as appropriate
- Document Blood results in case notes – very important
- Consultant will consent parent/patient

- **Pre Theatre**
  - Consultant takes biopsy gun and needles to theatre
  - Phone from theatre for radiologist and path tech (if for light microscopy only then take to pathology in formulain)

- **Post Theatre**
  - IV fluids til awake
  - Check urine - Admit overnight if frank haematuria

### 2.2 Emergency Cases – e.g. Transplant patients, chronics with rising creatinine

- **Find a Patient, often post transplant**
- **Identify Consultant**
  - will it be the Consultant on the ward for that week or will it be the patient’s own consultant?
- **Page Emergency theatre (pg2539)**
  - give them the patients details and the date you want
  - Give them the consultant’s name and page number
- **Contact appropriate anaesthetist or on-call anaesthetist (pg2602)**
  - let him/her know about the patient
  - tell them why you want the patient on the list and when
    - morning is better so as to get a Light Microscopy result by the end of the day.
- **HISS an ultrasound request**
  - US-RENP marked as urgent with the time and date of theatre and marked Emergency Theatre
- **Go and speak to a consultant Radiologist if you are allowed near to one.**
  - Andrew Watt is often a good bet, otherwise the person who is on for Ultrasound or Screening seems to be the way to go about it.
  - E-mail just isn’t fast enough at this point.
- **Phone Pathology**
- **Let the ward know**
  - but they probably knew before you anyway.
- **Bloods etc as per elective biopsy.**
- **Wait nervously til the patient/consultant arrives back on the ward**

There are bound to be some problems as the whole process involves pulling together so many services but when it works it’s rather rewarding!!!
3. Preparation for Percutaneous Renal Biopsy on transplant patient

If the decision is made during daytime hours to go ahead with biopsy, Danielle Ward, theatre secretary (EXT 80186) should be contacted, to place the Child's name on the emergency list.

If decision taken out with office hours, then the duty consultant anaesthetist should be informed by the on call nephrologist. They should also be asked to convey this information to the anaesthetist on call in the morning.

- It is imperative that the following biopsy work up list is completed. Preferable the evening before, so that the child can make the 0900 theatre slot
- Written informed consent of parent/patient (see Information Sheet)
- Ensure the child has had previous normal renal imaging - if not arrange an ultrasound assessment before going any further
- Check platelet count and coagulation screen
- **Group & save** a serum sample
- Inform the Radiologist (usually Dr. Wilkinson) at least 24 hours in advance and arrange for ultrasound screening of the procedure
- Inform the Pathology Dept. (ext. 0400/0403) at least 24 hours in advance and arrange for a technician to attend and collect the biopsy
- Ensure the child's case record is sent to theatre
- Ensure post-biopsy instructions are carried out (see procedure manual)

4. Procedure for Percutaneous Renal Biopsy

1. Real-time US control is optimal
2. Aim to biopsy lower pole of left kidney (unless contraindicated)
3. Ensure biopsy is away from vessels
4. Position patient prone (supine for Transplant biopsies)
5. A roll under the kidneys may be helpful
6. Do not proceed till adequately sedated (see sedation protocol)
7. Generally use 16G needles (18G for Tx biopsy)
8. Anaesthetise skin and down to capsule with 1-2% lignocaine (small needle for skin, LP needle deeper → depth)
9. Break skin with scalpel blade in a longitudinal direction
10. Advance needle till appropriate depth reached (tend to aim slightly superior & lateral for upper pole biopsies, but usually go for lower pole)
11. Take 2 or 3 cores (1 or 2 in Tx biopsies), patient holding breath in mid-inspiration
12. Press on wound for 2-5 mins
13. Routine post biopsy observations
14. Send tissue for LM, IF, EM (only LM if ? rejection)
5. Administration of IV Sedation for Renal Biopsies

Prior to procedure
1. Parents should sign consent prior to procedure, following adequate explanation of risks of procedure and of sedation to parents, and child if appropriate.
2. Hospital fasting guidelines:
   - Older children: 6 hours for solid food
     4 hours for clear fluids
   - Infants: 4 hours bottle milk
     3 hours breast milk
     2 hours clear fluid (maximum 10ml/kg)
3. Ensure adequate resuscitation equipment is readily available. This should include oxygen, suction, fluids, resuscitation drugs and equipment for airway support.
4. EMLA cream to be applied to biopsy site at least 90 minutes prior to procedure.
5. Insertion of intravenous cannula prior to the procedure.
6. Ensure adequate monitoring of the patient, including continuous pulse oximeter recording, during and following procedure.

Premedication
7. Midazolam 0.5 mg/kg orally, 20 minutes prior to procedure.

Sedation at time of procedure
8. Fentanyl 0.5 - 1.0 μg/kg intravenously.
9. Naloxone must be available in the procedure area.
10. Administration of 0.1 mg/kg Midazolam intravenously.
    Can give further doses up to maximum total dose of 0.3 mg/kg.
11. Flumazenil must be available in the procedure area.
    5 μg/kg - 40 μg/kg in divided doses.
12. Ensure sedation and analgesia has adequate time to take effect prior to commencing procedure.
13. Following procedure monitor vital signs q15mins for 2 hours and then q30mins for 4 hours.

6. Future Guideline Development

- Should any aspect of this guideline change before the planned review in September 2006 this guideline should be updated accordingly.
- Future review of this guideline should make use of the AGREE document to ensure that current evidence and best clinical practice has been used to inform this guideline. For further information on guideline development please contact the Chairperson of the Multi-Professional Clinical Practice Committee.
Pre Theatre Biopsy Checklist

Consultant    AVM / HM / IR / TJB

Patient fit for anaesthetic    YES

Ultrasound shows two kidney (if native biopsy)    YES/NO

Consented by Consultant / Renal Reg    YES

FBC    Hb ———— Plt

COAG    PT ———— APTT ———— FIB

UE    Na ———— K⁺ ———— Ur ———— Cr

GS    YES

Radiology Aware    YES

HISS request completed    YES

Pathology Aware    YES

HISS request printed    YES

Pre Op Management

Fast From    _____ 6hrs pre op

Clear Fluids til    _____ 3hrs pre op

Does this patient need an IV infusion running?    YES/NO

Rate    _____ mls/hr

'Maintenance' if not in renal failure
daily fluid allowance or restriction divided by 24

This patient is organised for a renal biopsy

Signed

Date