BEAUMONT HOSPITAL

Department of Nephrology, Dialysis & Transplantation

GUIDELINES FOR PERCUTANEOUS RENAL BIOPSY

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RENAL BIOPSY POLICY

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1.0 Aim/Purpose of policy

Renal Biopsy is potentially the most accurate diagnostic tool for determining the type and stage of progression of a pathologic condition of the renal system (Ishikawa et al 2009) The aim of this document is to provide up to date guidelines for Medical and Nursing staff on the Pre and Post care of a patient undergoing a kidney biopsy (native)

The objective is to ensure the prevention / detection and management of complications associated with renal biopsy is clearly outlined

0.2 Scope of Policy

This policy refers to all medical and registered nursing staff in the renal area in Beaumont Hospital. The registered nurse is solely accountable for the care she/he delivers. Nurses are required to base their practice on the best available evidence identified by research in order to provide effective, safe patient care. Agency nurses and roistered 4th year students may also provide the appropriate care for a patient undergoing a renal biopsy if deemed competent to do so by the ward sister or registered nurse in charge of that area. Medical team involved must know the correct processes required to ensure the patient is safely prepared for this procedure.

3.0 Definitions

A kidney biopsy is a procedure that is carried out to obtain a sample of the kidney tissue, the sample is then examined in the laboratory and a diagnosis is determined. The specimen of kidney tissue is then examined in the Histopathology laboratory using three techniques i.e. light microscopy, immunofluorescence and electron microscopy.

Light Microscopy - This is the simplest of the three methods. Evidence of diseases such as Proliferative Glomerular Nephritis can be seen clearly, as can sclerosis, crescents and other lesions.

Immunofluorescence - This is useful in the diagnosis of Immune disorders, as it shows glomerular deposits of immune complexes

Electron Microscopy -This shows ultrafine detail of cell structure and immune deposits. Minimal Change Glomerular Nephritis can only be definitively diagnosed using this method**.**

Kidney tissue may be examined using all three techniques providing there is sufficient kidney tissue to do so.

4.0 Responsibilities

Staff caring for a patient undergoing a kidney biopsy should have a baseline knowledge of the following:

Anatomy, Physiology and location of the Kidney

Indications for Renal Biopsy when other tests have not provided sufficient information:

- Nephrotic syndrome in all patients over twelve years of age
- Persistent proteinuria of more than 1gm/24 hours
- Recurrent haematuria - assuming neoplasm has been ruled out.
- Chronic Renal Failure
- Systemic diseases with renal involvement
- Unexplained Renal Failure
- Unexplained impairment of Renal Transplant Kidney function
- Serial biopsy to study the natural history or response to treatment

Contra indications for Renal Biopsy:

- Solitary kidney, except in the case of a Renal Transplant Kidney
- Pregnancy
- Coagulation defect
- Uncontrolled hypertension and malignant hypertension

- Obstructive Uropathy
- Polycystic Kidney Disease
- Gross sepsis
- Inability of the patient to co-operate
- Where consent is refused
- Bilateral small kidneys
- Gross obesity

Complications of Renal Biopsy:

- Haemorrhage
- Persistent haematuria
- Pain
- Peritoneal and/or intra renal arteriovenous fistula
- Aneurysm
- Biopsy of an organ other than the kidney
- Rupture of the kidney if the patient moves while the needle is passed through the renal substance

Psychological implications for a patient having a renal biopsy

The experience of anxiety is highly personal for the patient and can be affected by past experiences and situations and influenced by the experiences of other patients or can be as a result of fear of the unknown. Anxiety is a natural response to threatening situations and is therefore common component of a patient's experience. The staff involved in preparing the patient is expected to play a pivotal role in assessing patients psychological needs and individualising care through a holistic multidisciplinary approach. Measures should be implemented that have been shown to prevent and/or relieve anxiety, in particular giving information and teaching (Kimmel, 2001)

5.0 Procedure

Preparation for Procedure

- The biopsy is performed in the X-ray department, or at ward level at the discretion of the Nephrologist. In the case of Open Renal Biopsy it is performed in the operating theatre.

- **In all cases the doctor must obtain an informed written consent from the patient.** It is the responsibility of the doctor to ensure that the patient and their family (if appropriate) understand all aspects of renal biopsy relevant to them..

- It may be required to adequately sedate the patient to avoid movement while the biopsy needle punctures the kidney. It is also important to avoid over sedation so that the patient can hold and release his/her breathe when requested. The nurse should liaise with the doctor to determine if sedation is required for the patient.

5.0.1 Pre-biopsy Patient Assessment by Medical and Nursing Staff

Assessment should include:

- The patients and family's knowledge and previous experience of renal biopsy
- The patients physical condition (e.g. level of mobility and condition of their skin)
- The patients psychological condition (e.g. whether the patient is confused, anxious or experiencing lack of concentration or short term memory loss)
- Whether the patient and/or family experience comprehension difficulties (e.g. perceptual or language problems), and whether they can read written information. The patients and family's needs for information, support and education about Renal Biopsy to ensure informed consent.
- Appropriate biopsy form is completed **fully** by the **patient's medical team** and attached to the patient's medical chart
    - The patient and their family are provided with written information (see appendix1) and education relating to:-
- The reason and necessity for Renal Biopsy

- Pre Biopsy preparation
- Biopsy procedure
- Co-operation during biopsy
- Post biopsy care
- Risks of renal biopsy
- When results will be available
    - The patient should have the opportunity to express their anxieties. Any anxieties or concerns expressed by the patient should be discussed and alleviated.
    - The renal biopsy care pathway should be commenced if the patient is having the biopsy under the 23 hour initiative or if the patient will be discharged the following day from the scheduled procedure
    - Informed consent is obtained from the patient by the medical team
    - Blood samples are sent to the laboratory for urea and electrolytes, type & screen, coagulation screen and complete blood and platelet count.
    - Pre-operative checklist is completed.
    - Baseline vital signs are taken and recorded to detect any abnormalities i.e. elevated blood pressure. A urinalysis is also obtained to detect haematuria prior to biopsy.
- The patients' blood pressure has been well controlled, as an elevation in blood pressure could increase the risk of haemorrhage post biopsy (ANNA 2006)
- The patient is fasting from twelve midnight if procedure is happening in the radiology department. There is no need to fast patients for biopsies that are being performed by Nephrologists at ward level
- The patient has Intravenous access which is patent..
- Administer pre-medication if required, as prescribed by the medical team, one hour prior to the biopsy, in order to sedate the patient, making it safer to biopsy (ANNA 2006).
- The patient is advised to empty his/her bladder before the pre-medication is administered and instructed to remain in bed following same.

5.0.2 Contact Position Telephone No

Specimen Requirements for Renal Pathology

The Laboratory should be **notified in advance** when a renal biopsy is to be taken. Contact the Renal Pathology Secretary or if she is not available the Medical Scientists in the Renal Pathology/EM/Histopatholgy Laboratories:

Dr. Tony Dorman Consultant Renal Pathologist **(01) 809 2644**
Margaret Moran Senior Medical Scientist **2630**
Maria O'Grady Medical Scientist **2630**
Paula Gillic Renal Pathology Secretary **2008**
Histopathology Laboratory Laboratory **2353**

- **If the biopsy is taking place at ward level please refer to appendix 2 on how to set up a sterile trolley for this procedure.**
- The patient is correctly positioned for the biopsy i.e. prone on pillows compressing the abdomen and fixing the kidney, the back slightly rounded, shoulders tipping the mattress and the arms over the head. The location and depth of the kidney is checked by ultrasound, by the doctor.
- The puncture site is marked 1cm within the lower limit of the kidney. This is done so that the biopsy can be obtained from a safe area of the cortex, away from the hilum where the main blood vessels are located.
- The double drape is removed from the top of the trolley to expose the equipment.
- Following hand washing the doctor performing the procedure puts on the sterile gown and gloves.
- The patient's skin is thoroughly cleansed around the site of the biopsy (ChloraPrep with Tint, available from pharmacy) then the minor surgery drape is applied.
- The sterile cover is applied to the probe of the ultrasound machine with sterile ultrasound gel inside the cover and on the patients' skin.
- Local anaesthetic injection of lignocaine 2% is given sub-cutaneous.
- The exploration needle is inserted through the skin and the patient is asked to hold their breath, while the needle is pushed through the lumber fascia. The contact with the capsule of the kidney gives a characteristic firm and granular sensation.

The needle moves upwards on inspiration and downwards on expiration.

- Once the kidney is located the patient is once again asked to hold their breath and the exploration needle is removed. The depth at which the kidney is located is measured using the exploration needle.
- The biopsy needle is then inserted through the skin and, under guidance of ultrasound, pushed through to the cortex of the kidney. It may be necessary to make a very small incision using a scalpel before the biopsy needle is introduced.
- The patient holds their breath so that the kidney is in the correct position for biopsy and the needle is pushed into the kidney. A minute core of kidney tissue is then detached.
- The biopsy needle is then withdrawn while the patient once again holds their breath.
- It is usually necessary to take two specimens.
- It is the medical practitioner's responsibility to place the saline in the jar provided and label it.
- Both specimens are placed in 10ml of normal saline 0.9% and taken immediately to the laboratory. There the cortex is separated from the medulla under dissecting microscope. One core of the biopsy is fixed in formalin for light microscopy. The other is divided so that both portions contain glomeruli. The larger part is frozen in liquid nitrogen and processed for immunofluorescence. The other portion is fixed in gluteraldehyde for examination by electron microscopy
- The doctor must hand deliver the specimen to histopathology without delay. (Histopathology department ext. 2634) were a technician will receive the specimen in the lab.
- In the event of a renal biopsy being performed after 5pm or at weekends, the on-call pathologist should be contacted who will in turn contact a technician to come in and examine the specimen. The biopsy specimens should be collected in the usual way, but placed in Formalin when it reaches the lab and they will be suitable for light microscopy only. Formalin is located in the histopathology laboratory.

5.0.3 Current Best Practice for Renal Biopsies

Two cores of tissue should be taken to ensure that there are sufficient numbers of

glomeruli for examination – not less than 10 for light microscopy and immunofluorescence. This applies to native and allograft kidneys. Both cores can be placed in the same container.

5.0.4 Handling of Tissue after Biopsy has been taken.

Tissue **must be fresh** in order to allow immunological assessment to be performed. The biopsy cores are placed in a universal container which is at least half full of normal saline. The container is placed in a biohazard bag and the Renal Biopsy Request form which should have been filled in by the **Nephrology team** on the ward prior to transfer of the patient to X-Ray is placed in the outer pouch of the bag.

5.0.5 Details required for Renal Biopsies

The following **minimum** information must be supplied LEGIBLY:
On the body of the specimen container:
A Renal Biopsy Request Form must be filled in **(use a ballpoint pen please to make details legible on all copies of the form)** and sent with each biopsy :

_ Name of patient
_ Date of birth
_ Medical record number
_ Address of patient
_ Name of Consultant
_ Source (Ward Name/OPD/Hospital)
_ Date sample taken
_ Relevant clinical details

Please give ***as much clinical information on the form*** as possible, as this will be required by the Renal Pathologist when considering differential diagnoses. If using addressograph labels please attach one to both flimsies and to the backing card – these copies are sent with each portion of the biopsy to the three laboratories involved in the investigation. ***Do not*** attach labels, use date stamps or write in the portion marked for"**Laboratory use"** as this area is used by Beaumont Scientific staff for recording the gross description of the biopsy. If your despatch

procedures require that stamps or bar codes be attached please use the reverse (blank side) of the form's card copy.

5.0.6 Specimen Collection and Transportation

Requirements for External Centres

The Renal Pathology Department should be notified in advance (See Section 5.0.2)

The responsibility for sending specimens rests with the external centre.

The minimum details required are as set out above, including the use of the Renal Biopsy request form. Supplies of the Request Form can be obtained by contacting Ms Paula Gillic. Packaging and transportation should comply with current UN legislation and the Transport of Dangerous Goods Act. The specimen should be dispatched so as to arrive at Beaumont Hospital no later than 16.30.

Packages should be addressed to:

Dr. Tony Dorman,
Renal Pathology,
Histopathology Department,
Beaumont Hospital,
Dublin 9

NB Beaumont Hospital does not supply containers or fixative solutions for renal biopsies to external centres.

5.0.7 For referring hospitals in the Dublin area,

if the sample can be transported to Beaumont Hospital within a couple of hours of excision, then place all of the tissue in normal saline in a 60 ml specimen jar or a universal container at least half full of liquid.

5.0.8 For referrals from regional centres

Tissue can be examined and divided in the Histopathology Laboratory of the hospital prior to dispatch. Fresh tissue for immunofluorescence (0.3-0.4 cm of cortical tissue) should be placed in a transport 14 medium suitable for preserving antigenic activity

such as the Tissue Fixative available from Zeus Scientific Ltd. For best results, tissue should not spend any longer than 5days in Zeus Tissue Fixative.
A small piece about 0.1-0.2 cm in length should be cut from the cortical part of a core and placed in 3% Glutaraldehyde (cacodylate buffered) if it is available from your laboratory. A piece can be taken for EM from the Formalin fixed tissue on arrival at Beaumont Hospital Histopathology Department if your laboratory does not carry a stock of glutaraldehyde. The remainder of the tissue should be placed in Formalin.

5.0.9 Urgent Renal Biopsies for Rapid Processing

If a renal biopsy result is required urgently, i.e. the day of biopsy, then rapid processing can be requested:You **must** contact Dr. Tony Dorman to discuss the request, and when the request has been agreed, the Histopathology Laboratory should also be informed.
The tissue must arrive in the Histopathology Laboratory by 12.30 pm at **the latest.** The tissue processor is then run for this single biopsy, and cannot be used until the process is completed. The surgical and biopsy specimens from that day's cut-up must be processed daily to maintain continuity of service to all other clinical specialities, so the processor must be available for use again at 5pm.

5.1.0 Post Biopsy Patient assessment and nursing care

Assessment should include:

- The patients colour and general condition are observed to detect bleeding or shock.
- The patients psychological condition and need for support and reassurance
- The biopsy site for evidence of bleeding or haematoma formation
- The patient's vital signs for any evidence of internal and/or external bleeding. For example, a high or low blood pressure could be indicative of internal bleeding (Thomas 2002)
- Although mild pain or discomfort is normal post biopsy, severe pain over the

biopsy site may indicate bleeding (Thomas 2002).

Nursing Care

- The patient is advised to remain on strict bed rest for **6 hrs** in order to avoid haemorrhage and gross haematuria. The rationale should be re-enforced to the patient. The first four hours of bed rest should be on the side from which the biopsy was taken to exert pressure on the area and help to prevent bleeding. The patient should gently mobilise to the bathroom only after the 6 hours of bed rest, full mobility can return to normal the following morning.
- Vital signs are monitored – ¼ hourly for one hour,
  ½ hourly for two hours,
  1 hourly for four hours, and
  4 hourly until necessary

  any changes indicating haemorrhage are reported immediately to the medical team.

- The biopsy site is observed at the times of checking vital signs for any evidence of bleeding or haematoma formation.
- The patients urine is observed 24 hours post procedure for any signs of macroscopic haematuria and/or tested for microscopic haematuria (ANNA 2006, Thomas 2002) If patients are discharged prior to the 24 hour period patients are asked to observe for any new signs of haematuria.
- A high fluid intake is encouraged to reduce the risk of clots in the urinary tract, providing the patient is not on a fluid restriction.
- Mild analgesics are administered as prescribed, if required
- All patients should have a complete blood count check **6 hours** after the biopsy. Ideally Renal biopsy should be performed as early as possible on the morning of the procedure (whether in Radiology or at Ward level) This is stipulated as safe practice.

The Nurse monitors and evaluates post biopsy care and the appropriateness of interventions to meet the individual needs of the patient.

5.1.1 Discharge Plan

On discharge following renal biopsy the patient should be informed of the following points,

Not to lift any heavy objects for one week, and to report immediately to the medical team should there be any increased signs of haematuria or severe pain around the biopsy area

Reference List:

Abdulla K Al-Hweish et al (2007) Outpatient percutaneous renal biopsy in adult patients Saudi Journal of Kidney Diseases and Transplantation, issue 4, pp541-546

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American Journal of Kidney Disease: 35 (3) pp448-457

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Simickes A.M et al (2000) Success and safety of same day kidney biopsy in children and adolescents. Pediatric Nephrology Vol 14 No 10-11 August , pp946-952

Thomas, N. (2002) Renal Nursing. Ballere Tindal: London.

APPENDIX 1

Renal Biopsy Patient Education Leaflet

Below is a series of commonly asked questions about what is involved in having a renal biopsy. If you require any further information, your doctor or nurse will be available to discuss this with you.

What is a renal biopsy?

A renal biopsy is an important test to either find out why the kidneys have stopped working properly or to confirm a diagnosis of rejection in transplant patients.

What preparations are made before a biopsy?

You are admitted to the ward the day before or the morning of your biopsy. If you are having your biopsy performed in the radiology department it will be necessary to fast from 12 midnight, however, if you are having your biopsy performed by the Nephrologist on the ward you do not have to fast. . Your blood pressure will be checked and a blood sample taken to ensure that is safe to proceed. The doctors will discuss the complications to you and obtain an informed written consent.

The doctor will instruct you on any medications that need to be stopped prior to the procedure e.g. Warfarin.

How is the biopsy performed?

- A renal/kidney biopsy is carried out on the ward by a Renal Consultant or in the X-ray department.
- Mild sedation may be given prior to the procedure.
- If the biopsy is of your native kidney, you will be asked to lie on your tummy. If the biopsy is of your transplant kidney you will be asked to lie on your back. This allows the doctor easier access to the kidneys. The skin will be cleaned with antiseptic and a local anaesthetic will be given to numb the area. A special biopsy needle is introduced through the skin into the kidney to take the sample. Two or three samples may be required.

What happens after the biopsy?

Following the biopsy you will be asked to stay in bed for 24 hours. Your blood pressure and pulse will be monitored regularly and the biopsy site dressing checked. Each time you pass urine it should be given to the nurse who will then test it to see if there is any bleeding.

Painkillers will be prescribed for you if you need them

You will be able to eat and encouraged to drink plenty of fluids (providing you are not on a fluid restriction).

Following the 24-hour period of bed rest, you may be discharged.

It is advisable to avoid any strenuous exercise for a week after the biopsy to reduce the risk of bleeding. After this there should be no reason why normal activities cannot be restarted.

If you experience severe pain over the biopsy area or notice blood in your urine, you should report back to your doctor.

What are the possible complications during a renal biopsy?

Any medical or surgical procedure carries risks. Patients are asked to undergo procedures because it is felt that the benefits outweigh the risks.

Complications of renal biopsy are very rare. The most important is bleeding, and you are closely monitored after the biopsy to detect bleeding.

You may have pain or discomfort after the biopsy. Painkillers can be taken to reduce any discomfort. If you experience severe pain after the biopsy, you should contact the renal unit.

Other complications can be discussed with you by your doctor.

When do I get the results?

It takes up to 48 working hours for the laboratory to give a preliminary report and about a full week to get a full written report. Your doctor will discuss the results of the biopsy with you and discuss appropriate treatments if required.

Appendix 2

Items for Sterile Trolley for Renal Biopsies Performed on the Ward

In sterile field

·Dressing drapes x 2 (to create the sterile field)
·10ml syringes x 2
·Green needle x 2
·Orange needle x 2
·Pink spinal needle x 1
·Minor surgery drape x 1
·Small dressing kit x 1
·Sterile gauze x 4 pieces
·Sterile disposable scalpel x 1
·Sterile cover for ultrasound probe Ref 2320 PMP x 1
·Small mepore dressing x 1
·Sterile large gloves x 1

No need for sterile gown!

On bottom of trolley (non-sterile area)

·10ml of 2% lignocaine x 1
·10ml of sterile normal saline x 2
·MSU container (don't open) x 1
·Biopsy gun (don't open) x 1
·ChloraPrep with Tint (solution)