Cleveland Clinic
Laboratories

INFORMATION SHEET

Medical and Transplant Kidney

Introduction

Renal biopsy is a useful tool in the evaluation of patients with a wide variety of kidney diseases. Patients who have received a kidney transplant are often biopsied to monitor for transplant rejection. Patients who have not received a transplant but who have conditions such as hypertension, diabetes, autoimmune diseases, infections or other underlying illnesses can also develop kidney disease. Determining the cause of kidney disease often helps to guide clinical treatment. Renal biopsies for this purpose are sometimes referred to as "random" kidney biopsies or "medical" kidney biopsies in order to differentiate these biopsies from those that may be performed in the evaluation of a renal mass. A medical or transplant kidney biopsy is generally requested by either a nephrologist or a rheumatologist who is caring for the patient, and is typically performed by either an interventional radiologist or a nephrologist.

These renal biopsy specimens require highly specialized processing techniques and evaluation by a renal pathologist. A comprehensive panel of histochemical stains as well as immunofluorescence studies, and often electron microscopy, are all important in the full evaluation of medical and transplant kidney biopsies. It is the job of the renal pathologist to combine the diagnostic information provided by these special processing techniques and interpret these findings in the clinical context in which the biopsy was performed.

Renal biopsies have the best value for the patient and the treating physician when pertinent clinical information is provided, adequate tissue is obtained and the tissue is properly shipped by the local pathology laboratory. Details for each of these steps are provided below.

Treating Physicians and Radiologists

Prior to requesting the biopsy, the treating physician should obtain a "Medical and Transplant Kidney Biopsy Requisition" form from the local pathology laboratory or online at clevelandcliniclabs.com. Please fill it out completely and provide it to the radiologist or nephrologist performing the biopsy so that this critical information is received along with the biopsy. When filling out the referring physician contact information, please be sure to **provide the contact information for the physician who will be using the biopsy results to guide clinical decision making**. Urgent results will be called to the physician whose contact information is listed. Complicated cases often require a conversation between the renal pathologist and the treating physician to maximize the diagnostic information that can be gained with the biopsy material.

Medical and Transplant Kidney Biopsy Specimen Requirements

Obtaining an adequate amount of renal cortex is critical for accurate diagnosis. Separate portions of renal cortex are needed for light microscopy, immunofluorescence and electron microscopy. Two cores of tissue, 1-2 cm in length, composed predominantly of **renal cortex** will generally yield adequate glomeruli. If a thin needle (18 gauge) is used, a third core of cortex may be needed. Typically, at least 10 glomeruli are needed for light microscopy, 3-5 glomeruli are needed for immunofluorescence and 3-5 glomeruli are needed for electron microscopy. The physician performing the biopsy should be instructed to place the specimen on Telfa gauze that has been moistened with saline. If possible, confirmation that adequate glomeruli are sampled should be obtained during the procedure so that additional cores of tissue can be obtained if needed. The specimen should then be delivered promptly to the local pathology laboratory where it can be properly divided and placed into the appropriate fixatives and transport solutions. The Medical and Transplant Kidney Biopsy Requisition should accompany the specimen.

Pathology Laboratory Handling and Shipping Instructions

For your convenience, we can provide shipping kits containing the fixatives and solutions needed for the following steps:

1. The tissue cores should be handled delicately, preferably with a toothpick or needle, and divided (as described below) using a clean, sharp blade. If using forceps please take care not to pinch the cores.

2. Portions of tissue will need to be placed in 10% neutral buffered formalin for light microscopy, Michels Solution (or Zeus Solution) for immunofluorescence, and 2-4% glutaraldehyde for electron microscopy, if applicable. For transplant biopsies, electron microscopy is often not performed unless the patient has significant proteinuria.

   a. If you are using a microscope or hand lens to differentiate between cortex and medulla please place at least half of the cortical tissue in formalin for light microscopy (ideally more than 10 glomeruli). The remaining cortex (ideally 6-10 glomeruli) can be evenly divided between Michels (or Zeus) fixative for immunofluorescence and glutaraldehyde for electron microscopy.

   b. If you do not use a technique for distinguishing cortex and medulla please use the following empiric technique to divide the specimen: Cut a 1 mm portion of tissue from both ends of each tissue core and place it in

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glutaraldehyde. Place 1/3 of what remains of each tissue core in Michel's solution. Place the remaining tissue (should be at least half of the overall specimen) in formalin.

c. **A note on dividing limited/suboptimal specimens:** Sometimes there may not be adequate tissue to divide into 3 parts and judgement must be exercised as to which diagnostic studies are most useful. In almost all cases, light microscopy is of the highest priority and the best tissue should be placed in formalin. After light microscopy, immunofluorescence is typically most helpful; therefore, if possible, a small portion of cortex should be placed in Michel's or Zeus solution for this purpose. We can sometimes perform electron microscopy on tissue after it has been used for light microscopy and immunofluorescence as a salvage technique; thus, electron microscopy should usually be given the lowest priority when dividing limited tissue. The main exception to this would be in the setting of pediatric nephrotic syndrome, where electron microscopy is typically more important than immunofluorescence. For transplant biopsies, electron microscopy is typically not performed unless there is substantial proteinuria. If tissue is limited, medulla can be used for immunofluorescence to evaluate for antibody mediated rejection. Therefore, when tissue is limited in the transplant setting, please prioritize light microscopy over all other modalities, and put a portion of medulla in Michel's or Zeus solution for immunofluorescence.

3. Specimen containers must be labeled with at least 2 of 3 identifiers (name, birthdate, social security number) and these must match what is on the requisition. Place the specimen containers in a sealed bag and secure with padding in a rigid cardboard shipping container to prevent damage during shipment. Place the requisition into the shipping container and seal the box.

4. Address air bill for overnight delivery (FedEx or UPS) as follows:

   Surgical Pathology
   Cleveland Clinic Laboratories, L15
   2119 East 93rd Street
   Cleveland, OH 44106
   Phone: 216.444.4767

Cleveland Clinic Laboratories Contact Information

Client Services
800.628.6816
For general inquiries and shipping kits.

Surgical Pathology Desk
216.444.2836
For technical tissue handling and shipping questions.

Renal Pathology Secretary
216.445.7605
To speak to a renal pathologist regarding questions including specific tests offered, their indications and interpretation.