Renal Pathology / Electron Microscopy, Hennepin County Medical Center

The renal pathology elective rotation assures that residents understand and are able to perform and interpret results of the major morphologic procedures used to evaluate renal biopsies.

Core techniques and methods covered:

1. **Morphology** - The residents will utilize H & E, Trichrome, Jones Silver, and PAS stains in evaluating renal biopsies. Residents will learn the potential problems with these stains and methods for troubleshooting.

2. **Immunofluorescence** - The residents will use the standard immunofluorescent stains for renal and skin biopsies in evaluating the biopsies. They will learn the potential problems associated with immunofluorescence and methods for trouble shooting.

3. **Electron Microscopy** - The residents will learn to use the electron microscope and to take good pictures. They will utilize these pictures in evaluating the cases. They will learn the potential problems associated with electron microscopy and how to trouble shoot these problems.

**Rotation Information**

**Institutional Site Director**
E.H. Cameron, M.D.

**Coordinating Teaching Faculty Member**
Gretchen S. Crary, M.D., phone: 612-873-3976

**Teaching Faculty Members**
Gretchen S. Crary, M.D.
Bradley M. Linzie, M.D.
Stuart E.H. Cameron, M.D.

**Lead Technical and Support Personnel**
Sarah Pietz, Anatomic Pathology Supervisor: Phone: 612-873-2804
Linda Moyer, Residency Coordinator: Phone: 612-873-6479
Electron Microscopy Technicians: Phone: 612-873-2175
Rachel Booney
Cathy Kuehner
Sheila Coombs
Janet Parkin
Frida Maiers
Training Site:
Hennepin County Medical Center - Lower Level, North Block

Duration of Rotation:
One month

Post Graduate Level of Residents Involved
PGY 3-5

Overview of Daily Duties and Responsibilities

Daily:

1. The resident is expected to evaluate biopsies as they are ready; dictate report including light microscopy, immunofluorescence and electron microscopy.
2. The resident is expected to communicate to clinicians regarding clinical history, laboratory testing, and biopsy findings. The resident is expected to take increasing responsibility for patient care through these interactions, under faculty supervision.
3. Meet daily with the renal pathology on service to review and sign out renal cases.

Monthly:

1. The resident is expected to prepare cases for the Renal Pathology Conferences.

Supervisory Guidelines for Patient Care and Specimen Handling

As specimen handling is not a specified part of the rotation, specimen handling in the Renal Laboratory is the direct responsibility of the laboratory personnel and the teaching faculty. Resident decision making for the ordering of tests in the laboratory is under the direct supervision of the teaching faculty. The on service teaching faculty members are physically present during standard operating hours; faculty members not physically present are rapidly available by phone or pager. No diagnosis is communicated to the clinicians before a faculty member has evaluated the case.

Goals and Objectives

Proficient in correlating the clinical data with the morphologic findings in the biopsy and formulating diagnoses.

A. Be thoroughly familiar with the normal morphologic, immunoflorescent, and electron microscopic findings of the human kidney, including glomeruli, tubular, interstitial, and vascular
B. Be thoroughly familiar with the clinical presentation and salient morphologic, immunoflorescent, and electron microscopic changes for patients who present with standard glomerular diseases:
1. Nil lesion
2. Immune complex associated glomerulonephritis
3. Acute poststreptococcal (proliferative) glomerulonephritis
4. Rapidly progressive glomerulonephritis Postinfectious, Antiglomerular Basement Membrane Disease, Goodpasture's syndrome, and Idiopathic
5. Nephrotic syndrome
   a) Membranous glomerulonephritis
   b) Lipoid nephrosis
   c) Focal segmental glomerulosclerosis
   d) Membranoproliferative glomerulonephritis
6. Focal proliferative glomerulosclerosis / IgA nephropathy
7. Thin basement membrane disease
8. Chronic glomerulonephritis
9. Systemic disease associated
   a) Systemic lupus erythematosus
   b) Henoch-Schonlein purpura
   c) Bacterial endocarditis
   d) Diabetic glomerulosclerosis and nephropathy
   e) Scleroderma
   f) Amyloidosis
10. Hereditary nephritis
C. Be thoroughly familiar with the clinical presentation and salient morphologic changes for patients who present with standard tubular and tubulointerstitial diseases:
   1. Acute pyelonephritis
   2. Chronic pyelonephritis / reflux nephropathy
   3. Acute drug-induced / hypersensitivity interstitial nephritis
   4. Analgesic nephritis
   5. Urate nephropathy
   6. Hypercalcemia / nephrocalcinosis
   7. Hypokalemic nephropathy
   8. Multiple myeloma
   9. Immunologically mediated tubulointerstitial disease
   10. Radiation nephritis
D. Be thoroughly familiar with the clinical presentation and salient morphologic changes for patients who present with standard vascular diseases:
   1. Vasculitis
   2. Hypertensive changes
   3. Pre-eclampsia and eclampsia
   4. Benign nephrosclerosis
5. Malignant nephrosclerosis
6. Hemolytic uremic syndrome
7. Thrombotic thrombocytopenic purpura
8. Atheroembolic renal disease
9. Sickle cell disease nephropathy

E. Be thoroughly familiar with the salient morphologic changes of rejection in transplant patients:
   1. Hyperacute rejection
   2. Acute rejection
   3. Chronic rejection

F. Be thoroughly familiar with the salient morphologic changes of these patients' diseases:
   1. HIV nephropathy
   2. Fibrillary glomerulonephritis

**Opportunities to Function as Consultant to Other Physicians**

Residents have the responsibility, under faculty supervision, of discussing the interpretive consultative reports on renal pathology cases with appropriate members of the clinical teams. Through their discussions with the clinical team members, the residents have the opportunity to directly impact patient care.

**On-Call Duties**

The resident is expected to be available to laboratory personnel and our clinical colleagues, either in person or by pager, throughout the working day. The resident rotating on renal pathology participates in the Anatomic Pathology monthly call schedule.

**Prompt and Reliable Communication with On-duty Faculty**

The teaching faculty members are continuously available during standard operating hours either by phone or pager. During general working hours, the supervising teaching faculty is available either in person, by scheduled appointment, by phone, and in emergencies by pager. No diagnosis is communicated to clinicians before a faculty member has evaluated the case.

**Structured Education and Management of the Surgical Pathology Laboratory**

The residents attend scheduled quality assurance, laboratory safety, and other appropriate staff meetings, as they relate to laboratory management. The resident also becomes involved in management issues, as they arise during the course of the workday. These issues are further discussed in the daily focused tutorial sessions with the Laboratory Director. As opportunity provides, residents will be allowed to participate in CAP laboratory accreditation activities, including self-inspections and inspections of other institutions. Residents are urged to attend the Inspection Training Course provided by CAP.

**Required Conference/Seminars**
Monthly Renal Pathology Conferences: These conferences provides a monthly forum for trainee and faculty discussion of difficult and unusual cases and provide an avenue for trainee peer teaching. This clinical conference provides trainees with the opportunity to present pathologic findings for correlation and discussion.

- Fridays, noon, Hennepin County Medical Center

Wednesday - University of Minnesota Laboratory Medicine and Pathology Grand Rounds, 8:00-9:00 a.m., weekly. Conference is held on the University of Minnesota Medical School Campus.

Fridays - Rosai/Sinard Conference, 7:15-8:00 a.m., weekly, residents present a variety of real cases on a theme related to a recent or up-coming the faculty Resident's Conference. Conference is held on the University of Minnesota Medical School Campus. This conference provides a regular avenue for trainee peer teaching with feedback given by the Chief Resident's Subcommittee.

Fridays - Resident's Conference, 8:00-9:00 a.m., weekly, residents attend conferences on a variety of scheduled pathology topics. Conference is held on the University of Minnesota Medical School Campus.

Optional Conferences

- Tuesdays - Hennepin County Medical Center/Abbott Northwestern Hospital Unknown Conference, 7:30-8:30 a.m., weekly. This conference alternates hospital sites each week. Weekly challenge of 5 current (difficult or classic) cases from HCMC and 5 cases from Abbott-NW Hospital for review and diagnosis by the residents. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases. Each resident gives a diagnosis in round robin fashion with questioning and discussion by moderating faculty (Brad Linzie MD and John Jones MD) from each institution.

- Thursdays - City Wide Surgical Pathology Conference, 8:00-9:00 a.m., weekly, pathologists from the city bring interesting and difficult cases to share and discuss. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases.

Interdepartmental Conferences

1. Tumor conference, weekly case based discussion presented by Faculty of Surgical Oncology, Radiology, Pathology, Radiation Oncology, Medical Oncology. This clinical conference provides trainees with the opportunity to correlate and discuss pathologic findings.

2. Renal pathology conference, monthly interdisciplinary conference with pathology faculty and residents and nephrology faculty and residents. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases. This clinical conference provides trainees with the opportunity to correlate and discuss pathologic findings.

3. Urologic Pathology Conference, weekly. This conference provides a regular avenue for trainee peer teaching. This clinical conference provides trainees with the opportunity to present pathologic findings for correlation and discussion.
4. ENT Conference, monthly. This conference provides a regular avenue for trainee peer teaching. This clinical conference provides trainees with the opportunity to present pathologic findings for correlation and discussion.

5. Ob-Gyn Conference, as scheduled. This conference provides a regular avenue for trainee peer teaching. This clinical conference provides trainees with the opportunity to present pathologic findings for correlation and discussion.

6. Dermatology Conference, weekly. This conference provides a regular avenue for trainee peer teaching. This clinical conference provides trainees with the opportunity to present pathologic findings for correlation and discussion.

Scholarly Activities and Research During Rotation

Residents are provided with continuous access to literature searching programs. The expectation is that residents will utilize the medical literature to find up-to-date information on their cases. It is further expected that residents will utilize the medical literature to help provide our clinical colleagues with up-to-date knowledge related to the cases they complete. During sign-out of cases, the residents and teaching faculty discuss each case, both from a histologic perspective and a scholarly perspective. In discussing the latter, the resident and faculty discuss both normal and abnormal physiology and the mechanisms potentially responsible for creating the morphologic findings observed. It is hoped that these discussions will foster an interest in research and the development of new knowledge. Residents are encouraged to become involved in research.

Basis and Method of Resident Evaluation

The residents are provided with continuous feedback on their performance during the rotation. In general, only deficiencies are noted in writing. Residents are evaluated on their demonstrated ability to provide informative consultation to the clinical service teams, their medical knowledge, their application of this knowledge to efficient/quality patient care, and their gross and microscopic diagnostic, technical and observational skills. Residents are also evaluated on their interpersonal skills, professional attitudes, reliability, and ethics with members of the teaching faculty, peers, laboratory staff, and clinicians. They are further evaluated on their initiative in fostering quality patient care and use of the medical literature, as it relates to their assigned cases. Their timely completion of assigned interpretive reports is another component of the evaluation. Residents on probation receive a written mid-rotation evaluation.

Educational Resources Available

- D'Agati: Non-neoplastic Kidney Diseases (AFIP Atlas of Nontumor Pathology, Vol. 4), by Vivette D. D'Agati, J. Charles Jennette and Fred G. Silva; 2005, 721 pages, 1349 illus. This comprehensive volume is divided into 26 chapters. It covers the major disease categories including congenital and hereditary diseases, acquired diseases of the native kidneys as well as diseases of the renal allograft.
- Eble: WHO Classification of Tumours: Pathology and Genetics of Tumours of the Urinary System and Male Genital Organs; February 2004, 360 pages, 800 illus.; an authoritative, concise reference, prepared by 131 authors from 22 countries.
- Fogo: Diagnostic Atlas of Renal Pathology; April 2005, 464 pages, 600 illus. Covers all major inflammatory, infectious, pre-neoplastic, and neoplastic diseases of the kidney. The newest information regarding categorizing and classification of diseases is presented.
- Howie: Handbook of Renal Biopsy Pathology by Alexander J. Howie; 2007 (2nd ed.), 340 pages, 249 illus. This handbook provides a short, clear, useful and interesting guide to the findings in renal biopsy specimens. It is intended to be of practical help primarily to pathologists and trainee pathologists who look at these specimens.
- Jennette: Heptinstall's Pathology of the Kidney by J. Charles Jennette, Jean L. Olson, Melvin M. Schwartz and Fred G. Silva; 2006 (6th ed.), 1699 pages, 525 illus. Guided by the biggest names in renal pathology, the new Sixth Edition of this gold-standard text thoroughly examines the origins and manifestations of kidney disease. Experts offer careful pathologic descriptions, appropriate clinical correlations, and extensive discussions on causes and pathogenesis to clarify your understanding and facilitate easy, accurate diagnosis.

**Computer Information Systems Available for Resident Education and Service Duties**

All Anatomic and Clinical laboratory data are in the Pathnet module of the HNA Millenium System. Pathnet is a client server architecture system by Cerner Corporation, Kansas City, MO. All other clinical data is available on the EPIC system, including clinic visit and operative report dictations and medical imaging reports. Residents have these applications at their desks, along with microscopes and phones. High speed internet access is also available at these desks for computer literature searching.