



The Royal College of Pathologists

Pathology: the science behind the cure

Tissue pathway for medical renal biopsies

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The following recommendations are regarded as a minimum acceptable practice for medical renal biopsies. For a more detailed description of best practice, see ACP Best Practice No. 160.¹

1 STAFFING AND WORKLOAD

Optimally, two or more pathologists in a unit should be competent in the reporting of renal biopsies, in order to provide cover for periods of leave. It is recognised that in some smaller units only one pathologist may have specialist expertise, and in such cases cover for periods of leave should be arranged with renal pathologists in other units.

All pathologists reporting renal biopsies should participate in the renal pathology EQA scheme.

A maximum workload for a full time renal pathologist is not greater than 1200 renal biopsies/year. An evidence based minimum workload is as yet not clearly defined. However pathologists must bear in mind their diagnostic experience, on-going CPD activity and EQA outcomes in assessing their ability to maintain an acceptable level of reporting expertise. When the renal workload is low (<100 biopsies/year) no more than two pathologists should report the biopsies and when it is very low passing the renal workload to a larger unit should be considered, as maintaining an acceptable level of expertise may be difficult if reporting small numbers of biopsies.

If an on-call service is offered for out-of-hours urgent renal biopsies, this is staffed only by pathologists that contribute to the routine renal pathology service or have been specially trained to report urgent renal biopsies.

2 LABORATORY FACILITIES

In addition to routine light microscopy, there must be access to immunohistochemistry and electron microscopy. Electron microscopy is especially important in biopsies from paediatric patients. Electron microscopy facilities may be offsite.

The light microscopy, immunohistochemistry and electron microscopy from a single case are all reported by one pathologist. Reporting each in isolation may result in serious misdiagnoses.

3 SPECIMEN SUBMISSION AND DISSECTION

Native renal biopsies

Optimally these are divided whilst fresh. In circumstances when this is not possible (for example renal unit and laboratory in different hospitals), the specimen may be transported in formalin for light and electron microscopy, and buffer/transport medium if frozen tissue for immunofluorescence is required. Wherever practicable, a sample of cortex large enough to contain at least one glomerulus is fixed for electron microscopy. The rest of the available tissue is all processed for light microscopy.

Renal transplant biopsies

These may be submitted entirely in formalin unless:

- the laboratory requires fresh tissue for C4d immunostaining, in which case a 2 mm fragment must be submitted fresh and rapidly frozen
- there is a suspicion of recurrent or *de novo* glomerular disease, in which case the procedure for native renal biopsies is followed.

4 SECTIONING AND STAINING

Minimum light microscopy stains

Native renal biopsies

Haematoxylin and eosin (H&E / at least 2 levels), stain for basement membranes (such as PAS and silver), stain for connective tissue and vessels (such as elastic van Gieson (EVG) or other trichrome), a stain for amyloid.

Renal transplant biopsies for graft dysfunction

As above, but at least 3 H&E levels and 2 PAS levels.^{2,3} A ribbon of at least three sections at each level, and retention of unstained sections between levels are recommended.

5 ELECTRON MICROSCOPY

The need for electron microscopy may be assessed on the light microscopic appearances, but the majority of biopsies with suspected glomerular disease are investigated in this way.⁴

6 IMMUNOHISTOCHEMISTRY

Native renal biopsies:

IH is used in all cases unless there is no suspicion of glomerular disease or the diagnosis is already evident beyond any doubt.

Minimum routine panel: IgG, IgA, IgM, C3 or C9, C1q, *kappa and lambda light chains.

*Note that the demonstration of light chain restriction in glomerular deposits is usually possible by immunofluorescence staining of frozen sections but is frequently unsuccessful using immunoperoxidase stains in paraffin sections. Other antibodies, including amyloid A and myoglobin, are available for use if indicated.

Renal transplant biopsies

This depends on the clinical context of the biopsy. Immunohistochemistry for C4d (antibody mediated rejection)⁵ and SV40 T Ag (polyoma virus Infection)⁶ should be available for all biopsies if required. The native renal biopsy immunostaining panel and electron microscopy are used for transplant biopsies when there is a possibility of recurrent or *de novo* glomerulonephritis.

Antibodies to be available but which may be sourced by referral to specialist laboratories

Fibronectin, type III collagen, specific collagen type IV alpha chains, viruses known to infect the kidney.

7 MOLECULAR INVESTIGATIONS

These are not regarded as routine at present, but there needs to be a route for referral to a specialist genetic service for relevant cases where there is evidence of an inherited renal disease.

8 REPORT CONTENT

The report should refer specifically to glomeruli, tubules, interstitium, vessels, immunohistochemistry and electron microscopy, and should include a summary/comment at the end of the report.

For inflammatory renal disease, in addition to the diagnosis, the report includes indications to disease activity (grade) and chronicity (stage).⁷

If the adequacy of the biopsy is suspected of causing significant doubt about the reliability of the interpretation, this should be stated explicitly.

For renal transplant biopsies, it is recommended that rejection is typed according to Banff 97 criteria, 2005 update.^{3,5,8} Other aspects of the Banff classification, such as grades of chronic damage, should be used if local clinical staff find it helpful. However, the use of the Banff classification should not inhibit the pathologist from discussing how the biopsy result might be translated into clinical treatment, especially in the 'suspicious for acute rejection' category.

A SNOMED code is required for all biopsies.

9 REFERENCES

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