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# The changing role of the nephropathology laboratory

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*To Professor Adolfo Coelho,*
*my mentor in nephropathology.*

It has been a long road from the first renal biopsy, performed more than a century ago in New York City, to today. Until 1950, knowledge about kidney pathology came from post-mortem studies.

Castleman, Smithwick and Heptinstall were the first to perform biopsies during abdominal sympathectomy for hypertension. In 1953, Heptinstall published in the British Heart Journal a paper titled "Renal biopsies in hypertension."

The first use of needle biopsies for the diagnosis of kidney diseases was by Iverson and Brun in Denmark (1951) and Pardo in Cuba (1953). Kark and Muehrcke in Chicago introduced important changes to Iverson and Brun's technique, transforming this into a more comfortable and safer procedure for the patients.

In a few years, this technique was adopted by a large number of European and American investigators. Most clinicians adopted the Kark and Muehrcke technique, thus obtaining increased numbers of good specimens with fewer complications.

Today there is the automated cutting-needle biopsy gun, with ultrasound to visualise the kidney and position of the needle and make this technique safe and almost complication-free.

Nephropathologists have studied the best colourations for the kidney, developed and applied immunopathology to the understanding of kidney diseases and used electron microscopy to describe and define the fine kidney structure.

While the long road to modern times has not been travelled without controversies, a good number of certainties have been achieved. Discussions between clinicians and pathologists have allowed consensus on:

- Biopsy technique
- Specimen adequacy
- Technical advances of light and electron microscopy
- Immunopathology
- Terminology
- Disease classifications

By 2011 we have reached agreement on:

- What is an adequate fragment
- The four colourations for routine light microscopy that we are "obliged" to use
- How to perform routine immunopathology
- How to use electron microscopy
- Classification of lupus nephritis, IgA nephropathy, diabetic nephropathy, focal and segmental glomerulosclerosis, vasculitis
- The performance of Banff classification
- What we can expect from genomics

Interpretation of a kidney biopsy is difficult, requiring a good correlation and integration between clinical data and biopsy findings.

Robert Heptinstall, in a review of the development of renal pathology, wrote: "*By the middle of the 20$^{th}$*

*century a great number of anatomical details had been accumulated and crucial experiments performed. But in spite of this there was incredible confusion."*

This was to a large extent due to imprecise terminology.

Two dates have been very important for understanding the peculiarity of kidney biopsy interpretation and for recognition of how outstanding the meetings to discuss issues and obtain formal agreement are:

- 1961: The Ciba Foundation Symposium on Renal Biopsy[1] took place in London. Twenty-nine clinicians and pathologists analysed the risks, values and potential of renal biopsies as a means of improving clinical diagnosis and a guide to therapy. More than 5,000 biopsies were reviewed. Terminology, classification, adequacy and biopsy technique were discussed and standardised. This meeting became a turning point in the history of renal biopsy. After this symposium, renal biopsy was performed in the majority of renal centres in the world, playing a vital role in the emergence of nephrology as a major specialty.
- 1991: The First Banff Conference, where a group of pathologists, nephrologists and transplant surgeons discussed renal transplant pathology, adopting a "Banff Classification Standard for Transplant Biopsy Interpretation"[2]. Every two years a Banff Conference takes place in a different country, promoting discussions on the standard classification and incorporation of new genomics techniques in the diagnosis, increasing understanding of transplantation dynamics and reporting new diseases that affect renal transplant – humoral rejection, polyomavirus and identification of chronic humoral rejection. Banff classification is nowadays of the utmost importance in the diagnosis of transplant pathology and is used in renal centres worldwide.

Currently, there is universal agreement that renal biopsy is an integral part of the diagnostic armamentarium of nephrology centres and greatly contributes to patient management.

In Portugal, renal laboratories in the main cities in the north, midlands and south are sufficient and prepared to provide accurate and timely information on their patients.

We must gratefully remember those clinician-pioneers of the '60s, who introduced renal biopsy study in Portugal, applying knowledge learned in Europe and the US:

Cerqueira Magro (Porto); Adelino Marques (Coimbra); Jacinto Simões and Adolfo Coelho (Lisboa).

At the Ciba Foundation, 50 years ago, Paul Iverson, the father of renal biopsy, wrote: "*The renal biopsy technique and the judgment of the patho-anatomical changes are so difficult that the procedure and the judgment should only go on at places where there is expert knowledge.*"

Is this still true today?

Do we need laboratories dedicated to renal biopsy?

Is there a sound grounding for training people in nephropathology, taking a long time to be an expert in this field?

Renal biopsy diagnosis requires recognition, interpretation and integration of many findings present in light microscopy, immunohistochemistry and electron microscopy. Nowadays, new analytical techniques are emerging, such as genomics and proteomics. Finally, it is mandatory that nephrologists and pathologists work together to establish clinical correlations and a correct diagnosis.

A correct diagnosis is not only identification of the renal disease, but also extends to the prognosis and advises on therapy.

Quoting Conrad Pirani: "*Nephrologists and pathologists have learned to work together for the good of the patient. Structure and function have finally met at the microscope.*"

In fact, good practice and sound experience teach us that we need to be experts in renal pathology for the wellbeing of our patients.

For the 25th anniversary of the Portuguese Journal of Nephrology and Hypertension, I would like to express my gratitude to all who have contributed to our Journal, teaching me so many things.

I wish a long and fruitful journey to Dr Fernando Carrera as Editor-in-Chief of the Journal.

***Conflict of interest statement.*** None declared.

## References


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