

Renal Transplant Pathology Series: Part 1

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Introduction

Diagnostic renal pathology is considered by most practicing pathologists as the most difficult area of surgical pathology and renal transplant pathology is even more difficult. Part of the difficulty stems from the fact that renal transplant pathology is still evolving and lesions which were considered as un-important in the past have now become important and need to be reported. Moreover, kidney is one of the most complex organs in the body after brain and this anatomico-histologic complexity also adds to the difficulty of renal transplant pathology.

The transplanted kidney is susceptible to all forms of disease that afflict the native kidney. In addition, a major cause of injury to the transplanted organ comprises of the allo-specific immune response of the host, namely, rejection. Many of the immunosuppressive drugs used in transplant setting are also potentially nephrotoxic. The immunosuppressed status of the host also predisposes to a wide variety of infections. This variety of injurious insults further compounds the problem.

The theory of transplant rejection is relatively easy to define. It may be defined as the inflammation and/or scarring of the graft parenchyma caused by allo-specific immune responses. There are two arms of the specific allo-immune response. These include: T-cells and antibodies. Hence, rejection can be broadly categorized into two types: T-cell mediated and antibody-mediated. On many occasions, both types of rejection can occur together leading to a third category of “mixed” rejection. Each of these forms of rejection may occur in acute, chronic or acute in chronic setting. All of these except the pure chronic forms are amenable to treatment and hence, should be diligently sought and reported. On practical side, precise diagnosis and

categorization of rejection still remains a formidable challenge, especially for the transplant pathologists.

The transplanted kidney, like the native kidney, is composed of four closely interlinked and anatomically intertwined components. These include: glomeruli, blood vessels, tubules and interstitium (Figure 1). Each of these compartments may be involved, in varying combinations, in both the T-cell mediated or antibody-mediated rejection and these lesions may be acute, chronic or acute on chronic, giving rise to a bewildering array of rejection-related changes in the biopsy. A precise diagnosis and categorization of these has remained the holy grail of the transplant pathologist and transplant physician.

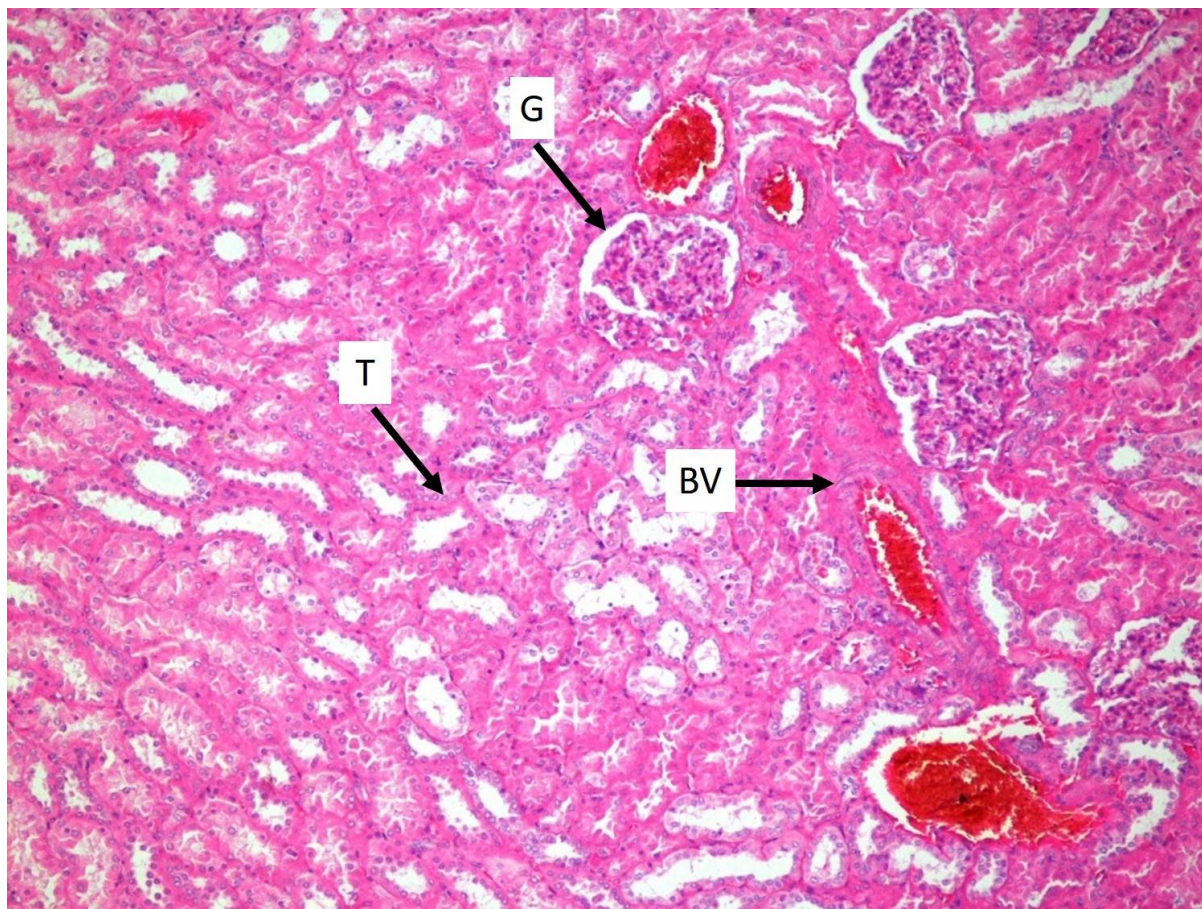


Figure 1. Normal structure of the allograft kidney. Three of the components can be normally seen under the light microscope, including glomeruli (labelled as G), blood vessels (BV) and tubules (T). The fourth component, the interstitium, is a potential space between the tubules, and is not normally appreciated under the light microscope. Each of these four components may be involved in both types of rejection (T-cell-mediated and antibody-mediated). (H&E, $\times 200$).

International standardization efforts began in 1991 at the first Banff conference on renal allograft pathology and have continued biennially since then and the latest, 15th meeting, was held in

2019. Majority of these meetings were followed by publications outlining significant changes in the original Banff classification.⁽¹⁻⁴⁾ A total of 10 papers have been published in different journals over the 30-year period. This dispersal of printed content on Banff classification and its updates has made it considerably difficult for novices and even experienced pathologists to fully comprehend and apply it in routine diagnostic work and research. Recently, a nice review article encompassing and summarizing all the classification updates in a concise and coherent manner has been published and represents an excellent educational tool for both novices and practicing pathologists.⁵

In this series of tutorial, we will attempt to comprehensively encompass the fully updated Banff classification of renal allograft pathology with the help of high-quality images for easy understanding for both the nephrologists and pathologists.

References:

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