Fate of Renal Tissue Procurement at Bedside in Times of Shrinking Pathology Laboratory Budgets

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Background
Renal biopsy is the gold standard for diagnosis of native and allograft kidney diseases. Tissue procurement at bedside (TPB) is used to improve specimen adequacy by allowing a trained individual to verify the presence of glomeruli prior to termination of the biopsy procedure by viewing the core(s) under a microscope. Tissue can also be better allocated for light microscopy (LM), immunofluorescence microscopy (IF), and electron microscopy (EM).

Providing this service requires having a qualified individual or individuals that can be called upon to spend, in our experience, around half an hour preparing for the procedure, evaluating the cores, and processing the specimen.

In 2016 TPB was discontinued at our institution. After one year without this program, we sought to determine if cessation of TPB had any impact on the quality of the biopsies.

Methods
The laboratory information system was searched to find all renal biopsies performed between January 1, 2015 and December 31, 2016. Only needle core biopsies were included. The pathology reports were reviewed and the following data was extracted:
- Number of glomeruli present in sections for LM, IF, and EM
- Number of arteries present by LM for allograft biopsies
- Number of cores collected

Adequacy was defined as follows for each category:
- LM: 10 glomeruli for allograft biopsies or 7 glomeruli for native biopsies
- IF: At least 1 glomerulus for both allograft and native biopsies
- EM: At least 1 glomerulus for both allograft and native biopsies

Biopsies were given 1 point for each modality found to be deficient. The inadequacy rate is calculated as total number of points divided by the total possible number of points.

A two-tailed Two-Proportions was used with an α of 0.05. Fisher’s exact test was applied to determine the statistical significance between data obtained from 2015 and 2016.

Results
A total of 120 renal biopsies from 2015 (52 allograft, 68 native) collected during 2015 with TPB and 111 biopsies (59 allograft, 52 native) were collected in 2016 without TPB. Allograft and native groups were compared year to year.

The rate of inadequacies was significantly higher in the 2016 allograft kidney biopsies when compared to the 2015 sample, 21.61% and 12.50% respectively (p=0.012). In 2016, 17 allograft biopsies had <10 glomeruli present for LM compared to 6 cases in 2015 (p=0.034) and 8 had no tissue available for IF compared to just 1 case in 2015 (p=0.035).

The 2016 native biopsy group had a statistically significant increase in the number of cores collected compared to 2015 (3.49 vs 2.76, p<0.001).

Discussion
An inadequate biopsy can potentially cause longer hospital stays or return visits to clinic for a second biopsy. This drives up costs and potentially delays definitive diagnosis and treatment.

Our data shows that cessation of TPB had a negative impact on the adequacy of the allograft biopsies obtained at our institution.
- Significantly more allograft cases had an inadequate number of glomeruli present for LM without TPB
- More cases had no tissue available for IF without TPB

No change was detected in the native group but we suspect that the increase in cores is confounding the result.

Bedside assessment of the tissue prior to the termination of the procedure allows additional cores to be requested if a sufficient number of glomeruli are not seen under the microscope. This is also an opportunity to divide the tissue prior to it being placed in fixative to ensure appropriate distribution of glomeruli for each microscopic modality.

While bedside evaluation of tissue cannot guarantee adequacy, it has been consistently demonstrated in the literature that utilization of this service can significantly increase adequacy rates.

References
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