Increasing Adequacy of Medical Kidney Biopsies in BC

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INTRODUCTION

Every kidney biopsy performed in BC for non-neoplastic disease is processed and interpreted at the BC Provincial Renal Pathology Laboratory (BCPRPL), located at St. Paul's Hospital in Vancouver, British Columbia. If a biopsy has too few glomeruli, full diagnostic and prognostic information cannot be determined by the renal pathologists. The incomplete diagnoses and absence of prognostic information affect treatment optimization to preserve and predict long-term kidney function and outcomes for patients.

There are no established guidelines to assess adequacy for native medical kidney biopsies. We created provincial medical kidney biopsy adequacy categories based on the total number of glomeruli sampled needed for optimal histopathological diagnosis:

- **Ideally adequate (≥25 glomeruli)**
- **Minimally adequate (15-24 glomeruli)**
- **Suboptimal (<15 glomeruli)**
- **Inadequate (no diagnosis)**

AIM

To increase the percent of ideally adequate medical kidney biopsies to at least 80% at all biopsy collection sites in BC.

METHOD

Adequacy categories were applied by the renal pathologists to all native kidney biopsies collected retrospectively through 2019 and prospectively for all kidney biopsy sites in BC. Interventions to increase biopsy adequacy included giving feedback to the collecting radiologists by providing adequacy categories on histology reports, creating provincial renal biopsy collection kits, and developing an innovative program in Northern Health (UHNBC, Prince George) where ultrasound technicians were trained and supported by renal pathology technologists to enable beside biopsy adequacy assessment at the time of collection, which was not previously available.

RESULTS

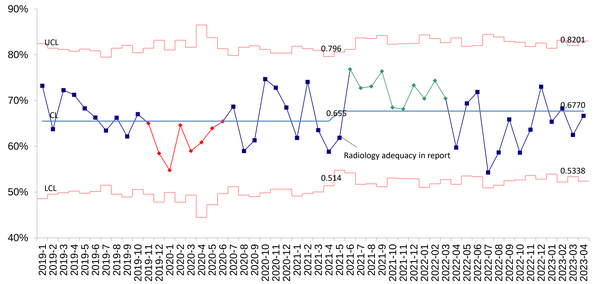

Figure 1. P-chart Percent Ideally Adequate Native Biopsies for all of British Columbia
Medical renal biopsy adequacy category data was collected for all biopsy collection sites in BC retrospectively from 2019 and prospectively through April 2023 (04-2023). Radiology adequacy categories were included in the kidney biopsy reports starting May 2021 (05-2021) to provide adequacy feedback to the collecting radiologists. Following this intervention, there was a sustained increase in the number of ideally adequate biopsies collected and an increase in the average percent ideally adequate biopsies collected at all hospital sites across the province.

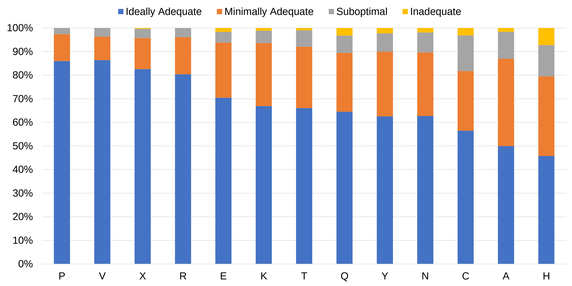

Figure 2. Native Biopsy Adequacy Breakdown by Hospital Collection Site
Percent adequacy for each biopsy adequacy category is shown by hospital collection site, where each hospital has been de-identified. Analysis is through April 2023. Four collection sites out of 13 meet or exceed the current aim of 80% ideally adequate biopsies collected. The BC Provincial Renal Pathology Laboratory is collaborating with each hospital site individually to best determine ways to increase the percent of ideally adequate biopsies collected to at least 80%.

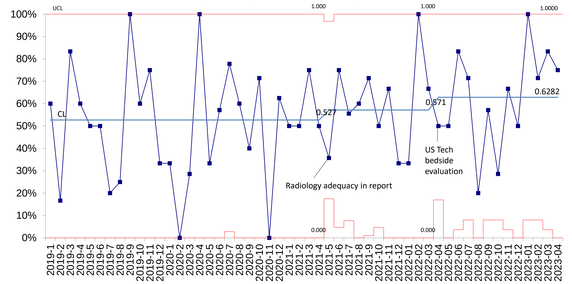

Figure 3. P-chart Percent Ideally Adequate Native Biopsies for Northern Health
Northern Health (Prince George) previously did not have bedside evaluation of kidney biopsies at the time of collection, and this was identified as a major reason for the low number of ideally adequate biopsies collected which sometimes resulted in the need to re-biopsy patients for full diagnosis and prognosis. In collaboration with Medical Imaging and Nephrology in Prince George, we developed an innovative program where the BCPRPL provided a microscope and renal technologists to give on-site training to the radiology ultrasound technicians to enable the radiology technicians to perform bedside adequacy elevation for the collecting radiologists in real time. Sustained improvement has not statistically been demonstrated due to the low number of biopsies performed in Northern Health, but the average number of ideally adequate biopsies has increased.

Provincial Medical Renal Biopsy Collection Kit

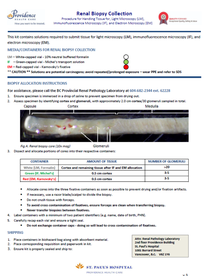

Figure 5. Provincial Renal Biopsy Collection Kit
A uniform provincial kit for evaluation and allocation of medical renal biopsies was created. The kit consists of:

(1) Fixatives and media required for the different types of tissue processing (left).

(2) Instructions with definitions of adequate tissue, an example of adequate tissue under the microscope, and instructions on how to allocate the tissue into the provided fixatives and media (right).

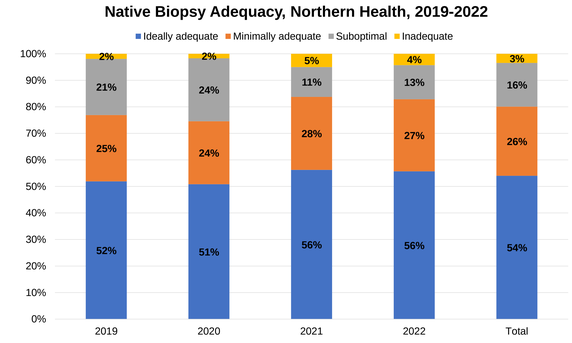

Figure 4. Native Biopsy Adequacy Breakdown for Northern Health
Percent adequacy for each biopsy category is show for Northern Health (Prince George) by year from 2019-2022. Since the initial intervention of including the radiology adequacy in the pathology report, there has been an increase in the percent of ideally adequate biopsies and a reduction in the percent of suboptimal biopsies. Since the implementation of bedside assessment, the total number of inadequate biopsies has also decreased.

CONCLUSIONS

We have established a benchmark for medical kidney biopsy quality in British Columbia. Through innovative collaborations with Northern Health (Prince George), we built relationships with a key community site, reduced the number of suboptimal and inadequate biopsies resulting in fewer re-biopsied patients, and improved diagnostics and patient care.

ACKNOWLEDGEMENTS

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