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# Reducing Discard Blood Draw Volumes from Subcutaneously Implanted Ports (PORT) in Patients with End Stage Renal Disease (ESRD)

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## Background

- To monitor clinical status, dialysis and transplant patients with ESRD frequently require blood draws.
- To preserve their veins and to avoid frequent intravenous access, these patients, especially young children, require PORT placement.
- The PORT is flushed with saline and filled with heparinized saline to prevent blood clotting between blood draws.
- To avoid contamination from PORT fluids, a fixed amount of blood is withdrawn and discarded before the blood sample is drawn for laboratory analyses. Currently, the recommended discard blood volume is 5 mL (five times the reservoir volume of most PORTs and attached catheters.)
- The volume of discarded blood can be significant, particularly in young patients with ESRD who are already anemic and who receive Epopen and iron therapy. This can be a leading cause of iatrogenic anemia.
- In this study, we evaluated the possibility of reducing the discarded blood volume from 5 mL to 3 mL without compromising laboratory results.

## Material and Methods

- Twelve patients with CKD who had a PORT placed as part of their clinical care were included in the study after obtaining informed consent.
- Blood specimens for CBC and BMP were obtained for clinical indications only.
- Fifty paired blood specimens were obtained between February and October 2017.
- Blood specimens were obtained sequentially: study blood specimen ( $S_{mL}$ ) was obtained after a discard volume of 3 mL, followed by any additional blood draw equal to  $[5 - (3 + S_{mL})]$ , followed by control blood specimen (C).
- The chemistry (BMP) samples were analyzed on a Vitros® analyzer and hematology (CBC) samples were analyzed on a Sysmex® analyzer.
- The agreement and variability between the results of the study (S) and the control (C) specimens were analyzed by regression analysis (coefficient of determination and line of equality), and Bland Altman analysis.
- Variability limits for most analytes were set as one-third of the difference between the reference range for that particular analyte (red lines).
- Statistical analysis was performed using MedCalc Statistical Software version 18.2.1, Ostend, Belgium.

## Results

- The coefficient of determination ( $R^2$ ) for all of the tested analytes was  $\geq 0.9$  with the exception of bicarbonate (0.75); (p for all  $< 0.001$ ).
- The line of equality slope was  $\geq 0.88$  ( $p < 0.001$ ) for all tested analytes.
- On Bland Altman analysis, with the exception of 6 outliers out of 550 paired lab values, the difference between the control and study sample values tested against the control values were within the preset variability limits.

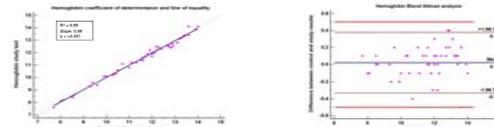
## Conclusion

- The study specimen results showed a high degree of correlation ( $R^2$ ) on regression analysis and a slope approximating 1 ( $x = y$ ) on the line of equality.
- There was a very high degree of agreement between control and study specimen results on Bland Altman analysis. Only 6 (1%) of the results were outside the preset clinically acceptable limits.
- Our results suggest that for at least CBC and BMP, the discard blood volume can be safely decreased from 5 to 3 mL, a 40% decrease in blood wastage without impacting the validity and accuracy of the results.

## Objective

- To determine if a decrease in the discarded volume from 5 mL to 3 mL will still provide accurate and valid lab results for the two most commonly obtained clinical tests, complete blood count (CBC) and basic metabolic profile (BMP).

## Regression Analysis and Bland Altman Analysis



\*Results for WBC and platelet count were also comparable (Data not shown.)

## References

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## Regression Analysis and Bland Altman Analysis

