Exploring Accuracy and Precision of Noninvasive and Intra-Arterial Blood Pressure Measurement in Neurocritical Care Patients

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Purpose

- The purpose of this study is to describe the accuracy and precision of noninvasive and intra-arterial blood pressure measurements in neurocritical care patients.

Background/Problem

- Inconsistencies with blood pressure (BP) readings due to inter-observer variability, equipment, the skills and competency of the clinician, and other physiological factors can lead to inappropriate clinical decision making.
- Despite the use of BP monitoring across patient populations, research on the accuracy and precision of BP remains limited.
- A university hospital conducted a study that explored the consistency of patients' BP readings from different locations.
- This sub-study further explored BP accuracy and precision, utilizing existing data.

Methodology

- This is a planned secondary analysis from a prospective, non-randomized observational study.
- A search for sources of literature that defined what an accurate BP is and which location to take the BP on was conducted.
- A 12x12 Pearson Correlation Matrix was created through the CORR procedure to display precision of BP measurements from the CATNIP data.

Accuracy

refers to how close something is to its true value.

Precision

refers to how approximate values are to one another.

Results

- The diastolic BPs and the mean arterial pressures (MAPs) for each have a stronger correlation with each other.
- Pearson correlation coefficients for systolic BP ranged from -0.0245 to 0.8823; diastolic BP ranged from -0.0226 to 0.8402 and MAP ranged from -0.0749 to 0.9486.
- For the diastolic blood pressures in the correlation matrix, the arterial diastolic BP and the left wrist (LW) systolic BP have the weakest correlation.
- There is no agreed upon best practice for BP site selection.

Discussion

- BP can be taken in either arm or either wrist, and no one site can be recommended given the statistically significantly different Pearson Correlation Coefficients.
- There is very limited precision between arterial line and non-invasive blood pressure (NIBP) measurements.
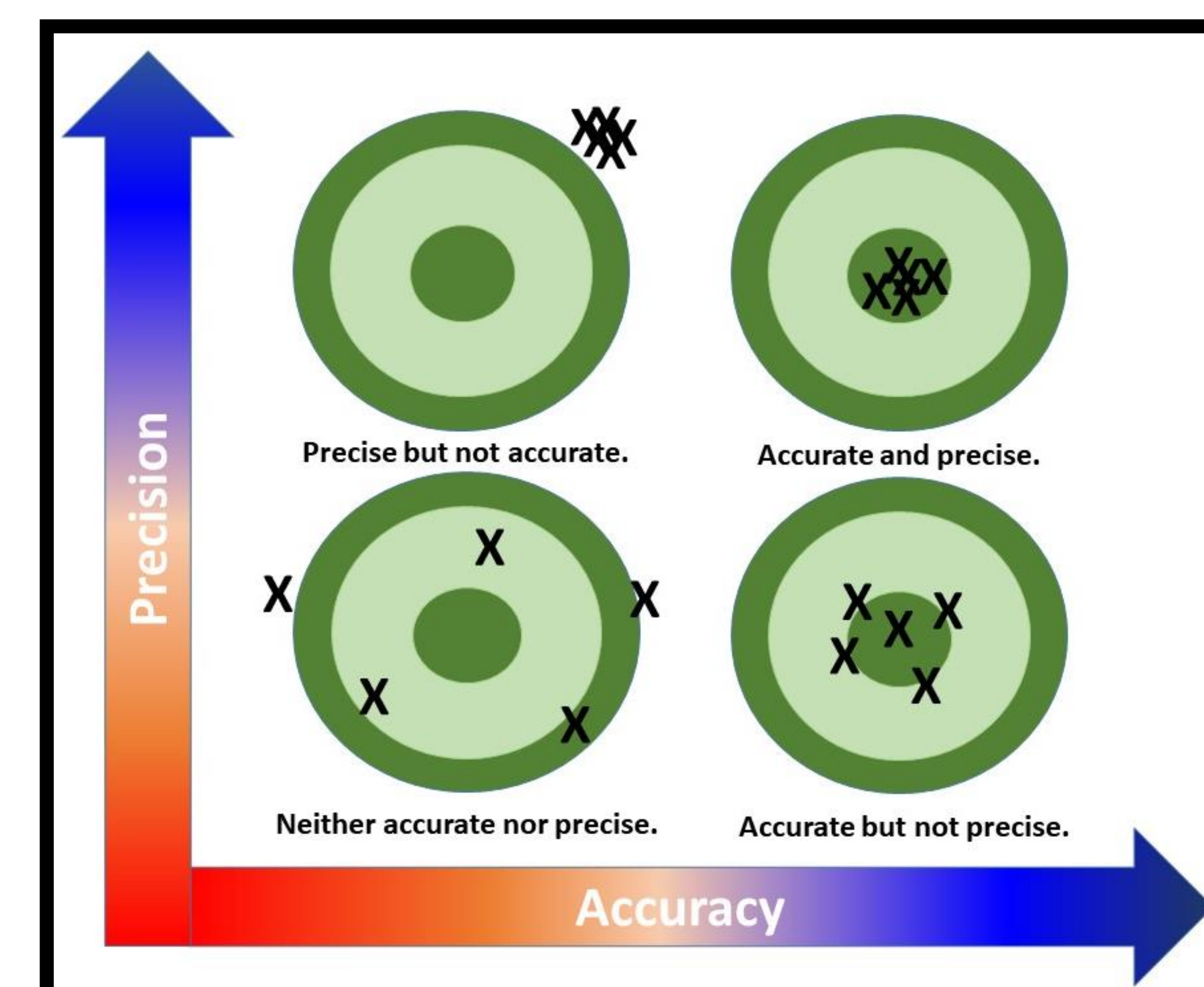
Recommendations for Future Research

- The parent study was conducted in a single center. A recommendation for further research would be to incorporate this study with multiple centers.
- Another recommendation would be to look into multiple populations and not only neurocritical care patients.

References

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