USE OF FINGERSTICK BLOOD COLLECTION FOR THE MEASUREMENT OF BLOOD ARSENIC

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Background and Aims: In Bangladesh millions of people are exposed to naturally occurring arsenic concentrations exceeding the World Health Organization's standard of 10 µg/L (Ahmed et al 2006). Recently a method has been developed to measure blood arsenic concentrations. Blood arsenic (BA) has the advantage of not needing to be normalized for creatinine. It also represents an internal dose, and in the case of chronic steady state exposure blood arsenic has the potential to serve as a biomarker of past exposure. A previous study conducted in Araihazar, Bangladesh has demonstrated that blood arsenic is strongly correlated with both water arsenic (r=0.76) and urinary arsenic adjusted for creatinine (r=0.85) (Hall et al. 2006). However in Bangladesh because of their cultural perceptions of blood, people often feel extremely uncomfortable giving blood by venipuncture.

Methods: In this study we employed fingerstick blood sampling, commonly used in the United States for screening blood lead levels in children, for the measurement of blood arsenic in 10 study participants. Collecting blood by fingerstick requires less blood then traditionally used venipuncture measurements. In this study, the precision of venous and capillary blood collection methods for measuring blood arsenic were compared. Whole blood samples were analyzed for arsenic using Inductively Coupled Plasma Mass Spectrometry (ICP-MS).

Results: Arsenic measured by venous and fingerstick sampling methods were found to be highly correlated (r=0.97) with a mean difference between fingerstick and venous methods of 1 µg/L.

Conclusions: Fingerstick blood collection is an acceptable alternative to venipunture for measuring blood arsenic concentrations. Blood arsenic is a useful biomarker of arsenic exposure that has the potential to help better understand the mechanisms behind arsenic toxicity. The fingerstick method of blood collection allows for this biomarker to be used in Bangladeshi populations that for cultural reasons prefer not to provide venous blood samples.