

Measured GFR by Iohexol Clearance: A Pediatric Perspective

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Measured glomerular filtration rate (mGFR) is the best indicator of renal function in children and adolescents. Accurate assessment of GFR is critical for diagnosing acute and chronic kidney disease, providing early intervention to prevent end-stage renal failure, safely prescribing nephrotoxic and renally cleared agents and for monitoring adverse side effects from such medications. Estimates of GFR (eGFR) are commonly calculated using equations based on creatinine and other parameters (e.g., BUN, cystatin C, race, gender, weight and height). Although relatively inexpensive and convenient, creatinine-based clearance is limited due to dependence on muscle mass, relative insensitivity to detect small changes in renal function and the assumption that extra renal clearance of creatinine is small. In children and adolescents, these equations are particularly problematic.[1] The largest study in children that has directly compared estimating equations with iohexol clearance mGFR showed that the best eGFR formula yielded 87.7% of eGFR within 30% of the iohexol-based mGFR and 45.6% within 10%. [2] Efforts continue to refine and improve estimating equations for use in pediatrics but there are frequently cases where an accurate and clinically useful method for determination of measured GFR is needed to assess pediatric kidney function.

The 'gold standard' for GFR measurement has been by inulin clearance. However, iohexol clearance has been increasingly accepted and applied in clinical practice because it overcomes many of the limitations of inulin clearance, particularly in children. A recent systematic review of mGFR methods found that iohexol clearance was sufficiently accurate compared to inulin clearance.[3] We have developed and validated a semi-automated liquid chromatography electrospray ionization (ESI) tandem mass spectrometry (LC-MS/MS) method to measure iohexol in serum. The method was highly correlated with a reference method.[4] We will

describe our experience providing iohexol-clearance mGFR in more than 100 pediatric patients seen over 2 years in the 'mGFR clinic' at our institution. The presentation will include discussion of the challenges faced when developing and implementing this multi-disciplinary mGFR procedure. A series of pediatric case studies will be reviewed, demonstrating the clinical benefit of iohexol-based mGFR over commonly employed estimating equations.

References:

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