Concordance between iothalamate and iohexol plasma clearances

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Objectives:

Iohexol plasma clearance is regarded as an accurate reference method for measuring glomerular filtration rate (GFR), and may represent a valid alternative to the gold standard, i.e. urinary clearance of inulin. Because urinary clearance of inulin is cumbersome and expensive, iohexol clearance in Europe and iothalamate clearance in USA became popular. Still, head-to-head comparisons of these two methods are lacking.

Methods:

We concomitantly measured GFR by plasma clearance of both iohexol and iothalamate in 101 patients. Indications for GFR measurement were kidney function evaluation either in potential living kidney donors or in patients whose GFR estimation, based on serum creatinine, was suspected as inaccurate. Five mL of iohexol (Omnipaque™240; iohexol, 240 mg/mL, GE Healthcare BVBA, Belgium) and 5 mL of iothalamate (Conray™ 30; iothalamate meglumine, 141 mg/mL, Covidien, Germany) were administrated simultaneously in the same vein (antecubital, forearm or hand vein) and flushed with 10 ml of normal saline. Blood samples were obtained using the contralateral arm at 120, 180, 240, and 300 minutes after injection and GFR was calculated according to Brochner-Mortensen. Collected blood samples were centrifuged for 10 min at 1500 revolutions per minute within 2 hours of collection and stored at -80 °C. Iohexol was measured by high performance liquid chromatography (HPLC). Iothalamate was measured by liquid chromatography-tandem mass spectrometry (LC-MS/MS).

Results:

Mean GFR measured by iohexol and iothalamate clearances were 77±25 and 80±29 mL/min/1.73 m², respectively. Figure 1 shows Passing-Bablok regression comparisons. The concordance coefficient of correlation gives a ρ value of 0.93 and C_b of 0.99. Relative bias between iohexol and iothalamate results were -2±13% (Figure 2). Accuracy within 30% and 15% (i.e. the percentage of iohexol GFR within 30% or 15% of iothalamate GFR) was 98% and 80%, respectively.

FIGURE 1

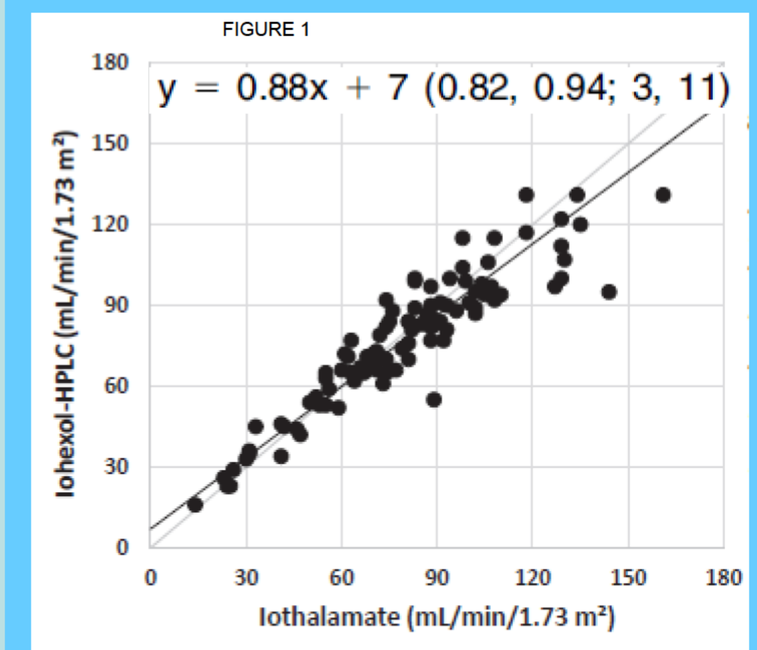
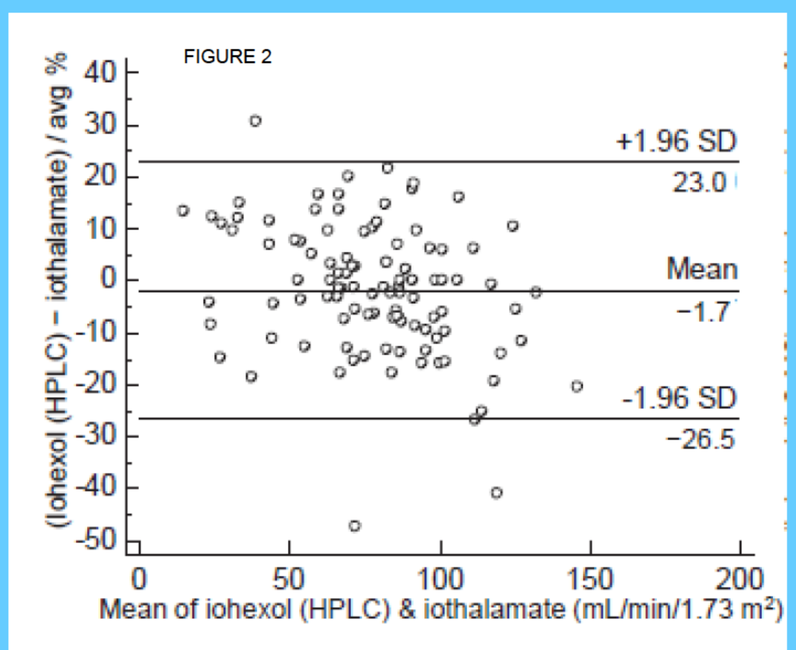


FIGURE 2



Conclusions:

Our results show that concordance between iohexol and iothalamate plasma clearances is acceptable for both clinical practice and research. Virtually all measures show a difference lower than 30%. Moreover, the difference is below 15% in 80% of cases, which is realistic given the intra-individual 10% physiological variation of GFR.

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