Reviewer's report

Title: Determination of the best method for estimating glomerular filtration rate from serum creatinine in adult patients with sickle cell disease: a prospective observational cohort study

Version: 1 Date: 7 July 2012

Reviewer: Bakhtawar Mahmoodi

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In current report Arlet et al assess performance of 5 GFR estimation equations in subjects with sickle cell disease (SCD). The results are interesting and carry potential of clinical implications. I have the following comments and suggestion.

1) Given the low number of patients mean values would be especially sensitive to outliers and Gaussian distributional assumption may not be met. I recommend to present in a sensitivity analysis Bias and precession assessed by median differences and the corresponding interquartile range in addition to the provided mean differences and 95% CIs. With current results of mean differences, I'm not totally convinced whether the made conclusions are indeed supported by the data.

2) In addition to the Bias and precision, quantification of the accuracy may be valuable (for an example, see Levey et al. Ann Intern Med. 2009; 150(9): 604–612).

3) Hyperfiltration definition cut-off at 110 is probably too low and I think this is overemphasized in the paper. Even in the general population the CKD-EPI equation classify about 25% of individuals above 110 (matsushita et al JAMA. 2012 May 9;307(18):1941-5). This is equal to the non-SS genotype. Given the young age and low BMI, the “hyperfiltration” prevalence may be equal to healthy individuals. If the authors have access to any data of healthy or non-SCD patients with similar age and BMI, it would be helpful to contrast the eGFR in the SCD individuals versus health/non-SCD individuals to justify the term of “hyperfiltration”. Otherwise, I recommend conveying the albuminuria information the way presented in table 2 rather than setting cut-offs for hyperfiltration.

4) Providing the distribution (eg., kernel density) of the eGFR that shows overlap of the 5 equations and measured GFR for visual assessment will be useful. Showing the mean difference with 95%CIs (table3) may be misleading in case of outliers.

5) The table 3 legend denotes that the tests are based on paired t-test, this require mentioning in the statistical methods section.

6) There are several section of the paper that require language editing and correction of typographical errors:
   a. Methods section on patients, in the sentence “...patients with diabetes
mellitus, hypertension or other diseases susceptible to…”, please list what “other disease” consisted of. I understand that the overall range could be long, however, the authors can provide the list of observed conditions that lead to exclusion in current study.

b. The acronym BSA needs introduction at its first use, page 6 (glomerular filtration rate measurement section).

c. Methods section on biological measurements: the first sentence “…..on single urinary plot expressed as mg/mmol…” needs revision. The authors probably mean measured in spot urine?

d. Similarly the following sentence in the same section, “AER was defined as normoalbuminuria……” should be changed to something like “AER was categorized as normoalbuminuria….”. It is the normo/micro/macro-albuminuria that are defined by AER, not the other-way around.

e. The last sentence of the same paragraph ending with “…traceable to IDMS” needs revision to something like: “Serum and urine creatinine were measured by using an alkaline picrate rate-blanked compensated kinetic assay (Hitachi 917 analyzer; Roche Diagnostics) with standardization to isotope dilution mass spectrometry.

f. In the CKD-EPI equation formula on page 7 and 8, the alpha should be raised to the power.

g. The final sentence of the “Glomerular filtration rate measurements section” on page 6&7 “Furthermore, we observed that a mGFR….. at least in our population” should be moved to results section or deleted as that is already mentioned in the results.

h. Page 10 results section, 2nd paragraph, last sentence “mGFR comprised” needs rephrasing. Saying the 2nd quartile instead of the range for GFR may make the sentence more easier to understand.

i. Results section page 11, there is no figure 2d and 2e. Probably 1d and 1e is meant by that?

j. The correlation coefficient of r=0.43 in the last sentence on page 11 should be negative? Otherwise the sentence does not make sense to me.

k. Please provide the correlation coefficient for all 5 equations rather than selecting some. It seems that also for the CKD-EPI with race adjustment the bias decreases with higher mean differences, given the figure?

l. Discussion section, page 12, paragraph 2, “…GFR <60 ml/min/1.73m2 and substantially more accurate in the subgroup with estimated GFR >60 ml/min/1.73m2 [12-16,17].” Not all references address this issue. Please list only the references addressing the mentioned point.

m. In the discussion section on page, the word “indexation for BSA” is used in several sentences, I suggest rephrasing that to something like “expressed per BSA”.

n. The discussion is lengthy and have some repetitions. Please shorten the overall discussion and add a paragraph on limitation of the study. There is no
study without limitations!

7) Finally, The paper will greatly benefit from language editing by a native English speaker.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

none