Reviewer's report

**Title:** Clinical Utility of Renal Ultrasound in Acute Kidney Injury

**Version:** 1  **Date:** 10 June 2013

**Reviewer:** Filippo Mangione

Reviewer's report:

1. The first question is: is renal ultrasound effective in detecting hydronephrosis?

Authors came to the conclusion that “renal ultrasound is indicated if there is medical history suggestive of urinary tract obstruction”, giving the impression that in other cases of AKI RUS could be unnecessary, if not harmful (i.e. leading to unnecessary interventions). The answer to the above question is, therefore, “no”: an excess of renal ultrasound should be performed in order to give a single positive result. The message is original and revolutionary, as renal ultrasound is part of the common diagnostic pathway in patients with AKI.

I have some concerns about the generalizability of their results, which led to these conclusions.

Authors referred to a selected population of patients with AKI, as:

a. patients with AKI who did not undergo a renal ultrasound were excluded:
Authors state that this may even strengthen their results, supposing that RUS has been ordered only for patients with higher suspicion of obstructive uropathy. I do not completely agree with this interpretation, as they report data on patients that undergo RUS even without AKI: this means that renal ultrasound is currently widely used in renal patients, apart from the presence of AKI. Moreover, the relatively low prevalence of acute urinary obstruction in their cohort, if compared to other case series (Liano F, Junco E, Pascual J, Madero R, Verde E. The spectrum of acute renal failure in the intensive care unit compared with that seen in other settings. The Madrid Acute Renal Failure Study Group. Kidney Int Suppl. 1998, 66: S16-S24) is inconsistent with their interpretation of a favourable selection bias. I agree that the selection bias is strictly related to the retrospective design of the study. However, authors cannot exclude that a number of diagnosis of hydronephrosis/obstructive uropathy could be missed; moreover, they admit that some cases of obstructive acute renal failure could have been diagnosed by means other than echography. This is consistent with the low prevalence of acute urinary obstruction (see above).

b. patients in which complete clinical data (probably including previous medical history) could not be obtained were also excluded from the analysis. This is a primary point, as authors conclude that medical history should guide the prescription of renal ultrasound in patients with AKI. They came to this advice because all patients in their population had a known medical history; but this may be not the case for every single patient with AKI. This represents a selection bias and restricts the generalizability of the conclusion that “renal ultrasound is
indicated if there is medical history suggestive of urinary tract obstruction” reached by the authors. If this statement was directly translated into clinical practice, renal ultrasound would be denied to patients in which medical history cannot be obtained for various reasons.

For these reasons, I strongly recommend that author’s trenchant conclusions (“renal ultrasound is unlikely to yield useful results” if there is no medical history suggestive of urinary tract obstruction) should be mitigated. This kind of conclusion can be translated into dangerous negligence. Renal ultrasound is now largely available, relatively inexpensive and not time-consuming; acute urinary tract obstruction is rapidly manageable, and its resolution is mandatory to prevent evolution to chronic kidney disease. Even a single missed diagnosis of urinary tract obstruction, which can translate into ESRD in a relatively short period, should be interpreted as a heavy medical failure and should be avoided.

2. The second question is: is hydronephrosis a reliable marker of urinary tract obstruction? Again, the authors’ answer is “no”, although it is based on descriptive statistics rather than a precise performance assessment of the marker (sensitivity, specificity, ROC curve). Again, the answer is original and revolutionary. Authors suggest a lack of specificity for hydronephrosis as a sign of obstructive AKI, while it has always been thought that renal ultrasound lacks sensitivity (i.e. non-dilated obstructive acute renal failure, when volume depletion is concomitant with obstruction).

Their observation ensues from the criterion that has been used to define obstructive AKI as a “situation requiring urological procedure or bladder catheterization”. In my opinion, obstructive AKI should be better defined as “resolution of AKI after resolution of obstruction”. In about an half of cases with hydronephrosis, AKI was attributed to other causes. I wonder if AKI has been resolved in all the patients in which hydronephrosis did not require a urological procedure. If not, AKI in these patients could also be interpreted as progression of renal disease in individuals with chronic obstructive uropathy.

- Minor Essential Revisions

Why reporting only descriptive statistics of the entire sample of individuals that underwent renal ultrasound (table 1)? If comparing characteristics of the whole sample to those of patients with AKI is considered interesting, a statistical analysis between the two groups should be performed.

- Discretionary Revisions

None

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.
Declaration of competing interests:

I declare that I have no competing interests.