

Acute Dialysis Quality Initiative

2nd International Consensus Conference

REVIEWS

ADQI workgroup reports were sent to leading experts who served as external reviewers.

Reviewers were asked to provide reviews and editorial comment on the workgroup reports.

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Workgroup 2: Clinical endpoints (effectiveness) in randomized clinical trials in acute renal failure

This report addresses a very important issue: how to assess outcome and the pitfalls involved in assessing them.

Measurement of renal function.

There are many candidates for this item; therefore, it would benefit a more detailed approach. For example, Serum creatinine measurements can have different results for the same sample, according to the methodology that was used (1, 2). Furthermore, many factors can influence serum creatinine, especially in critically ill patients. The serum creatinine level not only depends on renal elimination but also on creatinine generation, volume of distribution, and renal elimination. Creatinine is metabolized from creatine released by the muscles, so that muscle mass and metabolic transformation of creatine have an impact on creatinine concentration. Many characteristics apart from renal function, may influence creatinine concentration, such as age, gender and race: younger patients, males and blacks have higher serum creatinine levels for the same given glomerular filtration rate (GFR), compared to older patients, females and Caucasians (3, 4). A whole range of 'serum factors' can interfere with creatinine measurements: e.g. high bilirubin and glucose levels, and sulfonamides lead to false low measurements. Other products interfere with tubular secretion, leading to higher creatinine levels (e.g. cimetidine, trimethoprim/sulfamethoxazole). Critically ill patients are often in a non-steady state condition and it has been shown that changes of GFR are poorly reflected by daily changes in serum creatinine concentrations in patients with ARF (5).

Finally, there are many ways to assess GFR. Direct measurement of GFR, the golden standard for assessment of renal function, with exogenous substances such as inulin, nonradioactive contrast agents (iothalamate or iohexol) or radiolabelled compounds (e.g. iodine 125-iothalamate or technetium 99m-diethylenetriaminepenta-acetic acid) is not performed routinely in the ICU setting for practical reasons. Creatinine clearance overestimates GFR, which becomes proportionally more important in patients with low

GFR. Furthermore, creatinine clearance measurements require a steady state situation which is seldom met in these patients, therefore, 24 hr. creatinine clearances seem less appropriate. Assessment of GFR by equations has never been validated in critically ill patients, and given the considerations above, assessment on basis of equations has a lot of potential flaws.

Scoring systems

Although a specific issue, which is perhaps a bit beyond the scope of this report, is the problem that comes up when ARF and non-ARF cohorts are compared on the basis of morbidity scoring systems (e.g SOFA). How should they be compared? –only on basis of non-renal generated points? Scoring systems as APACHE/SAPS should be calculated on basis of data generated during the first 24 hours of ICU admission, therefore, there might, and should be therapeutic intervention (this is in contrast with what the text states). Furthermore, equal APACHE or SAPS scores do not represent the same predicted survival or mortality. For this, the admission data (i.e. admission diagnosis, surgical, non-surgical patient) should be included. Therefore, comparison of patients on basis of the APACHE II score only is probably suboptimal. Another point that is actually in the text, but might be stressed a bit more is the limited information, and absence of validation that daily APACHE/SAPS scores give.

References

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