■ CORRESPONDENCE

Avoidance of Perioperative Acute Renal Failure: Land in Sight?

To the Editor:—Acute renal failure (ARF) is a severe perioperative complication and, until today, strategies to avoid it remain controversial.[1] Kheterpal *et al.*[2] performed an informative retrospective analysis on this topic, underlining the impact of perioperative ARF on patient mortality. Moreover, they identified several independent predictors of ARF in noncardiac surgery. To have them in mind will be useful for our daily practice.

However, the authors' conclusions regarding intraoperative risk factors drawn in the abstract, despite being markedly attenuated in the main text, seem somewhat misleading to us, especially in combination with the title announcing a study on "Patients with Previously Normal Renal Function."[2] To prevent general confusion regarding the perioperative use of vasopressors and diuretics, it is important to clearly stress that one major shortcoming limits a direct transfer of the findings to the healthy individual: More than 65,000 patients were primarily screened to evaluate the propensity of patients with certain risk factors to ARF. Unfortunately, not only those 6,534 patients without preoperative renal function measures were excluded from the study,[3] but in addition 25,537 outpatient cases. In all, the investigators excluded the healthier part of their primary collective. To draw an overall conclusion questioning the use of vasopressors and diuretics in healthy patients from this preselected collective seems a bit overreaching to us. But a careful look into their subgroup analysis does not lower our concerns: In the low-, medium-, and medium–high-risk groups, only 0.8% of the patients receiving vasopressors and 1.5% of the patients receiving diuretics developed ARF. The authors themselves state that ARF occurs in 1–5% of all hospitalized patients,[2] meaning that diuretics seem to have no influence and that vasopressors seem to even lower the risk of ARF. This picture is slightly changed when taking the high-risk patients into account. However, even now, the overall risk (vasopressors 4.8% and diuretics 2.3%) is still within the range anticipated in hospitalized patients.[2]

To make such a striking statement in the abstract is an unnecessary overinterpretation and falls short of this otherwise very well-performed retrospective analysis.

In addition, an extremely interesting finding is only scarcely discussed by the authors: Urine output was not associated with ARF in this study. Eighty-eight percent of the patients not developing ARF had a urine output of less than $0.5 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$, surprisingly significantly more patients than those with ARF (75%). Above that, mean urine production in patients developing ARF was not significantly different from that in the other patients. This is in clear contrast to the common assumption that "logic suggests"[1] urine output has to be maintained above a certain level to prevent ARF and, therefore, should be treated with crystalloid boluses.[4] From our point of view, the authors made an important contribution to the current discussion on the practicability of a modern approach to perioperative fluid therapy, aiming at limiting the total crystalloid amount to reduce perioperative complications.[5]

We would like to congratulate Kheterpal *et al.* on this interesting retrospective analysis. Their work not only will contribute to our patient's safety, but, more importantly, it marks several starting points for further prospective investigations.

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The above letter was sent to the authors of the referenced editorial. The authors did not feel that a response was required.—James C. Eisenach, M.D., Editor-in-Chief

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Use of Cockroft and Gault Formula for Estimation of Creatinine Clearance

To the Editor:—We read with interest the recently featured article "Predictors of Postoperative Acute Renal Failure after Noncardiac Surgery in Patients with Previously Normal Renal Function" by Kheterpal *et al.*[1] in ANESTHESIOLOGY. We congratulate the authors on this excellent article. The importance of alterations in renal function in the perioperative period is not widely recognized by anesthesiologists. Hence, we appreciate the contribution of the authors on this subject.

During our own work on renal function, we have noticed a recent change away from using the Cockroft and Gault formula for estimation of Creatinine Clearance toward using the Modification of Diet in Renal Disease formula in view of the many drawbacks with the Cockroft and Gault formula.[2,3,4,5] We noted in the article significant findings related to renal function and obesity. These results may have looked different with the Modification of Diet in Renal Disease formula with respect to the obese patients in their population.

We would be curious if the authors could comment on their choice of formula for estimation of creatinine clearance in their article.

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