

Category : **Renal: failure**

A96 - Optimising postoperative hemodynamics in patients at high risk for acute kidney injury (aki) - the higher, the better?

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Introduction:

We hypothesised that postoperative hemodynamics are strongly associated with acute kidney injury (AKI) and investigated optimal target thresholds of systemic blood pressure and cardiac output in the cardiothoracic ICU.

Methods:

Data of the two PrevAKI-trials were combined, together including 554 patients after cardiac surgery (1,2). Four hours after surgery, patients at high risk for AKI were identified by the urinary biomarkers TIMP2*IGFBP7. Hemodynamics were then analysed for the consecutive 12 hours. In the combined dataset, the incidence and severity of AKI were compared between patients with postoperative hypotension and/or low cardiac index versus patients with hemodynamic stability. Thereafter, the incidence of AKI was evaluated for different hemodynamic thresholds of mean arterial pressure (MAP) and cardiac index (CI).

Results:

AKI occurred significantly more frequently in patients with postoperative hypotension and/or low cardiac index compared to patients with hemodynamic stability (57,1% vs. 37,2%, p<0,05). This effect was especially marked for more severe stages of AKI (29,8% vs. 9,3%, p<0,01). Our analyses demonstrated an almost constant increase in the rate of postoperative AKI with lower MAP and CI thresholds. A prominent threshold for increase in AKI rates was found at a mean MAP of between 70 mmHg or 75 mmHg and a cardiac index lower than 3.0 l/min/m².

Conclusion:

Postoperative hypotension and low cardiac output are key risk factors for AKI in the ICU. For cardiac surgery patients at high risk for AKI, a higher target mean arterial pressure than the generally recommended 65mmHg may be beneficial to prevent AKI, although this needs to be balanced against the potential side effects of required treatment intensity. Finally, our analyses strongly underline the importance of low cardiac output in the immediate postoperative period as a risk factor for kidney injury.

References:

- (1) Meersch, M, et al., Intensive Care Medicine (2017)
- (2) Zarbock, A, Küllmar, M, et al., Anesthesia and analgesia (2021)

Table:

Mean MAP (mmHg)	Incidence of any AKI (KDIGO criteria)	Mean cardiac index (l/min/m ²)	Incidence of any AKI (KDIGO criteria)
55 - 60	83.3% (5/6)	1.5 - 2.0	61.9% (13/21)
60 - 65	75.6% (34/45)	2.0 - 2.5	64.0% (48/75)
65 - 70	65.6% (82/125)	2.5 - 3.0	56.4% (62/110)
70 - 75	56.8% (92/162)	3.0 - 3.5	42.1% (24/57)
75 - 80	51.4% (56/109)	3.5 - 4.0	42.3% (11/26)

80 - 85	52.2% (35/67)	4.0 – 4.5	n/a
85 - 90	35.7% (10/28)	4.5 – 5.0	n/a

Hemodynamic thresholds of arterial blood pressure and cardiac output, over a 12 hours post-operative period