

Early detection of kidney stress and interventions to avoid acute kidney injury are recommended following surgery.

Class (Strength) of Recommendation	Class IIa (Moderate)
Level (Quality) of Evidence	Level B-R (Randomized)

Main Points

- Two novel urinary renal biomarkers, insulin-like growth factor-binding protein 7 (IGFBP7) and tissue inhibitor of metalloproteinases-2 (TIMP-2) can identify renal stress as early as one hour after starting cardiopulmonary bypass.
- Serum biomarkers may eventually allow us to accurately identify patients with normal glomerular filtration rates at risk of postoperative AKI.
- Studies have shown that earlier intervention based on biomarkers may decrease the incidence of postoperative acute kidney injury and decrease costs.
- Interventions include avoidance of nephrotoxic agents, discontinuation of ACE inhibitors and angiotensin II receptor blockers, avoidance of hyperglycemia, and close hemodynamic monitoring.

Key References

1. Wang Y, Bellomo R. Cardiac surgery-associated acute kidney injury: risk factors, pathophysiology and treatment. *Nat Rev Nephrol.* 2017;13:697-711.
2. Engelman DT, Kellum JA. The difficulty of predicting postoperative acute kidney injury from preoperative clinical data. *The Journal of thoracic and cardiovascular surgery.* 2018.
3. Ronco C, Kellum JA, Haase M. Subclinical AKI is still AKI. *Critical care.* 2012;16:313.
4. Kashani K, Al-Khafaji A, Ardiles T, et al. Discovery and validation of cell cycle arrest biomarkers in human acute kidney injury. *Critical care.* 2013;17:R25.
5. Mayer T, Bolliger D, Scholz M, et al. Urine Biomarkers of Tubular Renal Cell Damage for the Prediction of Acute Kidney Injury After Cardiac Surgery-A Pilot Study. *Journal of cardiothoracic and vascular anesthesia.* 2017;31:2072-2079.

6. Meersch M, Schmidt C, Hoffmeier A, et al. Prevention of cardiac surgery-associated AKI by implementing the KDIGO guidelines in high risk patients identified by biomarkers: the PrevAKI randomized controlled trial. *Intensive care medicine*. 2017;43:1551-1561.
7. Khwaja A. KDIGO clinical practice guidelines for acute kidney injury. *Nephron Clin Pract*. 2012;120:c179-184.
8. Gocze I, Jauch D, Gotz M, et al. Biomarker-guided Intervention to Prevent Acute Kidney Injury After Major Surgery: The Prospective Randomized BigPAK Study. *Annals of surgery*. 2017.

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