



DAFTAR PUSTAKA

- Aksoy, R., Adademir, T., Yilmaz, E., Cevirme, D., Sengor, M., Koksal, C. & Rabus, M.B. 2019. Is hypoalbuminemia a predictor for acute kidney injury after coronary bypass grafting in diabetes mellitus patients? *Brazilian Journal of Cardiovascular Surgery*, 34(5): 565–571.
- Alharazy, S.M., Kong, N., Saidin, R., Halim, A., Gafor, A., Maskon, O., Mohd, M., Zulkifli, S. & Zakaria, S. 2014. Neutrophil Gelatinase-Associated Lipocalin as an Early Marker of After Coronary Angiography. *Angiology*, 65(3): 216–223.
- Andújar, A.M., Lucas, A., Escudero, V.J., Rovira, I., Matute, P., Ibañez, C., Blasco, M., Sandoval, E., Ruiz, J., Sánchez, M.C., Piñeiro, G.J., Quintana, E. & Poch, E. 2022. Risk Factors for Acute Kidney Injury Following Cardiac Surgery and Performance of Leicester Score in a Spanish Cohort. *Journal of Clinical Medicine*, 11(4).
- Arques, S. 2018. Human serum albumin in cardiovascular diseases. *European Journal of Internal Medicine*, 52(April): 8–12. <https://doi.org/10.1016/j.ejim.2018.04.014>.
- Axtell, A.L. et al. (2020) ‘Correlation of cardiopulmonary bypass duration with acute renal failure after cardiac surgery’, *Journal of Thoracic and Cardiovascular Surgery*, 159(1), pp. 170-178.e2. doi:10.1016/j.jtcvs.2019.01.072.
- Bagshaw, S.M. & Bellomo, R. 2007. Early diagnosis of acute kidney injury. *Current Op in Critical Care*, 13(6): 638–644.
- Belinskaia, D.A., Voronina, P.A., Batalova, A.A. & Goncharov, N. V. 2020. Serum Albumin. *Encyclopedia*, 1(1): 65–75
- Berbel-Franco, D., Lopez-Delgado, J.C., Putzu, A., Esteve, F., Torrado, H., Farrero, E., Rodríguez-Castro, D., Carrio, M.L. & Landoni, G. 2020. The influence of postoperative albumin levels on the outcome of cardiac surgery. *Journal of Cardiothoracic Surgery*, 15(1): 1–13.
- Boom C. et al. 2013 Panduan Klinis Perioperatif Kardiovaskular Anestesi. Jakarta: Komisi Pendidikan Spesialis Anestesiologi Konsultan Anestesi Kardiovaskular (KAKV). Aksara Bermakna: Hal. 91-92
- Che, M. et al. (2010) ‘Clinical usefulness of novel biomarkers for the detection of acute kidney injury following elective cardiac surgery’, *Nephron - Clinical Practice*, 115(1). doi:10.1159/000286352.
- Chien, S.C., Chen, C.Y., Lin, C.F. & Yeh, H.I. 2017. Critical appraisal of the role of serum albumin in cardiovascular disease. *Biomarker Research*, 5(1): 1–9.
- Dhanju, A.S., Chhina, G., Manekar, S.P. & Sandhu, P.S. 2022. A study of serum albumin levels in acute coronary syndrome and its correlation with clinical outcome. *Int J Adv Med*, 9(5): 571–574.
- Esper, S.A., Subramaniam, K. and Tanaka, K.A. (2014) ‘Pathophysiology of cardiopulmonary bypass: Current strategies for the prevention and treatment of anemia, coagulopathy, and organ dysfunction’, *Seminars in Cardiothoracic and Vascular Anesthesia*, 18(2), pp. 161–176.



- Fanzca, D.S. (2012) 'Novel biomarkers for cardiac surgery-associated acute kidney injury: A skeptical assessment of their role', *Journal of Extra-Corporeal Technology*, 44(4), pp. 235–240.
- Fliser, D., Laville, M., Covic, A., Fouque, D., Vanholder, R., Juillard, L. & Van Biesen, W. 2012. A European Renal Best Practice (ERBP) position statement on the Kidney Disease Improving Global Outcomes (KDIGO) Clinical Practice Guidelines on Acute Kidney Injury: Part 1: Definitions, conservative management and contrast-induced nephropathy. *Nephrology Dialysis Transplantation*, 27(12): 4263–4272.
- Findik, O., Aydin, U., Baris, O., Parlar, H., Alagoz, G.A., Ata, Y., Turk, T. & Kunt, A.T. 2016. Preoperative low serum albumin levels increase the requirement of renal replacement therapy after cardiac surgery. *Heart Surgery Forum*, 19(3): E123–E127.
- Frenette, A.J., Bouchard, J., Bernier, P., Charbonneau, A., Nguyen, L.T., Rioux, J.P., Troyanov, S. & Williamson, D.R. 2014. Albumin administration is associated with acute kidney injury in cardiac surgery: A propensity score analysis. *Critical Care*, 18(6): 1–11.
- Gameiro, J., Marques, F. & Lopes, J.A. 2021. Long-term consequences of acute kidney injury: A narrative review. *Clinical Kidney Journal*, 14(3): 789–804.
- Gounden V, Vashisht R, J.I. 2022. Hypoalbuminemia Pathophysiology. *StatPearls*: 5–9. <https://www.ncbi.nlm.nih.gov/books/NBK526080/>.
- Gravlee, G.P. 2012. Association Between Postoperative Acute Kidney Injury and Duration of Cardiopulmonary Bypass: A Meta-Analysis. *Yearbook of Anesthesiology and Pain Management*, 2012: 81.
- Harky, A. et al. (2020) 'Acute kidney injury associated with cardiac surgery: A comprehensive literature review', *Brazilian Journal of Cardiovascular Surgery*, 35(2), pp. 211–224. doi:10.21470/1678-9741-2019-0122.
- Haller C. et al. (2005) Hypoalbuminemia in renal failure: pathogenesis and therapeutic considerations. *Kidney Blood Press Res*;28(5-6):307-10.
- Heidari, B., Hassan, T., Karimollah, H.-T., Yolmeh, M. & Akbari, R. 2015. Low baseline serum albumin as a predictor of anemia in chronic hemodialysis patients. *Caspian J Intern Med*, 6(3): 161–164.
- Huen, S. & Parikh, C.R. 2012. Predicting Acute Kidney Injury Following Cardiac Surgery: A Systematic Review. *Ann Thorac Surg*, 93(1): 337–347.
- Ishikawa M. et al. (2022) The neutrophil to lymphocyte ratio and serum albumin as predictors of acute kidney injury after coronary artery bypass grafting. *scientific reports*, 12:15438.
- Jain, T., Shah, S., Shah, J., Jacobsen, G. & Khandelwal, A. 2018. Contrast-induced nephropathy in STEMI patients with and without chronic kidney disease. *Crit Pathw Cardiol*, 17(1): 25–31.
- Jing H, Liao M, Tang S, Lin S, Ye L, Zhong J, Wang H, Zhou J. 2022. Predicting the risk of acute kidney injury after cardiopulmonary bypass: development and assessment of a new predictive nomogram. *BMC Anesthesiol*. 22(1):1–12. doi:10.1186/s12871-022-01925-w.



- Karim, H., Yunus, M., Saikia, M., Kalita, J. & Mandal, M. 2017. Incidence and progression of cardiac surgery-associated acute kidney injury and its relationship with bypass and cross clamp time. *Annals of Cardiac Anaesthesia*, 20(1): 22–27
- Kellum, J.A., Lameire, N., Aspelin, P., Barsoum, R.S., Burdmann, E.A., Goldstein, S.L., Herzog, C.A., Ioannidis, M., Kribben, A., Levey, A.S., MacLeod, A.M., Mehta, R.L., Murray, P.T., Naicker, S., Opal, S.M., Schaefer, F., Schetz, M. & Uchino, S. 2012. Kidney disease: Improving global outcomes (KDIGO) acute kidney injury work group. KDIGO clinical practice guideline for acute kidney injury. *Kidney International Supplements*, 2(1): 1–138.
- Kemenkes RI (2014) ‘Situasi kesehatan jantung’, *Pusat data dan informasi kementerian kesehatan RI*, p. 3. doi:10.1017/CBO9781107415324.004.
- Khwaja, A. 2012. KDIGO clinical practice guidelines for acute kidney injury. *Nephron - Clinical Practice*, 120(4): 179–184.
- Kim, C.S., Oak, C.Y., Kim, H.Y., Kang, Y.U., Choi, J.S., Bae, E.H., Ma, S.K., Kweon, S.S. & Kim, S.W. 2013. Incidence, predictive factors, and clinical outcomes of acute kidney injury after gastric surgery for gastric cancer. *PLoS ONE*, 8(12).
- Kim, W.H., Park, M.H., Kim, H.J., Lim, H.Y., Shim, H.S., Sohn, J.T., Kim, C.S. & Lee, S.M. 2015. Potentially modifiable risk factors for acute kidney injury after surgery on the thoracic aorta: A propensity score matched case-control study. *Medicine (United States)*, 94(2): e273.
- Kupeli, I. & Unver, S. 2020. The Correlation between Preoperative and Postoperative Hypoalbuminaemia and the Development of Acute Kidney Injury with Respect to the KDIGO Criteria in the Hip Fracture Surgery in Elderly Patients. *Turkish Journal of Anaesthesiology and Reanimation*, 48(1): 38–43.
- Lang J, Katz R, Ix JH, Gutierrez OM, Peralta CA, Parikh CR, Satterfield S, Petrovic S, Devarajan P, Bennett M, et al. 2018. Association of serum albumin levels with kidney function decline and incident chronic kidney disease in elders. *Nephrol Dial Transplant*. 33(6):986–992.
- Levitt, D.G. & Levitt, M.D. 2016. Human serum albumin homeostasis: A new look at the roles of synthesis, catabolism, renal and gastrointestinal excretion, and the clinical value of serum albumin measurements. *International Journal of General Medicine*, 9: 229–255.
- Lee, H.E., et al. (2016) ‘Effect of exogenous albumin on the incidence of postoperative Acute Kidney Injury in patients undergoing off-pump coronary artery bypass surgery with a preoperative albumin level of less than 4.0 g/dL’, *Journal of Anesthesiology*, 4(1), pp. 1006–1010.
- Li, N., Qiao, H., Guo, J.F., Yang, H.Y., Li, X.Y., Li, S.L., Wang, D.X. & Yang, L. 2019. Preoperative hypoalbuminemia was associated with acute kidney injury in high-risk patients following non-cardiac surgery: A retrospective cohort study. *BMC Anesthesiology*, 19(1): 1–11.



- Liu, D. *et al.* (2021) ‘Acute Kidney Injury following Cardiopulmonary Bypass: A Challenging Picture’, *Oxidative Medicine and Cellular Longevity*, 2021. doi:10.1155/2021/8873581.
- Mandrekar JN. 2013. Receiver operating characteristic curve in diagnostic test assessment. *J Thorac Oncol.* 5(9):1315–1316.
- Mehta, R., Kellum, J., Shah, S., Molitoris, B., Ronco, C. & Warnock, D. 2007. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. *Critical Care*, 11(2).
- Moman, R., Gupta, N. & Varacallo, M. 2022. Physiology , Albumin. *NCBI Bookshelf*: 1–3. <https://www.ncbi.nlm.nih.gov/books/NBK459198/>.
- Moriyama, T. *et al.* (2016) ‘Comparison of three early biomarkers for acute kidney injury after cardiac surgery under cardiopulmonary bypass’, *Journal of Intensive Care*, 4(1), pp. 1–6. doi:10.1186/s40560-016-0164-1.
- Saydam, O. *et al.* (2018) ‘Emerging biomarker for predicting acute kidney injury after cardiac surgery’, *Turkish Journal of Medical Sciences*, 48(6), pp. 1096–1103. doi:10.3906/sag-1704-96.
- Shekar, P.S. (2006) ‘On-pump and off-pump coronary artery bypass grafting’, *Circulation*, 113(4), pp. 51–52. doi:10.1161/CIRCULATIONAHA.105.566737.
- Shiyovich A, Bental T, Assali A, Vaknin-Assa H, Kornowski R, Perl L. 2020. Changes over time in serum albumin levels predict outcomes following percutaneous coronary intervention. *J Cardiol.* 75(4):381–386. doi:10.1016/j.jcc.2019.08.019.
- Soeters, P.B., Wolfe, R.R. & Shenkin, A. 2019. Hypoalbuminemia: Pathogenesis and Clinical Significance. *Journal of Parenteral and Enteral Nutrition*, 43(2): 181–193.
- Surgery, C. (2022) ‘Key Concepts Anesthesia for Cardiovascular Surgery : Introduction’, *Anesthesia for Cardiovascular Surgery*, pp. 1–51.
- Vives, M. *et al.* (2019) ‘Acute kidney injury after cardiac surgery: Prevalence, impact and management challenges’, *International Journal of Nephrology and Renovascular Disease*, 12, pp. 153–166. doi:10.2147/IJNRD.S167477.
- Waikar, S. & Bonventre, J. 2009. Creatinine kinetics and the definition of acute kidney injury. *J Am Soc Nephrol*, 3: 672–679.
- Wiedermann CJ, Wiedermann W, Joannidis M. 2010. Hypoalbuminemia and acute kidney injury: A meta-analysis of observational clinical studies. *Intensive Care Medicine*. 36(10):1657–65.
- Wu, B., Chen, J. and Yang, Y. (2019) ‘Biomarkers of Acute Kidney Injury after Cardiac Surgery: A Narrative Review’, *BioMed Research International*, 2019. doi:10.1155/2019/7298635.
- Zakkar, M. *et al.* (2015) ‘Cardiopulmonary bypass and oxidative stress’, *Oxidative Medicine and Cellular Longevity*, 2015, pp. 10–12. doi:10.1155/2015/189863.
- Yu, Y.T., Liu, J., Hu, B., Wang, R.L., Yang, X.H., Shang, X.L., Wang, G., Wang, C.S., Li, B.L., Gong, Y., Zhang, S., Li, X., Wang, L., Shao, M., Meng, M.,



ALBUMIN SERUM SEBAGAI PREDIKTOR ACUTE KIDNEY INJURY PASCA OPERASI BEDAH

JANTUNG CARDIOPULMONARY

BYPASS DI RSUP DR. SARDJITO YOGYAKARTA

A. Datu Intan Purnamasari, Prof. dr. Budi Mulyono, SpPK(K), MM ; dr. Ira Puspitawati, M.Kes, SpPK(K)

Universitas Gadjah Mada, 2023 | Diunduh dari <http://etd.repository.ugm.ac.id/>

Zhu, F., Shang, Y., Xu, Q.H., Wu, Z.X., Chen, D.C. & Wei, P.F. 2021. Expert consensus on the use of human serum albumin in critically ill patients. *Chinese Medical Journal*, 134(14): 1639–1654.