

## DAFTAR PUSTAKA

Altamirano-Diaz, L., Welisch, E., Rauch, R., et al. (2018b) Does obesity affect the non-invasive measurement of cardiac output performed by electrical cardiometry in children and adolescents? *Journal of Clinical Monitoring and Computing*, 32 (1): 45-52.

Alvarado-Sánchez, J. I., Caicedo Ruiz, J. D., Diaztagle Fernández, J. J., Cruz Martínez, L. E., Carreño Hernández, F. L., Santacruz Herrera, C. A., & Ospina-Tascón, G. A. (2023). Variables influencing the prediction of fluid responsiveness: a systematic review and meta-analysis. *Critical care (London, England)*, 27(1), 361.

Assadi F. (2017). Passive Leg Raising: Simple and Reliable Technique to Prevent Fluid Overload in Critically ill Patients. *International journal of preventive medicine*, 8, 48.

Bergamaschi, V., Vignazia, G. L., Messina, A., Colombo, D., Cammarota, G., Corte, F. D., Traversi, E., & Navalesi, P. (2019). Transthoracic echocardiographic assessment of cardiac output in mechanically ventilated critically ill patients by intensive care unit physicians. *Brazilian journal of anesthesiology (Elsevier)*, 69(1), 20–26

Bernstein DP. A new stroke volume equation for thoracic electrical bioimpedance: theory and rationale. *Crit Care Med*. 1986; 14: 904–9.

Biais, M., Vidil, L., Sarrabay, P., Cottenceau, V., Revel, P., & Sztark, F. (2009). Changes in stroke volume induced by passive leg raising in spontaneously breathing patients: comparison between echocardiography and Vigileo/FloTrac device. *Critical care (London, England)*, 13(6), R195.

Blanco P. (2020). Rationale for using the velocity-time integral and the minute distance for assessing the stroke volume and cardiac output in point-of-care settings. *The ultrasound journal*, 12(1), 21.

Brown, R. M., & Semler, M. W. (2019). Fluid Management in Sepsis. *Journal of intensive care medicine*, 34(5), 364–373.

Carlos-Sanchez, E., Pinsky, M. R., Sinha, S., Mishra, R. C., Lopa, A. J., & Chatterjee, R. (2023). Fluids and Early Vasopressors in the Management of Septic Shock: Do We Have the Right Answers Yet?. *Journal of critical care medicine (Universitatea de Medicina si Farmacie din Targu-Mures)*, 9(3), 138–147.

Cheong I, Otero Castro V, Brizuela M, Früchtenicht MF, Merlo PM, Tamagnone FM. Passive leg raising test to predict fluid responsiveness using the right

ventricle outflow tract velocity-time integral through a subcostal view. *J Ultrasound*. Published online September 21, 2022.

Cherpanath, T. G., Geerts, B. F., Lagrand, W. K., Schultz, M. J., & Groeneveld, A. B. (2013). Basic concepts of fluid responsiveness. *Netherlands heart journal : monthly journal of the Netherlands Society of Cardiology and the Netherlands Heart Foundation*, 21(12), 530–536.

Cherpanath TG, Hirsch A, Geerts BF, et al. Predicting Fluid Responsiveness by Passive Leg Raising: A Systematic Review and Meta-Analysis of 23 Clinical Trials. *Crit Care Med*. 2016;44(5):981-991.

Chowhan, G., Kundu, R., Maitra, S., Arora, M. K., Batra, R. K., Subramaniam, R., Baidya, D. K., & Trikha, A. (2021). Efficacy of Left Ventricular Outflow Tract and Carotid Artery Velocity Time Integral as Predictors of Fluid Responsiveness in Patients with Sepsis and Septic Shock. *Indian journal of critical care medicine : peer-reviewed, official publication of Indian Society of Critical Care Medicine*, 25(3), 310–316.

Collinas-Fernández L, Hernández Martínez G, Serna Gandía MB, et al. Improving echographic monitoring of hemodynamics in critically ill patients: Validation of right cardiac output measurements through the modified subcostal window. *Med Intensiva (Engl Ed)*. 2023;47(3):149-156.

Dellinger RP, Carlet JM, Masur H, et al. Surviving Sepsis Campaign guidelines for management of severe sepsis and septic shock. *Crit Care Med*. 2004;32(3):858-873.

Dellinger RP, Levy MM, Carlet JM, et al. Surviving Sepsis Campaign: international guidelines for management of severe sepsis and septic shock: 2008. *Crit Care Med*. 2008;36(1):296-327.

Dellinger, R. P., Levy, M. M., Rhodes, A., et al. Surviving Sepsis Campaign Guidelines Committee including The Pediatric Subgroup (2013). *Surviving Sepsis Campaign: international guidelines for management of severe sepsis and septic shock, 2012*. *Intensive care medicine*, 39(2), 165–228.

El-Sheikh, A.S., Ismael, S.A., El-Shmaa, N.S., et al. (2021) The Effect of Cardiometry Guided Fluid Management on Outcome of Patients Presented for Intracranial Surgeries: Randomized Controlled Study. *Journal of Advances in Medicine and Medical Research*, pp. 16-25.

Elgebaly, A.S., Anwar, A.G., Fathy, S.M., et al. (2020) The accuracy of electrical cardiometry for the noninvasive determination of cardiac output before and after lung surgeries compared to transthoracic echocardiography. *Annals of Cardiac Anaesthesia*, 23 (3): 288-292.

Elsayed Afandy, M., El Sharkawy, S. I., & Omara, A. F. (2020). 18 Transthoracic echocardiographic versus cardiometry derived indices in management of septic patients. *Egyptian Journal of Anaesthesia*, 36(1), 312–318.

Elwan, M. H., Roshdy, A., Elsharkawy, E. M., Eltahan, S. M., & Coats, T. J. (2022). Can passive leg raise predict the response to fluid resuscitation in ED?. *BMC emergency medicine*, 22(1), 172

Fleischmann-Struzek C, Mellhammar L, Rose N, et al. Incidence and mortality of hospital- and ICU-treated sepsis: results from an updated and expanded systematic review and meta-analysis. *Intensive Care Med*. 2020. August;46(8):1552–62.

Gavelli, F., Shi, R., Teboul, J. L., et al. (2022). Extravascular lung water levels are associated with mortality: a systematic review and meta-analysis. *Critical care (London, England)*, 26(1), 202.

Githaiga A, Waweru-Siika W, Jeilan M, Chikophe I, Mung'ayi V. (2023). Inferior Vena Cava Collapsibility Index Versus Passive Leg Raise To Assess Fluid Responsiveness in Non-Intubated Septic Patients - A Prospective Observational Study. *International Journal of Anesthesia and Clinical Medicine*, 11(2), 88-97.

Global report on the epidemiology and burden of sepsis: current evidence, identifying gaps and future directions. Geneva: World Health Organization: 2020. Available from: <https://apps.who.int/iris/handle/10665/334216> [cited 2024 July 14].

Hofer CK, Cannesson M. Monitoring fluid responsiveness. *Acta Anaesthesiol Taiwan*. 2011;49(2):59-65.

Huan, S., Dai, J., Song, S., Zhu, G., Ji, Y., & Yin, G. (2022). Stroke volume variation for predicting responsiveness to fluid therapy in patients undergoing cardiac and thoracic surgery: a systematic review and meta-analysis. *BMJ open*, 12(5), e051112.

Huang J, Singh Y, Adie M, et al. Effect of assessing velocity time integral at different locations across ventricular outflow tracts when calculating cardiac output in neonates. *Eur J Pediatr*. 2023;182(10):4433-4441.

Kohn MA, Senyak J. Sample Size Calculators [website]. UCSF CTSI. 12 June 2024. Available at <https://www.sample-size.net/> [Accessed 20 June 2024]

Koopmans NK, Stolmeijer R, Sijtsma BC, et al. Non-invasive assessment of fluid responsiveness to guide fluid therapy in patients with sepsis in the emergency department: a prospective cohort study *Emergency Medicine Journal* 2021;38:416-422.

Lanspa MJ, Cirulis MM, Wiley BM, et al. Right Ventricular Dysfunction in Early Sepsis and Septic Shock. *Chest*. 2021;159(3):1055-1063.

Levy MM, Evans LE, Rhodes A. The Surviving Sepsis Campaign Bundle: 2018 update. *Intensive Care Med.* 2018;44(6):925-928.

Li L, Ai Y, Huang L, Ai M, Peng Q, Zhang L. Can bioimpedance cardiography assess hemodynamic response to passive leg raising in critically ill patients: A STROBE-compliant study. *Medicine (Baltimore).* 2020 Dec 18;99(51):e23764.

Liu, Y.H., Dhakal, B.P., Keesakul, C., et al. (2016b) Continuous non-invasive cardiac output monitoring during exercise: Validation of electrical cardiometry with Fick and thermodilution methods. *British Journal of Anaesthesia.* 117 (1) pp. 129-131.

LKPP. ICON NON INVASIVE CARDIAC OUTPUT / PORTABLE HEMODYNAMIC MONITOR 4815000207-AK1-00208688. Available from [https://e-katalog.lkpp.go.id/katalog\\_produkctr/getdetailproductcenter?id=1388481](https://e-katalog.lkpp.go.id/katalog_produkctr/getdetailproductcenter?id=1388481)

Mahrous, Atef A.; Helmy, Tamer A.; Nabil, Ahmed M.; Ibrahim Nagy, Rawan M.K. Electrical cardiometry assessment of cardiac output compared to echocardiography in septic shock patients. *Research and Opinion in Anesthesia & Intensive Care* 11(2):p 108-115, April-June 2024.

Malbrain, M. L. N. G., Van Regenmortel, N., Saugel, B., De Tavernier, B., Van Gaal, P. J., Joannes-Boyau, O., Teboul, J. L., Rice, T. W., Mythen, M., & Monnet, X. (2018). Principles of fluid management and stewardship in septic shock: it is time to consider the four D's and the four phases of fluid therapy. *Annals of intensive care*, 8(1), 66.

Marik PE, Lemson J. Fluid responsiveness: an evolution of our understanding. *Br J Anaesth.* 2014;112(4):617-620.

Megri, M., Fridenmaker, E., & Disselkamp, M. (2022). Where Are We Heading With Fluid Responsiveness and Septic Shock?. *Cureus*, 14(4), e23795.

Mehta, Y., & Arora, D. (2014). Newer methods of cardiac output monitoring. *World journal of cardiology*, 6(9), 1022–1029.

Mejaddam, A.Y., van der Wilden, G.M., Chang, Y., et al. (2013b) Development of a Rugged Handheld Device for Real-Time Analysis of Heart Rate: Entropy in Critically Ill Patients. *Journal of Special Operations Medicine*, 13 (1): 29-33.

Mercado, P., Maizel, J., Beyls, C., Titeca-Beauport, D., Joris, M., Kontar, L., Riviere, A., Bonaf, O., Soupison, T., Tribouilloy, C., de Cagny, B., & Slama, M. (2017). Transthoracic echocardiography: an accurate and precise method for estimating cardiac output in the critically ill patient. *Critical care (London, England)*, 21(1), 136.

Minini, A., Abraham, P., & Malbrain, M. L. N. G. (2020). Predicting fluid responsiveness with the passive leg raising test: don't be fooled by intra-abdominal hypertension!. *Annals of translational medicine*, 8(12), 799.

Mohseni-Badalabadi R, Hosseininejad L, Hali R, Fallah F, Hosseinsabet A. Assessing the repeatability, reliability, and precision of right ventricular outflow tract and mid-pulmonary artery diameters, velocity time integrals, and agreement between site-specific stroke volumes. *BMC Cardiovasc Disord.* 2024;24(1):703.

Monnet X, Marik PE, Teboul JL. Prediction of fluid responsiveness: an update. *Ann Intensive Care.* 2016;6(1):111.

Monnet, X., Shi, R., & Teboul, J. L. (2022). Prediction of fluid responsiveness. What's new?. *Annals of intensive care*, 12(1), 46.

Murphy, E., & Shelley, B. (2018). The right ventricle-structural and functional importance for anaesthesia and intensive care. *BJA education*, 18(8), 239–245.

Musu M, Guddelmoni L, Murgia F, et al.. Prediction of fluid responsiveness in ventilated critically ill patients. *J Emerg Crit Care Med* 2020; 4.

Parker CW, Kolimas AM, Kotini-Shah P. Velocity-Time Integral: A Bedside Echocardiography Technique Finding a Place in the Emergency Department. *J Emerg Med.* 2022;63(3):382-388.

Pinsky M. R. (2015). Functional hemodynamic monitoring. *Critical care clinics*, 31(1), 89–111.

Rao, A. D., & Shelgaonkar, V. C. (2023). An electrocardiometric evaluation of dynamic cardiac parameters to assess fluid responsiveness in major non-cardiac surgery. *Indian Journal of Applied Research*, 13(5)

Reuter DA, Kirchner A, Felbinger TW, Weis FC, Kilger E, Lamm P, Goetz AE. Usefulness of left ventricular stroke volume variation to assess fluid responsiveness in patients with reduced cardiac function. *Crit Care Med.* 2003;31:1399–404.

Rhee C, Chiotos K, Cosgrove SE, et al. Infectious Diseases Society of America Position Paper: Recommended Revisions to the National Severe Sepsis and Septic Shock Early Management Bundle (SEP-1) Sepsis Quality Measure. *Clin Infect Dis.* 2021;72(4):541-552.

Rhodes A, Evans LE, Alhazzani W, et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016. *Intensive Care Med.* 2017;43(3):304-377.

Sae-Phua V, Tanasittiboon S, Sangtongjaraskul S. The Effect of Goal-directed Fluid Management based on Stroke Volume Variation on ICU Length of Stay in Elderly Patients Undergoing Elective Craniotomy: A Randomized Controlled Trial. *Indian J Crit Care Med* 2023;27(10):709-716.

Said, A., Salah, M., Mamdouh, S., Heggy, E., & Wagih, M. (2022). Validation of stroke volume variation assessed by electrical cardiometry to predict fluid

responsiveness in patients undergoing coronary artery bypass surgery after closure of the sternum: an observational study. *The Egyptian Journal of Cardiothoracic Anesthesia*, 16(3), 47.

Sanders, M., Servaas, S., & Slagt, C. (2020). Accuracy and precision of non-invasive cardiac output monitoring by electrical cardiometry: a systematic review and meta-analysis. *Journal of clinical monitoring and computing*, 34(3), 433–460.

Sharkawy, M. S. El, Abdelghany, M. S., Dabe, A. A. El, & Hafez, A. A. A. El. (2022). Validation of Electrical Cardiometry Measurements Compared to Transthoracic Echocardiography in Fluid Responsiveness in Sepsis. *Journal of Advances in Medicine and Medical Research*, 10–20.

Singer M, Deutschman CS, Seymour CW, Shankar-Hari M, Annane D, Bauer M, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). *JAMA*. 2016;315(8):801-10.

Sivakorn, C., Schultz, M. J., & Dondorp, A. M. (2021). How to monitor cardiovascular function in critical illness in resource-limited settings. *Current opinion in critical care*, 27(3), 274–281.

Soliman, Randa. Prediction of fluid status and survival by electrical cardiometry in septic patients with acute circulatory failure. *The Egyptian Journal of Critical Care Medicine* 5(2):p 65-68, August 2017.

Song, R., Rich, W., Kim, J.H., et al. (2014) The use of electrical cardiometry for continuous cardiac output monitoring in preterm neonates: a validation study. *American journal of perinatology*, 31 (12): 1105-1110.

Su, C. H., Liu, S. H., Tan, T. H., & Lo, C. H. (2018). Using the Pulse Contour Method to Measure the Changes in Stroke Volume during a Passive Leg Raising Test. *Sensors (Basel, Switzerland)*, 18(10), 3420.

Sumbel, L., Nagaraju, L., Ogbeifun, H., Agarwal, A., & Bhalala, U. (2022). Comparing cardiac output measurements using electrical cardiometry versus phase contrast cardiac magnetic resonance imaging. *Progress in Pediatric Cardiology*, 66, 101551.

Summers RL, Shoemaker WC, Peacock WF, Ander DS, Coleman TG. Bench to bedside: electrophysiologic and clinical principles of noninvasive hemodynamic monitoring using impedance cardiography. *Acad Emerg Med*. 2003;10(6):669-680.

Tan C., Rubenson D., Srivastava A., Mohan R., Smith M.R., Billick K., Bardarian S., Heywood J.T. Left ventricular outflow tract velocity time integral outperforms ejection fraction and Doppler-derived cardiac output for predicting outcomes in a select advanced heart failure cohort. *Cardiovasc. Ultrasound*. 2017;15:18.

Trinkmann F, Berger M, Doesch C, Papavassiliu T, Schoenberg SO, Borggrefe M, Kaden JJ, Saur J. Comparison of electrical velocimetry and cardiac magnetic resonance imaging for the non-invasive determination of cardiac output. *J Clin Monit Comput.* 2016;30(4):399–408.

Vallabhajosyula S, Shankar A, Vojjini R, et al. Impact of Right Ventricular Dysfunction on Short-term and Long-term Mortality in Sepsis: A Meta-analysis of 1,373 Patients. *Chest.* 2021;159(6):2254-2263.

Vieillard-Baron A, Prigent A, Repessé X, et al. Right ventricular failure in septic shock: characterization, incidence and impact on fluid responsiveness. *Crit Care.* 2020;24(1):630.

Weiss, S. L., Peters, M. J., Alhazzani, W., Agus, M. S. D., Flori, H. R., Inwald, D. P., Nadel, S., Schlapbach, L. J et al. (2020). Surviving sepsis campaign international guidelines for the management of septic shock and sepsis-associated organ dysfunction in children. *Intensive care medicine*, 46(Suppl 1), 10–67.

WHO. Handbook on Health Inequality Monitoring With a Special Focus on Low- and Middle-income Countries. World Health Organization. Geneva: WHO, 2013, pp. 1–126.

Winter UJ, Klocke RK, Kubicek WG, Niederlag W, (eds). Thoracic Impedance Measurements in Clinical Cardiology. New York : Thieme Medical Publishers, 1994.

Xing CY, Liu YL, Zhao ML, et al. New method for noninvasive quantification of central venous pressure by ultrasound. *Circ Cardiovasc Imaging.* 2015;8(5):e003085.

Yi L, Liu Z, Qiao L, Wan C, Mu D. Does stroke volume variation predict fluid responsiveness in children: A systematic review and meta-analysis. *PLoS One.* 2017;12(5):e0177590.

Yu YH, Dai HW, Yan ML, Gong SJ, Cai GL, Zhang ZC, Chen J, Yan J. An evaluation of stroke volume variation as a predictor of fluid responsiveness in mechanically ventilated elderly patients with severe sepsis. *Zhongguo Wei Zhong Bing Ji Jiu Yi Xue.*2009;21:463–5.

Zaidi, A., Knight, D. S., Augustine, D. X., Harkness, A., Oxborough, D., Pearce, K., Ring, L., Robinson, S., Stout, M., Willis, J., Sharma, V., & Education Committee of the British Society of Echocardiography. (2020). Echocardiographic assessment of the right heart in adults: a practical guideline from the British Society of Echocardiography. *Echo research and practice*, 7(1), G19–G41.

Zhang Z, Lu B, Sheng X, Jin N. Accuracy of stroke volume variation in predicting fluid responsiveness: a systematic review and meta-analysis. *J Anesth.* 2011;25(6):904-916.



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**Validasi Rasio Perubahan Right Ventricle Output Tract Volume Time Integral (RVOT VTI) dan Stroke Volume Variation (SVV) untuk Memprediksi Respons Cairan pada Pasien Sepsis**  
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Zoremba N, Bickenbach J, Krauss B, Rossaint R, Kuhlen R, Schalte G. Comparison of electrical velocimetry and thermodilution techniques for the measurement of cardiac output. *Acta Anaesthesiol Scand.* 2007;51(10):1314–1319.