

DAFTAR PUSATAKA

- Aaronson, P.I. (Philip I., Ward, J.P.T., Connolly, M.J., 2013. The cardiovascular system at a glance, 4th editio. ed. Willey-Blackwell, West Sussex, UK.
- Armoundas, A.A., Cohen, R.J., 1997. Clinical Utility of T-Wave Alternans. *Card. Electrophysiol. Rev.* 1: 390–394. doi:10.1023/A:1009902030340
- Armoundas, A.A., Hohnloser, S.H., Ikeda, T., Cohen, R.J., 2005. Can microvolt T-wave alternans testing reduce unnecessary defibrillator implantation? *Nat. Clin. Pract. Cardiovasc. Med.* 2: 522–528. doi:10.1038/ncpcardio0323
- Armoundas, A.A., Tomaselli, G.F., Esperer, H.D., 2002. Pathophysiological basis and clinical application of T-wave alternans. *J. Am. Coll. Cardiol.* 40: 207–217. doi:10.1016/S0735-1097(02)01960-5
- Aro, A.L., Kenttä, T. V., Huikuri, H. V., 2016. Microvolt t-wave alternans: Where are we now? *Arrhythmia Electrophysiol. Rev.* 5: 37–40. doi:10.15420/AER.2015.28.1
- Bloomfield, D.M., Bigger, J.T., Steinman, R.C., Namerow, P.B., Parides, M.K., Curtis, A.B., Kaufman, E.S., Davidenko, J.M., Shinn, T.S., Fontaine, J.M., 2006. Microvolt T-wave alternans and the risk of death or sustained ventricular arrhythmias in patients with left ventricular dysfunction. *J. Am. Coll. Cardiol.* 47: 456–463. doi:10.1016/j.jacc.2005.11.026
- Bloomfield, D.M., Hohnloser, S.H., Cohen, R.J., 2002. Interpretation and classification of microvolt T wave alternans tests. *J. Cardiovasc. Electrophysiol.* 13: 502–512. doi:10.1046/j.1540-8167.2002.00502.x
- Bonapace, S., Targher, G., Molon, G., Rossi, A., Costa, A., Zenari, L., Bertolini, L., Cian, D., Lanzoni, L., Barbieri, E., 2011. Relationship between early diastolic dysfunction and abnormal microvolt T-wave alternans in patients with type 2 diabetes. *Circ. Cardiovasc. Imaging* 4: 408–414. doi:10.1161/CIRCIMAGING.110.962951
- Chan, P.S., Gold, M.R., Nallamothu, B.K., 2010. Do beta-blockers impact microvolt T-wave alternans testing in patients at risk for ventricular arrhythmias? A meta-analysis. *J. Cardiovasc. Electrophysiol.* 21: 1009–1014. doi:10.1111/j.1540-8167.2010.01757.x
- Chauhan, V.S., Selvaraj, R.J., 2007. Utility of microvolt T-wave alternans to predict sudden cardiac death in patients with cardiomyopathy. *Curr. Opin. Cardiol.* 22: 25–32. doi:10.1097/HCO.0b013e328011aa49
- Chow, B.J.W., Abraham, A., Wells, G.A., Chen, L., Ruddy, T.D., Yam, Y., Govas, N., Galbraith, P.D., Dennie, C., Beanlands, R.S., 2009. Diagnostic accuracy and impact of computed tomographic coronary angiography on utilization of invasive coronary angiography. *Circ. Cardiovasc. Imaging* 2: 16–23. doi:10.1161/CIRCIMAGING.108.792572
- Chow, T., Kereiakes, D.J., Bartone, C., Booth, T., Schloss, E.J., Waller, T., Chung, E.S., Menon, S., Nallamothu, B.K., Chan, P.S., 2006. Prognostic Utility of Microvolt T-Wave Alternans in Risk Stratification of Patients With Ischemic Cardiomyopathy. *J. Am. Coll. Cardiol.* 47: 1820–1827.

- doi:10.1016/j.jacc.2005.11.079
- Conti, A., Gallini, C., Costanzo, E., Ferri, P., Matteini, M., Paladini, B., Francois, C., Grifoni, S., Migliorini, A., Antoniucci, D., Pieroni, C., Berni, G., 2001. Early detection of myocardial ischaemia in the emergency department by rest or exercise^{99m}Tc tracer myocardial SPET in patients with chest pain and non-diagnostic ECG. *Eur. J. Nucl. Med.* 28: 1806–1810. doi:10.1007/s002590100647
- Cutler, M.J., Rosenbaum, D.S., 2009. Explaining the clinical manifestations of T wave alternans in patients at risk for sudden cardiac death. *Hear. Rhythm* 6: S22–S28. doi:10.1016/j.hrthm.2008.10.007
- Dahlan, M.S., 2016. Besar Sampel untuk Penelitian Kedokteran dan Kesehatan, 4th ed. ed. Epidemiologi Indonesia, Jakarta.
- Das, B., Mishra, T.K., 2016. Prevention and Management of Arrhythmias in Acute Myocardial Infarction. *Int. J. Contemp. Med. Res.* 3: 1401–1405. doi:10.1007/BF02953865
- Djohan, A.H., Sia, C.H., Singh, D., Lin, W., Kong, W.K.F., Poh, K.K., 2020. A myriad of electrocardiographic findings associated with digoxin use. *Singapore Med. J.* 61: 9–14. doi:10.11622/smedj.2020005
- Donoiu, I., Cristina, M.O., Alina, G., Militaru, C., Ionescu, D., 2012. Post-Myocardial Infarction Arrhythmia Risk Stratification Using Microvolt T-Wave Alternans. *Curr. Heal. Sci. J.* 38: 62–66.
- Falk, E., Nakano, M., Bentzon, J.F., Finn, A. V., Virmani, R., 2013. Update on acute coronary syndromes: The pathologists' view. *Eur. Heart J.* 34: 719–728. doi:10.1093/eurheartj/ehs411
- Figliozzi, S., Stazi, A., Pinnacchio, G., Laurito, M., Parrinello, R., Villano, A., Russo, G., Milo, M., Mollo, R., Lanza, G.A., Crea, F., 2016. Use of T-wave alternans in identifying patients with coronary artery disease. *J. Cardiovasc. Med.* 17: 20–25. doi:10.2459/JCM.0000000000000080
- Francis, D., Lane, R., Mayet, J., Foale, R.A., Thom, S., Peters, N., 2001. Microvolt T wave alternans in patients with hypertension and left ventricular hypertrophy. *J. Hum. Hypertens.* 15: S95–S96. doi:10.1038/sj.jhh.1001254
- Gandhi, M.S., Kamalov, G., Shahbaz, A.U., Bhattacharya, S.K., Ahokas, R.A., Sun, Y., Gerling, I.C., Weber, K.T., 2011. Cellular and molecular pathways to myocardial necrosis and replacement fibrosis. *Heart Fail. Rev.* 16: 23–34. doi:10.1007/s10741-010-9169-3
- Garcia, E.D.V., 2008. T-wave alternans: Reviewing the clinical performance, understanding limitations, characterizing methodologies. *Ann. Noninvasive Electrocardiol.* 13: 401–420. doi:10.1111/j.1542-474X.2008.00254.x
- Gorennek, B., Lundqvist, C.B., Terradellas, J.B., Camm, A.J., Hindricks, G., Huber, K., Kirchhof, P., Kuck, K.H., Kudaiberdieva, G., Lin, T., Raviele, A., Santini, M., Tilz, R.R., Valgimigli, M., Vos, M.A., Vrints, C., Zeymer, U., 2014. Cardiac arrhythmias in acute coronary syndromes: Position paper from the joint EHRA, ACCA, and EAPCI task force. *Europace* 16: 1655–1673. doi:10.1093/europace/euu208
- Groh, W.J., Shinn, T.S., Engelstein, E.E., Zipes, D.P., 1999. Amiodarone reduces the prevalence of T wave alternans in a population with ventricular

- tachyarrhythmias. *J. Cardiovasc. Electrophysiol.* 10: 1335–1339. doi:10.1111/j.1540-8167.1999.tb00188.x
- Hasan, M.A., Abbott, D., Baumert, M., Krishnan, S., 2016. Increased beat-To-beat T-wave variability in myocardial infarction patients. *Biomed. Tech.* 63: 123–130. doi:10.1515/bmt-2015-0186
- Hashimoto, K., Harada, N., Kasamaki, Y., 2020. Reference values for a novel ambulatory-based frequency domain T-wave alternans in subjects without structural heart disease. *J. Cardiol.* 76: 506–513. doi:10.1016/j.jjcc.2020.06.002
- Hashimoto, K., Kasamaki, Y., Soma, M., Takase, B., 2019. Diurnal variation of frequency domain T-wave alternans on 24-hour ambulatory electrocardiogram in subjects without heart disease: Significant effect of autonomic nervous activity of the heart. *Ann. Noninvasive Electrocardiol.* 24: 1–10. doi:10.1111/anec.12620
- Hennessy, M.G., Niebch, V., Perings, C., Strauer, B.-E., 2001. T-wave alternans and ventricular arrhythmias in arterial hypertension. *Hypertension* 37: 199–203. doi:10.1007/978-3-7091-0912-0_6
- Hidayati, F., Bagaswoto, H.P., Taufiq, N., Setiyanto, B.Y., 2017. Patient's Profile Across Our Intensive Cardiac Care Unit: A Single Center Study at Sardjito Hospital. *Acta Cardiol. Indones.* 1.
- Hosseini, K., Mortazavi, S.H., Sadeghian, S., Ayati, A., Nalini, M., Aminorroaya, A., Tavolinejad, H., Salarifar, M., Pourhosseini, H., Aein, A., Jalali, A., Bozorgi, A., Mehrani, M., Kamangar, F., 2021. Prevalence and trends of coronary artery disease risk factors and their effect on age of diagnosis in patients with established coronary artery disease: Tehran Heart Center (2005–2015). *BMC Cardiovasc. Disord.* 21: 1–11. doi:10.1186/s12872-021-02293-y
- Hua, W., Chen, K., Zhou, X., Dai, Y., Chen, R., Wang, J., Ding, L., Liu, Z., Feng, T., Yu, J., Cheng, J., Liu, C., Zhang, S., 2015. Cardiac resynchronization therapy reduces T-wave alternans in patients with heart failure. *Europace* 17: 281–288. doi:10.1093/europace/euu258
- Ibanez, B., James, S., Agewall, S., Antunes, M.J., Bucciarelli-Ducci, C., Bueno, H., Caforio, A.L.P., Crea, F., Goudevenos, J.A., Halvorsen, S., Hindricks, G., Kastrati, A., Lenzen, M.J., Prescott, E., Roffi, M., Valgimigli, M., Varenhorst, C., Vranckx, P., Widimský, P., Baumbach, A., Bugiardini, R., Coman, I.M., Delgado, V., Fitzsimons, D., Gaemperli, O., Gershlick, A.H., Gielen, S., Harjola, V.P., Katus, H.A., Knuuti, J., Kolh, P., Leclercq, C., Lip, G.Y.H., Morais, J., Neskovic, A.N., Neumann, F.J., Niessner, A., Piepoli, M.F., Richter, D.J., Shlyakhto, E., Simpson, I.A., Steg, P.G., Terkelsen, C.J., Thygesen, K., Windecker, S., Zamorano, J.L., Zeymer, U., Chettibi, M., Hayrapetyan, H.G., Metzler, B., Ibrahimov, F., Sujayeva, V., Beauloye, C., Dizdarevic-Hudic, L., Karamfiloff, K., Skoric, B., Antoniades, L., Tousek, P., Shaheen, S.M., Marandi, T., Niemelä, M., Kedev, S., Gilard, M., Aladashvili, A., Elsaesser, A., Kanakakis, I.G., Merkely, B., Gudnason, T., Iakobishvili, Z., Bolognese, L., Berkinbayev, S., Bajraktari, G., Beishenkulov, M., Zake, I., Lamin, H. Ben, Gustiene, O., Pereira, B., Xuereb, R.G., Ztot, S., Juliebø, V., Legutko, J., Timoteo, A.T., Tatu-Chit,oiu, G., Yakovlev, A., Bertelli, L.,

- Nedeljkovic, M., Studencan, M., Bunc, M., de Castro, A.M.G., Petursson, P., Jeger, R., Mourali, M.S., Yildirim, A., Parkhomenko, A., Gale, C.P., 2018. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur. Heart J.* 39: 119–177. doi:10.1093/eurheartj/ehx393
- Jamee, A., Abed, Y., Jalambo, M.O., 2013. Gender difference and characteristics attributed to coronary artery disease in Gaza-Palestine. *Glob. J. Health Sci.* 5: 51–56. doi:10.5539/gjhs.v5n5p51
- Janusek, D., Kania, M., Zaczek, R., Kobylecka, M., Chojnowski, M., Królicki, L., Opolski, G., Maniewski, R., 2015. Evaluation of T-wave alternans in high-resolution ECG maps recorded during the stress test in patients after myocardial infarction. *Arch. Med. Sci.* 11: 99–105. doi:10.5114/aoms.2014.43893
- Karpuz, D., Hallioglu, O., Buyukakilli, B., Gurgul, S., Tasdelen, B., 2017. Effects of bosentan, sildenafil and their combination on T-wave amplitude and QT interval in a rat model of pulmonary hypertension. *J. Turgut Ozal Med. Cent.* 24: 1. doi:10.5455/jtomc.2016.11.114
- Katzung, B.G., Masters, S.B., Trevor, A.J., 2012. Basic and Clinical Pharmacology, 12th ed. ed. McGraw-Hill, New York.
- Kaufman, E.S., Bloomfield, D.M., Steinman, R.C., Namerow, P.B., Costantini, O., Cohen, R.J., Bigger, J.T., 2006. “Indeterminate” Microvolt T-Wave Alternans Tests Predict High Risk of Death or Sustained Ventricular Arrhythmias in Patients With Left Ventricular Dysfunction. *J. Am. Coll. Cardiol.* 48: 1399–1404. doi:10.1016/j.jacc.2006.06.044
- Keeley, E.C., Hillis, L.D., 2007. Primary PCI for Myocardial Infarction with ST-Segment Elevation. *N. Engl. J. Med.* 356: 47–54. doi:10.1056/nejmct063503
- Kementerian Kesehatan Republik Indonesia, 2013. Riset Kesehatan Dasar (Riskesdas) 2013. Jakarta. doi:10.1126/science.127.3309.1275
- Kistamás, K., Veress, R., Horváth, B., Bányász, T., Nánási, P.P., Eisner, D.A., 2020. Calcium Handling Defects and Cardiac Arrhythmia Syndromes. *Front. Pharmacol.* 11: 1–25. doi:10.3389/fphar.2020.00072
- Kraaijer, K., Verhorst, P.M.J., Van Der Palen, J., Van Dessel, P.F.H.M., Wilde, A.A.M., Scholten, M.F., 2009. Microvolt T-wave alternans during exercise and pacing are not comparable. *Europace* 11: 1375–1380. doi:10.1093/europace/eup253
- Lachenbruch, P.A., Lwanga, S.K., Lemeshow, S., 1991. Sample Size Determination in Health Studies: A Practical Manual. *J. Am. Stat. Assoc.* doi:10.2307/2290547
- Leino, J., Minkinen, M., Nieminen, T., Lehtimäki, T., Viik, J., Lehtinen, R., Nikus, K., Kööbi, T., Turjanmaa, V., Verrier, R.L., Kähönen, M., 2009. Combined assessment of heart rate recovery and T-wave alternans during routine exercise testing improves prediction of total and cardiovascular mortality: The Finnish Cardiovascular Study. *Hear. Rhythm* 6: 1765–1771. doi:10.1016/j.hrthm.2009.08.015
- Leschka, S., Alkadhi, H., Plass, A., Desbiolles, L., Grünenfelder, J., Marincek, B., Wildermuth, S., 2005. Accuracy of MSCT coronary angiography with 64-slice

- technology: First experience. *Eur. Heart J.* 26: 1482–1487. doi:10.1093/eurheartj/ehi261
- Lewek, J., Ptaszynski, P., Klingenhoben, T., Cygankiewicz, I., 2017. The clinical value of T-wave alternans derived from Holter monitoring. *Europace* 19: 529–534. doi:10.1093/europace/euw292
- Li, R., Zhao, X., Gong, Y., Zhang, J., Dong, R., Xia, L., 2021. A New Method for Detecting Myocardial Ischemia Based on ECG T-Wave Area Curve (TWAC). *Front. Physiol.* 12: 1–8. doi:10.3389/fphys.2021.660232
- Li, Y., Rukshin, I., Pan, F., Sen, S., Islam, M., Yousif, A., Rukshin, V., 2014. The impact of the 2008-2009 economic recession on acute myocardial infarction occurrences in various socioeconomic areas of raritan Bay Region, New Jersey. *N. Am. J. Med. Sci.* 6: 215–218. doi:10.4103/1947-2714.132938
- Libby, P., Braunwald, E., Bonow, R., Mann, D., Tomaselli, G., Bhatt, D., Solomon, S.D., Braunwald, E., 2021. Braunwald's heart disease: a textbook of cardiovascular medicine., 12 ed. ed. Elsevier, Philadelphia, USA.
- Libby, P., Theroux, P., 2005. Pathophysiology of coronary artery disease. *Circulation* 111: 3481–3488. doi:10.1161/CIRCULATIONAHA.105.537878
- Lilly, L.S., 2011. Pathophysiology of heart disease : a collaborative project of medical students and faculty 461.
- Loewe, A., Schulze, W.H.W., Jiang, Y., Wilhelms, M., Luik, A., Dössel, O., Seemann, G., 2015. ECG-Based Detection of Early Myocardial Ischemia in a Computational Model: Impact of Additional Electrodes, Optimal Placement, and a New Feature for ST Deviation. *Biomed Res. Int.* 2015. doi:10.1155/2015/530352
- Magdi, M., Mubasher, M., Alzaem, H., Hamid, T., 2019. Resistant Ventricular Arrhythmia and the Role of Overdrive Pacing in the Suppression of the Electrical Storm. *Case Reports Cardiol.* 2019: 1–4. doi:10.1155/2019/6592927
- Marks, A.R., 2013. Calcium cycling proteins and heart failure: Mechanisms and therapeutics. *J. Clin. Invest.* 123: 46–52. doi:10.1172/JCI62834
- Martínez, J.P., Olmos, S., Wagner, G., Laguna, P., 2006. Characterization of repolarization alternans during ischemia: Time-course and spatial analysis. *IEEE Trans. Biomed. Eng.* 53: 701–711. doi:10.1109/TBME.2006.870233
- McDonagh, T.A., Metra, M., Adamo, M., Gardner, R.S., Baumbach, A., Böhm, M., Burri, H., Butler, J., Celutkiene, J., Chioncel, O., Cleland, J.G.F., Coats, A.J.S., Crespo-Leiro, M.G., Farmakis, D., Gilard, M., Heymans, S., 2021. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur. Heart J.* 42: 3599–3726. doi:10.1093/eurheartj/ehab368
- McMurray, J.J.V., Ezekowitz, J.A., Lewis, B.S., Gersh, B.J., Van Diepen, S., Amerena, J., Bartunek, J., Commerford, P., Oh, B.H., Harjola, V.P., Al-Khatib, S.M., Hanna, M., Alexander, J.H., Lopes, R.D., Wojdyla, D.M., Wallentin, L., Granger, C.B., 2013. Left ventricular systolic dysfunction, heart failure, and the risk of stroke and systemic embolism in patients with atrial fibrillation insights from the ARISTOTLE trial. *Circ. Hear. Fail.* 6: 451–460. doi:10.1161/CIRCHEARTFAILURE.112.000143
- Merchant, F.M., Sayadi, O., Moazzami, K., Puppala, D., Armoundas, A.A., 2013.

- T-wave alternans as an arrhythmic risk stratifier: State of the art. *Curr. Cardiol. Rep.* 15. doi:10.1007/s11886-013-0398-7
- Minkinen, M., Kähönen, M., Viik, J., Nikus, K., Lehtimäki, T., Lehtinen, R., Kööbi, T., Turjanmaa, V., Kaiser, W., Verrier, R.L., Nieminen, T., 2009. Enhanced predictive power of quantitative TWA during routine exercise testing in the Finnish Cardiovascular Study. *J. Cardiovasc. Electrophysiol.* 20: 408–415. doi:10.1111/j.1540-8167.2008.01325.x
- Mollo, R., Cosenza, A., Spinelli, A., Coviello, I., Careri, G., Battipaglia, I., Laurito, M., Pinnacchio, G., Lanza, G.A., Crea, F., 2012. T-wave alternans in apparently healthy subjects and in different subsets of patients with ischaemic heart disease. *Europace* 14: 272–277. doi:10.1093/europace/eur285
- Molon, G., Costa, A., Bertolini, L., Zenari, L., Arcaro, G., Barbieri, E., Targher, G., 2007. Relationship between abnormal microvolt T-wave alternans and poor glycemic control in type 2 diabetic patients. *PACE - Pacing Clin. Electrophysiol.* 30: 1267–1272. doi:10.1111/j.1540-8159.2007.00849.x
- Nagueh, S.F., Smiseth, O.A., Appleton, C.P., Byrd, B.F., Dokainish, H., Edvardsen, T., Flachskampf, F.A., Gillebert, T.C., Klein, A.L., Lancellotti, P., Marino, P., Oh, J.K., Popescu, B.A., Waggoner, A.D., 2016. Recommendations for the Evaluation of Left Ventricular Diastolic Function by Echocardiography: An Update from the American Society of Echocardiography and the European Association of Cardiovascular Imaging. *J. Am. Soc. Echocardiogr.* 29: 277–314. doi:10.1016/j.echo.2016.01.011
- Narayan, S.M., 2006. T-wave alternans and the susceptibility to ventricular arrhythmias. *J. Am. Coll. Cardiol.* 47: 269–281. doi:10.1016/j.jacc.2005.08.066
- Nearing, B.D., Oesterle, S.N., Verrier, R.L., 1994. Quantification of ischaemia induced vulnerability by precordial T wave alternans analysis in dog and human. *Cardiovasc. Res.* 28: 1440–1449.
- Neumann, F.J., Sechtem, U., Banning, A.P., Bonaros, N., Bueno, H., Bugiardini, R., Chieffo, A., Crea, F., Czerny, M., Delgado, V., Dendale, P., Knuuti, J., Wijns, W., Flachskampf, F.A., Gohlke, H., Grove, E.L., James, S., Katritsis, D., Landmesser, U., Lettino, M., Matter, C.M., Nathoe, H., Niessner, A., Patrono, C., Petronio, A.S., Pettersen, S.E., Piccolo, R., Piepoli, M.F., Popescu, B.A., Räber, L., Richter, D.J., Roffi, M., Roithinger, F.X., Shlyakhto, E., Sibbing, D., Silber, S., Simpson, I.A., Sousa-Uva, M., Vardas, P., Witkowski, A., Zamorano, J.L., Achenbach, S., Agewall, S., Barbato, E., Bax, J.J., Capodanno, D., Cuisset, T., Deaton, C., Dickstein, K., Edvardsen, T., Escaned, J., Funck-Brentano, C., Gersh, B.J., Gilard, M., Hasdai, D., Hatala, R., Mahfoud, F., Masip, J., Muneretto, C., Prescott, E., Saraste, A., Storey, R.F., Svitil, P., Valgimigli, M., Aboyans, V., Baigent, C., Collet, J.P., Dean, V., Fitzsimons, D., Gale, C.P., Grobbee, D.E., Halvorsen, S., Hindricks, G., Iung, B., Jüni, P., Katus, H.A., Leclercq, C., Lewis, B.S., Merkely, B., Mueller, C., Petersen, S., Touyz, R.M., Benkhedda, S., Metzler, B., Sujayeva, V., Cosyns, B., Kusljagic, Z., Velchev, V., Panayi, G., Kala, P., Haahr-Pedersen, S.A., Kabil, H., Ainla, T., Kaukonen, T., Cayla, G., Pagava, Z., Woehrle, J., Kanakakis, J., Toth, K., Gudnason, T., Peace, A., Aronson, D., Riccio, C.,

- Elezi, S., Mirrakhimov, E., Hansone, S., Sarkis, A., Babarskiene, R., Beissel, J., Cassar Maempel, A.J., Revenco, V., de Grooth, G.J., Pejkov, H., Juliebø, V., Lipiec, P., Santos, J., Chioncel, O., Duplyakov, D., Bertelli, L., Dikic, A.D., Studencan, M., Bunc, M., Alfonso, F., Back, M., Zellweger, M., Addad, F., Yildirim, A., Sirenko, Y., Clapp, B., 2020. 2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes. *Eur. Heart J.* 41: 407–477. doi:10.1093/eurheartj/ehz425
- Okunrintemi, V., Tibuakuu, M., Virani, S.S., Sperling, L.S., Volgman, A.S., Gulati, M., Cho, L., Leucker, T.M., Blumenthal, R.S., Michos, E.D., 2020. Sex differences in the age of diagnosis for cardiovascular disease and its risk factors among us adults: Trends from 2008 to 2017, the medical expenditure panel survey. *J. Am. Heart Assoc.* 9. doi:10.1161/JAHA.120.018764
- Park, J., Pedrycz, W., Jeon, M., 2012. Ischemia episode detection in ECG using kernel density estimation, support vector machine and feature selection. *Biomed. Eng. Online* 11: 1–22. doi:10.1186/1475-925X-11-30
- Pedretti, R., Etro, M.D., Laporta, A., Braga, S.S., Caru, B., 1993. Prediction of Late Arrhythmic Events After Acute Myocardial Infarction from Combined Use of Noninvasive Prognostic Variables and Inducibility of Sustained Monomorphic Ventricular Tachycardia. *Am. J. Cardiol.* 71: 1131–1141.
- PERKI, 2018. Pedoman Tatalaksana Sindrom Koroner Akut, 4th ed. ed. PERKI, Jakarta. doi:10.5694/j.1326-5377.2007.tb01292.x
- PERKI, 2016a. Panduan Praktik Klinis (PPK) dan Clinical Pathway (CP) Penyakit Jantung dan Pembuluh Darah, 1st ed. ed. PERKI, Jakarta.
- PERKI, 2016b. Pedoman Uji Latih Jantung: Prosedur dan Interpretasi, 1st ed. ed. Perki. PERKI, Jakarta.
- Piepoli, M.F., Hoes, A.W., Agewall, S., Albus, C., Brotons, C., Catapano, A.L., Cooney, M.T., Corrà, U., Cosyns, B., Deaton, C., Graham, I., Hall, M.S., Hobbs, F.D.R., Løchen, M.L., Löllgen, H., Marques-Vidal, P., Perk, J., Prescott, E., Redon, J., Richter, D.J., Sattar, N., Smulders, Y., Tiberi, M., Van Der Worp, H.B., Van Dis, I., Verschuren, W.M.M., Binno, S., De Backer, G., Roffi, M., Aboyans, V., Bachl, N., Carerj, S., Cho, L., Cox, J., De Sutter, J., Egidi, G., Fisher, M., Fitzsimons, D., Franco, O.H., Guenoun, M., Jennings, C., Jug, B., Kirchhof, P., Kotseva, K., Lip, G.Y.H., Mach, F., Mancina, G., Bermudo, F.M., Mezzani, A., Niessner, A., Ponikowski, P., Rauch, B., Stauder, A., Turc, G., Wiklund, O., Windecker, S., Zamorano, J.L., Achenbach, S., Badimon, L., Barón-Esquivias, G., Baumgartner, H., Bax, J.J., Dean, V., Erol, Ç., Gaemperli, O., Kolh, P., Lancellotti, P., Nihoyannopoulos, P., Torbicki, A., Carneiro, A.V., Metzler, B., Najafov, R., Stelmashok, V., De Maeyer, C., Dilić, M., Gruev, I., Miličić, D., Vaverkova, H., Gustafsson, I., Attia, I., Duishvili, D., Ferrières, J., Kostova, N., Klimiashvili, Z., Hambrecht, R., Tsioufis, K., Szabados, E., Andersen, K., Vaughan, C., Zafir, B., Novo, S., Davletov, K., Jashari, F., Kerimkulova, A., Mintale, I., Saade, G., Petrulioniene, Z., Delagardelle, C., Magri, C.J., Rudi, V., Oukerraj, L., Çölkesen, B.E., Schirmer, H., Dos Reis, R.P., Gherasim, D., Nedogoda, S., Zavatta, M., Giga, V., Filipova, S., Padial, L.R., Kiessling, A., Mahdhaoui, A., Ural, D., Nesukay, E., Gale, C., 2016. 2016 European Guidelines on

- cardiovascular disease prevention in clinical practice. *Eur. Heart J.* 37: 2315–2381. doi:10.1093/eurheartj/ehw106
- Puljevic, M., Danilowicz-Szymanowicz, L., Molon, G., Puljevic, D., Raczak, G., Canali, G., Velagic, V., Pezo-Nikolic, B., Milicic, D., 2019. TWARDMI pilot trial: The value and optimal criteria of microvolt T-wave alternans in the diagnosis of reversible myocardial ischemia in patients without structural cardiac disease. *Ann. Noninvasive Electrocardiol.* 24: 1–8. doi:10.1111/anec.12610
- Radoi, N., Pescariu, S., Lighezan, D., Ionescu, D.D., Dragulescu, S.T.I., 2005. Calcium channel blockers influence on T wave alternans. *EP Eur.* 7: 82–82. doi:10.1016/eupace/7.supplement_1.82-b
- Richter, S., Duray, G., Hohnloser, S.H., 2005. How to analyze T-wave alternans. *Hear. Rhythm* 2: 1268–1271. doi:10.1016/j.hrthm.2005.07.020
- Rosenbaum, D.S., 2008. T-wave alternans in the sudden cardiac death in heart failure trial population signal or noise? *Circulation* 118: 2015–2018. doi:10.1161/CIRCULATIONAHA.108.818286
- Rosenbaum, D.S., Jackson, L.E., Smith, J.M., Garan, H., Ruskin, J.N., Cohen, R.J., 1994. Electrical alternans and vulnerability to ventricular arrhythmias. *N. Engl. J. Med.* 330: 235–241.
- Salerno-Uriarte, J.A., De Ferrari, G.M., Klersy, C., Pedretti, R.F.E., Tritto, M., Sallusti, L., Libero, L., Pettinati, G., Molon, G., Curnis, A., Occhetta, E., Morandi, F., Ferrero, P., Accardi, F., 2007. Prognostic Value of T-Wave Alternans in Patients With Heart Failure Due to Nonischemic Cardiomyopathy. Results of the ALPHA Study. *J. Am. Coll. Cardiol.* 50: 1896–1904. doi:10.1016/j.jacc.2007.09.004
- Sanchis-Gomar, F., Perez-Quilis, C., Leischik, R., Lucia, A., 2016. Epidemiology of coronary heart disease and acute coronary syndrome. *Ann. Transl. Med.* 4: 1–12. doi:10.21037/atm.2016.06.33
- Sharma, A., Klein, A.L., 2018. Diastolic Assessment: Application of the New ASE Guidelines. *Curr. Cardiovasc. Imaging Rep.* 11: 1–15. doi:10.1007/s12410-018-9474-0
- Slawnych, M.P., Nieminen, T., Kähönen, M., Kavanagh, K.M., Lehtimäki, T., Ramadan, D., Viik, J., Aggarwal, S.G., Lehtinen, R., Ellis, L., Nikus, K., Exner, D. V., 2009. Post-Exercise Assessment of Cardiac Repolarization Alternans in Patients With Coronary Artery Disease Using the Modified Moving Average Method. *J. Am. Coll. Cardiol.* 53: 1130–1137. doi:10.1016/j.jacc.2008.12.026
- Soebagijo, A., Novida, H., Rudijanto, A., Soewondo, P., Suastika, K., Manaf, A., Sanusi, H., Lindarto, D., Shahab, A., Pramono, B., Langi, Y., Purnamasari, D., Soetedjo, N., Saraswati, M., Dwipayana, M., Yuwono, A., Sugiarto, Sucipto, K., Zafry, H., 2015. Konsensus Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 di Indonesia. PB PERKENI, Jakarta.
- Stein, P.K., Sanghavi, D., Domitrovich, P.P., Mackey, R.A., Deedwania, P., 2008. Ambulatory ECG-based T-wave alternans predicts sudden cardiac death in high-risk post-MI patients with left ventricular dysfunction in the EPHEsus study. *J. Cardiovasc. Electrophysiol.* 19: 1037–1042. doi:10.1111/j.1540-

8167.2008.01225.x

- Sudoyo, A.W., Setiyohadi, B., Alwi, I., Simadribrata, M., Setiati, S., 2014. Buku Ajar Ilmu Penyakit Dalam, 6th ed. ed. Interna Publishing, Jakarta.
- Thygesen, K., Alpert, J.S., Jaffe, A.S., Chaitman, B.R., Bax, J.J., Morrow, D.A., White, H.D., Mickley, H., Crea, F., Van De Werf, F., Bucciarelli-Ducci, C., Katus, H.A., Pinto, F.J., Antman, E.M., Hamm, C.W., De Caterina, R., Januzzi, J.L., Apple, F.S., Garcia, M.A.A., Underwood, S.R., Canty, J.M., Lyon, A.R., Devereaux, P.J., Zamorano, J.L., Lindahl, B., Weintraub, W.S., Newby, L.K., Virmani, R., Vranckx, P., Cutlip, D., Gibbons, R.J., Smith, S.C., Atar, D., Luepker, R. V., Robertson, R.M., Bonow, R.O., Steg, P.G., O'Gara, P.T., Fox, K.A.A., Hasdai, D., Aboyans, V., Achenbach, S., Agewall, S., Alexander, T., Avezum, A., Barbato, E., Bassand, J.P., Bates, E., Bittl, J.A., Breithardt, G., Bueno, H., Bugiardini, R., Cohen, M.G., Dangas, G., De Lemos, J.A., Delgado, V., Filippatos, G., Fry, E., Granger, C.B., Halvorsen, S., Hlatky, M.A., Ibanez, B., James, S., Kastrati, A., Leclercq, C., Mahaffey, K.W., Mehta, L., Müller, C., Patrono, C., Piepoli, M.F., Piñero, D., Roffi, M., Rubboli, A., Sharma, S., Simpson, I.A., Tendera, M., Valgimigli, M., Van Der Wal, A.C., Windecker, S., 2019. Fourth universal definition of myocardial infarction (2018). *Eur. Heart J.* 40: 237–269. doi:10.1093/eurheartj/ehy462
- Vasudha, N., Sundararajan, N., 2014. Early detection of ischemia from ECG by Wavelet analysis. *Int. Conf. Comput. Commun. Technol. ICCCT 2014* 2–5. doi:10.1109/ICCCT2.2014.7066699
- Verrier, R.L., Klingenhoben, T., Malik, M., El-Sherif, N., Exner, D. V., Hohnloser, S.H., Ikeda, T., Martínez, J.P., Narayan, S.M., Nieminen, T., Rosenbaum, D.S., 2011. Microvolt T-wave alternans: Physiological basis, methods of measurement, and clinical utility consensus guideline by international society for Holter and noninvasive Electrocardiology. *J. Am. Coll. Cardiol.* 58: 1309–1324. doi:10.1016/j.jacc.2011.06.029
- Verrier, R.L., Nieminen, T., 2010. T-wave alternans as a therapeutic marker for antiarrhythmic agents. *J. Cardiovasc. Pharmacol.* 55: 544–554. doi:10.1097/FJC.0b013e3181d6b781
- Villa, A.D.M., Corsinovi, L., Ntalas, I., Milidonis, X., Scannell, C., Di Giovine, G., Child, N., Ferreira, C., Nazir, M.S., Karady, J., Eshja, E., De Francesco, V., Bettencourt, N., Schuster, A., Ismail, T.F., Razavi, R., Chiribiri, A., 2018. Importance of operator training and rest perfusion on the diagnostic accuracy of stress perfusion cardiovascular magnetic resonance. *J. Cardiovasc. Magn. Reson.* 20: 1–10. doi:10.1186/s12968-018-0493-4
- Wagner, G.S., Macfarlane, P., Wellens, H., Josephson, M., Gorgels, A., Mirvis, D.M., Pahlm, O., Surawicz, B., Kligfield, P., Childers, R., Gettes, L.S., 2009. AHA/ACCF/HRS Recommendations for the Standardization and Interpretation of the Electrocardiogram. Part VI: Acute Ischemia/Infarction A Scientific Statement From the American Heart Association Electrocardiography and Arrhythmias Committee, Council on Clinical. *J. Am. Coll. Cardiol.* 53: 1003–1011. doi:10.1016/j.jacc.2008.12.016
- Walters, A.M., Porter, G.A., Brookes, P.S., 2012. Mitochondria as a drug target in ischemic heart disease and cardiomyopathy. *Circ. Res.* 111: 1222–1236.

doi:10.1161/CIRCRESAHA.112.265660

- Wang, C., Dong, X., Ou, S., Wang, W., Hu, J., Yang, F., 2016. A new method for early detection of myocardial ischemia: cardiodynamicsgram (CDG). *Sci. China Inf. Sci.* 59: 1–11. doi:10.1007/s11432-015-5309-7
- Willerson, J.T., Holmes, D.R., 2015. Coronary artery disease, Delaware medical journal. Springer-Verlag, London, UK.
- Wilson, L.D., Jeyaraj, D., Wan, X., Hoeker, G.S., Said, T.H., Gittinger, M., Laurita, K.R., Rosenbaum, D.S., 2009. Heart failure enhances susceptibility to arrhythmogenic cardiac alternans. *Hear. Rhythm* 6: 251–259. doi:10.1016/j.hrthm.2008.11.008
- Yuniadi, Y., 2009. Clinical Application of Amiodarone Trials Review Article Aplikasi Klinis Beberapa Trial Amiodaron. *J. Kardiol. Indones.* 30: 25–31.
- Zacks, E.S., Morin, D.P., Ageno, S., Janik, M., Mauer, A.C., Markowitz, S.M., Mittal, S., Iwai, S., Shah, B.K., Lerman, B.B., Stein, K.M., 2007. Effect of oral β -blocker therapy on microvolt T-wave alternans and electrophysiology testing in patients with ischemic cardiomyopathy. *Am. Heart J.* 153: 392–397. doi:10.1016/j.ahj.2006.12.010
- Zhao, L., Yang, P., Tang, Y., Li, R., Peng, Y., Wang, Y., Pu, L., Guo, T., 2015. Effect of cardiac shock wave therapy on the microvolt T wave alternans of patients with coronary artery disease. *Int. J. Clin. Exp. Med.* 8: 16463–16471.