

“2023 AHA/ACC/HRS Atrial Fibrillation Guidelines: What's New?” | Cardiology Grand Rounds - Marco Perez, MD and Mark Cutkosky, PhD

References

- Abed, H. S., Wittert, G. A., Leong, D. P., Shirazi, M. G., Bahrami, B., Middeldorp, M. E., Lorimer, M. F., Lau, D. H., Antic, N. A., Brooks, A. G., Abhayaratna, W. P., Kalman, J. M., & Sanders, P. (2013). Effect of weight reduction and cardiometabolic risk factor management on symptom burden and severity in patients with atrial fibrillation: a randomized clinical trial. *JAMA*, 310(19), 2050–2060.
<https://doi.org/10.1001/jama.2013.280521>.
- Ackerman, M. J., Priori, S. G., Willems, S., Berul, C., Brugada, R., Calkins, H., Camm, A. J., Ellinor, P. T., Gollob, M., Hamilton, R., Hershberger, R. E., Judge, D. P., Le Marec, H., McKenna, W. J., Schulze-Bahr, E., Semsarian, C., Towbin, J. A., Watkins, H., Wilde, A., Wolpert, C., ... Zipes, D. P. (2011). HRS/EHRA expert consensus statement on the state of genetic testing for the channelopathies and cardiomyopathies this document was developed as a partnership between the Heart Rhythm Society (HRS) and the European Heart Rhythm Association (EHRA). *Heart rhythm*, 8(8), 1308–1339.
<https://doi.org/10.1016/j.hrthm.2011.05.020>.
- Andrade, J. G., Deyell, M. W., Macle, L., Wells, G. A., Bennett, M., Essebag, V., Champagne, J., Roux, J. F., Yung, D., Skanes, A., Khaykin, Y., Morillo, C., Jolly, U., Novak, P., Lockwood, E., Amit, G., Angaran, P., Sapp, J., Wardell, S., Lauck, S., ... EARLY-AF Investigators (2023). Progression of Atrial Fibrillation after Cryoablation or Drug Therapy. *The New England journal of medicine*, 388(2), 105–116.
<https://doi.org/10.1056/NEJMoa2212540>.
- Boersma, L. V., Ince, H., Kische, S., Pokushalov, E., Schmitz, T., Schmidt, B., Gori, T., Meincke, F., Protopopov, A. V., Betts, T., Mazzone, P., Foley, D., Grygier, M., Sievert, H., De Potter, T., Vireca, E., Stein, K., Bergmann, M. W., & following investigators and institutions participated in the EWOLUTION study (2019). Evaluating Real-World Clinical Outcomes in Atrial Fibrillation Patients Receiving the WATCHMAN Left Atrial Appendage Closure Technology: Final 2-Year Outcome Data of the EWOLUTION Trial Focusing on History of Stroke and Hemorrhage. *Circulation. Arrhythmia and electrophysiology*, 12(4), e006841. <https://doi.org/10.1161/CIRCEP.118.006841>.
- Buck, B. H., Hill, M. D., Quinn, F. R., Butcher, K. S., Menon, B. K., Gulamhussein, S., Siddiqui, M., Coutts, S. B., Jeerakathil, T., Smith, E. E., Khan, K., Barber, P. A., Jickling, G., Reyes, L., Save, S., Fairall, P., Piquette, L., Kamal, N., Chew, D. S., Demchuk, A. M., ... Exner, D. V. (2021). Effect of Implantable vs Prolonged External Electrocardiographic Monitoring on Atrial Fibrillation Detection in Patients With Ischemic Stroke: The PER DIEM Randomized Clinical Trial. *JAMA*, 325(21), 2160–2168.
<https://doi.org/10.1001/jama.2021.6128>.

- Caples, S. M., Mansukhani, M. P., Friedman, P. A., & Somers, V. K. (2019). The impact of continuous positive airway pressure treatment on the recurrence of atrial fibrillation post cardioversion: A randomized controlled trial. *International journal of cardiology*, 278, 133–136. <https://doi.org/10.1016/j.ijcard.2018.11.100>.
- Chen, S., Pürerfellner, H., Meyer, C., Acou, W. J., Schratter, A., Ling, Z., Liu, S., Yin, Y., Martinek, M., Kiuchi, M. G., Schmidt, B., & Chun, K. R. J. (2020). Rhythm control for patients with atrial fibrillation complicated with heart failure in the contemporary era of catheter ablation: a stratified pooled analysis of randomized data. *European heart journal*, 41(30), 2863–2873. <https://doi.org/10.1093/eurheartj/ehz443>.
- Elliott, A. D., Verdicchio, C. V., Mahajan, R., Middeldorp, M. E., Gallagher, C., Mishima, R. S., Hendriks, J. M. L., Pathak, R. K., Thomas, G., Lau, D. H., & Sanders, P. (2023). An Exercise and Physical Activity Program in Patients With Atrial Fibrillation: The ACTIVE-AF Randomized Controlled Trial. *JACC. Clinical electrophysiology*, 9(4), 455–465. <https://doi.org/10.1016/j.jacep.2022.12.002>.
- Healey, J. S., Connolly, S. J., Gold, M. R., Israel, C. W., Van Gelder, I. C., Capucci, A., Lau, C. P., Fain, E., Yang, S., Bailleul, C., Morillo, C. A., Carlson, M., Themeles, E., Kaufman, E. S., Hohnloser, S. H., & ASSERT Investigators (2012). Subclinical atrial fibrillation and the risk of stroke. *The New England journal of medicine*, 366(2), 120–129. <https://doi.org/10.1056/NEJMoa1105575>.
- Healey, J. S., Lopes, R. D., Granger, C. B., Alings, M., Rivard, L., McIntyre, W. F., Atar, D., Birnie, D. H., Boriany, G., Camm, A. J., Conen, D., Erath, J. W., Gold, M. R., Hohnloser, S. H., Ip, J., Kautzner, J., Kutyifa, V., Linde, C., Mabo, P., Mairesse, G., ... ARTESIA Investigators (2024). Apixaban for Stroke Prevention in Subclinical Atrial Fibrillation. *The New England journal of medicine*, 390(2), 107–117. <https://doi.org/10.1056/NEJMoa2310234>.
- Hindricks, G., Potpara, T., Dagres, N., Arbelo, E., Bax, J. J., Blomström-Lundqvist, C., Boriany, G., Castella, M., Dan, G. A., Dilaveris, P. E., Fauchier, L., Filippatos, G., Kalman, J. M., La Meir, M., Lane, D. A., Lebeau, J. P., Lettino, M., Lip, G. Y. H., Pinto, F. J., Thomas, G. N., ... ESC Scientific Document Group (2021). 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS): The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. *European heart journal*, 42(5), 373–498. <https://doi.org/10.1093/eurheartj/ehaa612>.
- Jacobs, V., May, H. T., Bair, T. L., Crandall, B. G., Cutler DO, M. J., Day, J. D., Mallender, C., Osborn, J. S., Weiss, J. P., & Bunch, T. J. (2017). Long-term aspirin does not lower risk of stroke and increases bleeding risk in low-risk atrial fibrillation ablation patients. *Journal of cardiovascular electrophysiology*, 28(11), 1241–1246. <https://doi.org/10.1111/jce.13327>.

January, C. T., Wann, L. S., Alpert, J. S., Calkins, H., Cigarroa, J. E., Cleveland, J. C., Jr, Conti, J. B., Ellinor, P. T., Ezekowitz, M. D., Field, M. E., Murray, K. T., Sacco, R. L., Stevenson, W. G., Tchou, P. J., Tracy, C. M., Yancy, C. W., & ACC/AHA Task Force Members (2014). 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the Heart Rhythm Society. *Circulation*, 130(23), 2071–2104.
<https://doi.org/10.1161/CIR.0000000000000040>.

January, C. T., Wann, L. S., Calkins, H., Chen, L. Y., Cigarroa, J. E., Cleveland, J. C., Jr, Ellinor, P. T., Ezekowitz, M. D., Field, M. E., Furie, K. L., Heidenreich, P. A., Murray, K. T., Shea, J. B., Tracy, C. M., & Yancy, C. W. (2019). 2019 AHA/ACC/HRS Focused Update of the 2014 AHA/ACC/HRS Guideline for the Management of Patients With Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. *Journal of the American College of Cardiology*, 74(1), 104–132.
<https://doi.org/10.1016/j.jacc.2019.01.011>.

Joglar, J. A., Chung, M. K., Armbruster, A. L., Benjamin, E. J., Chyou, J. Y., Cronin, E. M., Deswal, A., Eckhardt, L. L., Goldberger, Z. D., Gopinathannair, R., Gorenek, B., Hess, P. L., Hlatky, M., Hogan, G., Ibeh, C., Indik, J. H., Kido, K., Kusumoto, F., Link, M. S., Linta, K. T., ... Peer Review Committee Members (2024). 2023 ACC/AHA/ACCP/HRS Guideline for the Diagnosis and Management of Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*, 149(1), e1–e156.
<https://doi.org/10.1161/CIR.0000000000001193>.

Joglar, J. A., Chung, M. K., Armbruster, A. L., Benjamin, E. J., Chyou, J. Y., Cronin, E. M., Deswal, A., Eckhardt, L. L., Goldberger, Z. D., Gopinathannair, R., Gorenek, B., Hess, P. L., Hlatky, M., Hogan, G., Ibeh, C., Indik, J. H., Kido, K., Kusumoto, F., Link, M. S., Linta, K. T., ... Peer Review Committee Members (2024). 2023 ACC/AHA/ACCP/HRS Guideline for the Diagnosis and Management of Atrial Fibrillation: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*, 149(1), e1–e156.
<https://doi.org/10.1161/CIR.0000000000001193>.

Kirchhof, P., Camm, A. J., Goette, A., Brandes, A., Eckardt, L., Elvan, A., Fetsch, T., van Gelder, I. C., Haase, D., Haegeli, L. M., Hamann, F., Heidbüchel, H., Hindricks, G., Kautzner, J., Kuck, K. H., Mont, L., Ng, G. A., Rekosz, J., Schoen, N., Schotten, U., ... EAST-AFNET 4 Trial Investigators (2020). Early Rhythm-Control Therapy in Patients with Atrial Fibrillation. *The New England journal of medicine*, 383(14), 1305–1316.
<https://doi.org/10.1056/NEJMoa2019422>.

Kirchhof, P., Toennis, T., Goette, A., Camm, A. J., Diener, H. C., Becher, N., Bertaglia, E., Blomstrom Lundqvist, C., Borlich, M., Brandes, A., Cabanelas, N., Calvert, M.,

- Chlouverakis, G., Dan, G. A., de Groot, J. R., Dichtl, W., Kravchuk, B., Lubiński, A., Marijon, E., Merkely, B., ... NOAH-AFNET6 sites and investigators (2023). Anticoagulation with Edoxaban in Patients with Atrial High-Rate Episodes. *The New England journal of medicine*, 389(13), 1167–1179.
<https://doi.org/10.1056/NEJMoa2303062>.
- Korompoki, E., Filippidis, F. T., Nielsen, P. B., Del Giudice, A., Lip, G. Y. H., Kuramatsu, J. B., Huttner, H. B., Fang, J., Schulman, S., Martí-Fàbregas, J., Gathier, C. S., Viswanathan, A., Biffi, A., Poli, D., Weimar, C., Malzahn, U., Heuschmann, P., & Veltkamp, R. (2017). Long-term antithrombotic treatment in intracranial hemorrhage survivors with atrial fibrillation. *Neurology*, 89(7), 687–696.
<https://doi.org/10.1212/WNL.0000000000004235>.
- Morillo, C. A., Verma, A., Connolly, S. J., Kuck, K. H., Nair, G. M., Champagne, J., Sterns, L. D., Beresh, H., Healey, J. S., Natale, A., & RAAFT-2 Investigators (2014). Radiofrequency ablation vs antiarrhythmic drugs as first-line treatment of paroxysmal atrial fibrillation (RAAFT-2): a randomized trial. *JAMA*, 311(7), 692–700.
<https://doi.org/10.1001/jama.2014.467>.
- Osmancik, P., Herman, D., Neuzil, P., Hala, P., Taborsky, M., Kala, P., Poloczek, M., Stasek, J., Haman, L., Branny, M., Chovancik, J., Cervinka, P., Holy, J., Kovarnik, T., Zemanek, D., Havranek, S., Vancura, V., Opatrny, J., Peichl, P., Tousek, P., ... PRAGUE-17 Trial Investigators (2020). Left Atrial Appendage Closure Versus Direct Oral Anticoagulants in High-Risk Patients With Atrial Fibrillation. *Journal of the American College of Cardiology*, 75(25), 3122–3135. <https://doi.org/10.1016/j.jacc.2020.04.067>.
- Packer, D. L., Mark, D. B., Robb, R. A., Monahan, K. H., Bahnson, T. D., Poole, J. E., Noseworthy, P. A., Rosenberg, Y. D., Jeffries, N., Mitchell, L. B., Flaker, G. C., Pokushalov, E., Romanov, A., Bunch, T. J., Noelker, G., Ardashev, A., Revishvili, A., Wilber, D. J., Cappato, R., Kuck, K. H., ... CABANA Investigators (2019). Effect of Catheter Ablation vs Antiarrhythmic Drug Therapy on Mortality, Stroke, Bleeding, and Cardiac Arrest Among Patients With Atrial Fibrillation: The CABANA Randomized Clinical Trial. *JAMA*, 321(13), 1261–1274. <https://doi.org/10.1001/jama.2019.0693>.
- Potpara, T. S., Ferro, C., Lip, G. Y. H., Dan, G. A., Lenarczyk, R., Mallamaci, F., Ortiz, A., Sarafidis, P., Ekart, R., & Dagres, N. (2020). Management of atrial fibrillation in patients with chronic kidney disease in clinical practice: a joint European Heart Rhythm Association (EHRA) and European Renal Association/European Dialysis and Transplantation Association (ERA/EDTA) physician-based survey. *Europace : European pacing, arrhythmias, and cardiac electrophysiology : journal of the working groups on cardiac pacing, arrhythmias, and cardiac cellular electrophysiology of the European Society of Cardiology*, 22(3), 496–505. <https://doi.org/10.1093/europace/euz358>.
- Sanna, T., Diener, H. C., Passman, R. S., Di Lazzaro, V., Bernstein, R. A., Morillo, C. A., Rymer, M. M., Thijss, V., Rogers, T., Beckers, F., Lindborg, K., Brachmann, J., & CRYSTAL AF Investigators (2014). Cryptogenic stroke and underlying atrial fibrillation. *The New*

England journal of medicine, 370(26), 2478–2486.

<https://doi.org/10.1056/NEJMoa1313600>.

Sato, H., Ishikawa, K., Kitabatake, A., Ogawa, S., Maruyama, Y., Yokota, Y., Fukuyama, T., Doi, Y., Mochizuki, S., Izumi, T., Takekoshi, N., Yoshida, K., Hiramori, K., Origasa, H., Uchiyama, S., Matsumoto, M., Yamaguchi, T., Hori, M., & Japan Atrial Fibrillation Stroke Trial Group (2006). Low-dose aspirin for prevention of stroke in low-risk patients with atrial fibrillation: Japan Atrial Fibrillation Stroke Trial. *Stroke*, 37(2), 447–451.

<https://doi.org/10.1161/01.STR.0000198839.61112.ee>.

Shoemaker, M. B., Shah, R. L., Roden, D. M., & Perez, M. V. (2020). How Will Genetics Inform the Clinical Care of Atrial Fibrillation?. *Circulation research*, 127(1), 111–127.

<https://doi.org/10.1161/CIRCRESAHA.120.316365>.

Traaen, G. M., Aakerøy, L., Hunt, T. E., Øverland, B., Bendz, C., Sande, L. Ø., Aakhus, S., Fagerland, M. W., Steinshamn, S., Anfinsen, O. G., Massey, R. J., Broch, K., Ueland, T., Akre, H., Loennechen, J. P., & Gullestad, L. (2021). Effect of Continuous Positive Airway Pressure on Arrhythmia in Atrial Fibrillation and Sleep Apnea: A Randomized Controlled Trial. *American journal of respiratory and critical care medicine*, 204(5), 573–582. <https://doi.org/10.1164/rccm.202011-4133OC>.

Van Gelder, I. C., Healey, J. S., Crijns, H. J. G. M., Wang, J., Hohnloser, S. H., Gold, M. R., Capucci, A., Lau, C. P., Morillo, C. A., Hobbel, A. H., Rienstra, M., & Connolly, S. J. (2017). Duration of device-detected subclinical atrial fibrillation and occurrence of stroke in ASSERT. *European heart journal*, 38(17), 1339–1344.

<https://doi.org/10.1093/eurheartj/ehx042>.

Voskoboinik, A., Kalman, J. M., De Silva, A., Nicholls, T., Costello, B., Nanayakkara, S., Prabhu, S., Stub, D., Azzopardi, S., Vizi, D., Wong, G., Nalliah, C., Sugumar, H., Wong, M., Kotschet, E., Kaye, D., Taylor, A. J., & Kistler, P. M. (2020). Alcohol Abstinence in Drinkers with Atrial Fibrillation. *The New England journal of medicine*, 382(1), 20–28. <https://doi.org/10.1056/NEJMoa1817591>.

Wazni, O. M., Dandamudi, G., Sood, N., Hoyt, R., Tyler, J., Durrani, S., Niebauer, M., Makati, K., Halperin, B., Gauri, A., Morales, G., Shao, M., Cerkvenik, J., Kaplon, R. E., Nissen, S. E., & STOP AF First Trial Investigators (2021). Cryoballoon Ablation as Initial Therapy for Atrial Fibrillation. *The New England journal of medicine*, 384(4), 316–324. <https://doi.org/10.1056/NEJMoa2029554>.

Whitlock, R. P., Belley-Cote, E. P., Paparella, D., Healey, J. S., Brady, K., Sharma, M., Reents, W., Budera, P., Baddour, A. J., Fila, P., Devereaux, P. J., Bogachev-Prokophiev, A., Boening, A., Teoh, K. H. T., Tagarakis, G. I., Slaughter, M. S., Royse, A. G., McGuinness, S., Alings, M., Punjabi, P. P., ... LAAOS III Investigators (2021). Left Atrial Appendage Occlusion during Cardiac Surgery to Prevent Stroke. *The New England journal of medicine*, 384(22), 2081–2091.

<https://doi.org/10.1056/NEJMoa2101897>.

Yasuda, S., Kaikita, K., Akao, M., Ako, J., Matoba, T., Nakamura, M., Miyauchi, K., Hagiwara, N., Kimura, K., Hirayama, A., Matsui, K., Ogawa, H., & AFIRE Investigators (2019). Antithrombotic Therapy for Atrial Fibrillation with Stable Coronary Disease. *The New England journal of medicine*, 381(12), 1103–1113.

<https://doi.org/10.1056/NEJMoa1904143>.

Yoneda, Z. T., Anderson, K. C., Quintana, J. A., O'Neill, M. J., Sims, R. A., Glazer, A. M., Shaffer, C. M., Crawford, D. M., Stricker, T., Ye, F., Wells, Q., Stevenson, L. W., Michaud, G. F., Darbar, D., Lubitz, S. A., Ellinor, P. T., Roden, D. M., & Shoemaker, M. B. (2021). Early-Onset Atrial Fibrillation and the Prevalence of Rare Variants in Cardiomyopathy and Arrhythmia Genes. *JAMA cardiology*, 6(12), 1371–1379.

<https://doi.org/10.1001/jamacardio.2021.3370>

Zhang, X. L., Zhang, X. W., Wang, T. Y., Wang, H. W., Chen, Z., Xu, B., & Xu, W. (2021). Off-Label Under- and Overdosing of Direct Oral Anticoagulants in Patients With Atrial Fibrillation: A Meta-Analysis. *Circulation. Cardiovascular quality and outcomes*, 14(12), e007971. <https://doi.org/10.1161/CIRCOUTCOMES.121.007971>.