



中国心脏起搏与心电生理杂志

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《2024 ESC 与欧洲心胸外科协会(EACTS)合作制定的心房颤动管理指南》要点解读

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2024年8月30日发布了2024年欧洲心脏病学会(ESC)与欧洲心胸外科协会(EACTS)合作制定的心房颤动(简称房颤)管理指南(下文简称2024 ESC指南)^[1]包含了一系列新的方法和特定治疗建议,以应对全球范围内迅速增长的房颤患者数量。2024 ESC指南强调共同决策与平等护理、患者参与、共病管理、循证医学和动态再评估。

主要要点:①由于人口老龄化、共病负担增加、意识提高以及新检测技术的出现,预计到2050年房颤的患病率将翻倍。②通过遵循新的“AF-CARE”路径可以优化房颤患者的管理。③“AF-CARE”整合了共病和风险因素管理[C, Comorbidity and risk factor management],预防卒中和血栓栓塞[A, Avoid stroke and thromboembolism],通过控制心率和节律减轻症状[R, Reduce symptoms by rate and rhythm control],以及评估和动态再评估[E, Evaluation and dynamic reassessment]。④共享决策,包括患者和多学科团队,以及对患者、家属和医护人员的教育,应成为房颤管理的基石。

1 AF-CARE 管理路径更新

2024 ESC指南强调了按照新的AF-CARE路径进行最佳管理的重要性,该路径旨在确保每一位房颤患者都能从最新的科学进展中受益:[C]共病和风险因素管理;[A]预防卒中和血栓栓塞;[R]通过控制心率和节律减轻症状;以及[E]评估和动态再评估。

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2 房颤类型更新

详见表1。

表1 推荐:根据时间模式对房颤定义和分类更新

分类	定义
首诊房颤	从未被诊断过的房颤。无论症状状态、发作时间或持续时间如何
阵发性房颤	在7天内自行终止或通过干预终止的房颤。有证据表明,大多数自发终止的阵发性房颤持续时间少于48 h ^[2]
持续性房颤	房颤发作不会自行终止。许多干预试验将7天作为定义持续性房颤的界限 ^[3-4] 。
永久性房颤	长期持续性房颤定义为持续至少12个月的连续房颤,但在某些患者中,节律控制仍然是一个治疗选择,这使其与永久性房颤有所区别
	在患者和医生共同决定后,计划不再尝试恢复窦性心律的房颤

3 共病管理更新

2024 ESC指南中的共病章节强调了房颤不能孤立地看待。对共病和风险因素的全面评估和管理对房颤患者的各个管理方面至关重要,这有助于避免房颤的复发和进展,提高治疗成功率,并预防与房颤相关的不良结果。详见表2。

4 血栓风险评估更新

使用CHA₂DS₂-VA评分(不考虑性别)来辅助决策,更广泛地应用适当的抗凝治疗。详见表3。

女性性别是一个依赖年龄的卒中风险修正因素,而不是一个独立的风险因素^[49-51]。性别的纳入使得临床实践对医疗专业人员和患者而言更加复杂^[52],也忽略了那些自我认同为非二元性别、跨性别或正在接受性激素治疗的个体。ESC及全球的先前指南实际上并未使用CHA₂DS₂-VASc评分;

表 2 推荐:房颤患者合并症和风险因素管理的建议

推荐	建议类别	证据级别
将识别和管理风险因素及合并症作为房颤管理的核心部分 ^[5-8]	I	B
对合并高血压的房颤患者进行降血压治疗,以减少房颤的复发和进展,并预防不良心血管事件 ^[7-11]	I	B
对于合并心力衰竭和充血的房颤患者,建议使用利尿剂,以缓解症状并促进更好的房颤管理	I	C
对于合并心力衰竭和左室射血分数(LVEF)受损的房颤患者,建议使用适当的心力衰竭药物治疗,以减轻症状和/或减少心力衰竭住院次数,并预防房颤复发 ^[12-18]	I	B
建议对合并心力衰竭和房颤的患者使用钠-葡萄糖共转运蛋白2(SGLT2)抑制剂,无论LVEF如何,以降低心力衰竭住院和心血管死亡的风险 ^[17,19-21]	I	A
建议在糖尿病患者和房颤患者中进行有效的血糖控制,作为全面风险管理的一部分,以减少房颤负荷、复发和进展	I	C
建议在超重和肥胖的房颤患者中进行减重,作为全面风险管理的一部分,以减少症状和房颤负荷,目标是体重减少10%或更多 ^[6-9]	I	B
建议为阵发性或持续性房颤患者量身定制运动计划,以改善心肺适应并减少房颤复发 ^[22-27]	I	B
建议将酒精摄入量减少到每周不超过3份标准饮料(≤ 30 克酒精),作为全面风险管理的一部分,以减少房颤的复发 ^[7-8,28]	II b	C
对于房颤患者且体重指数(BMI) $\geq 40 \text{ kg/m}^2$,并计划进行节律控制策略的个体,可以考虑结合生活方式改变和药物治疗进行减重手术,以减少房颤的复发和进展	II b	B
对于房颤患者,可以考虑将阻塞性睡眠呼吸暂停的管理纳入全面风险管理中,以减少房颤的复发和进展 ^[7-9,29-35]	III	B
在对房颤患者筛查阻塞性睡眠呼吸暂停时,不推荐仅使用基于症状的问卷调查 ^[36-38]		

注: * 或 $\text{BMI} \geq 35 \text{ kg/m}^2$ 伴肥胖相关并发症

而是为房颤的女性和男性提供了不同的评分标准来决定是否进行口服抗凝治疗。因此,实际上 $\text{CHA}_2\text{DS}_2\text{-VA}$ (不包括性别)已经在使用中^[53]。

表 3 推荐: $\text{CHA}_2\text{DS}_2\text{-VA}$ 评分表

$\text{CHA}_2\text{DS}_2\text{-VA}$ 评分	定义	评分*
C 慢性心力衰竭	心力衰竭的症状和体征[无论LVEF如何,包括心力衰竭射血分数保留型(HFpEF)、心力衰竭射血分数中间型(HFmrEF)和心力衰竭射血分数降低型(HFrEF)],或无症状的LVEF $\leq 40\%$ ^[39-41]	1
H 高血压	至少在两个不同时间点的静息血压 $>140/90 \text{ mmHg}$,或当前正在接受抗高血压治疗。与最低心血管事件风险相关的最佳血压目标是 $120\sim129/70\sim79 \text{ mmHg}$ (或尽可能低的水平) ^[42-43]	1
A ≥ 75 岁	年龄是缺血性卒中风险的独立决定因素 ^[44] 。年龄相关的风险是一个连续过程,但为了实际操作,年龄 ≥ 75 岁给予2分	2
D 糖尿病	糖尿病(1型或2型),根据当前接受的标准定义 ^[45] ,或接受降糖治疗	1
S 既往卒中、短暂性脑缺血发作(TIA)或动脉血栓	既往发生血栓塞与复发风险极高相关,因此权重为2分	2
V 血管疾病	冠状动脉疾病:包括既往心肌梗死、心绞痛、冠状动脉再血管化史(外科或经皮)及血管造影或心脏影像学显示的显著冠状动脉疾病 ^[46] 外周血管疾病:包括间歇性跛行、既往外周血管再血管化、腹主动脉经皮或外科干预,以及影像学上显示的复杂主动脉斑块(具有活动性、溃疡、蒂状突起或厚度 $\geq 4 \text{ mm}$ 的特征) ^[47-48]	1
A $65\sim74$ 岁	年龄在65至74岁之间的患者给予1分	1
注: * 除这些因素外,还应考虑改变个体卒中和血栓栓塞风险的其他特征,包括癌症、慢性肾脏疾病、种族(黑人、西班牙裔、亚裔)、生物标志物(肌钙蛋白和脑钠肽),以及特定人群中的心房增大、高脂血症、吸烟和肥胖		
2024 ESC 指南工作组建议,在没有其他经过本地验证的替代方案的情况下,临床医生和患者应使用 $\text{CHA}_2\text{DS}_2\text{-VA}$ 评分来协助决定口服抗凝治疗(即不考虑出生性别或性别)。在低风险患者进一步试验结果(NCT04700826 ^[54] , NCT02387229 ^[55])出来之前,对于 $\text{CHA}_2\text{DS}_2\text{-VA}$ 评分为 2 分或以上的患者推荐使用口服抗凝药物,对于 $\text{CHA}_2\text{DS}_2\text{-VA}$ 评分为 1 分的患者应考虑采取以患者为中心的共享管理方法。详见表 4。		

表 4 推荐:评估和管理房颤患者血栓栓塞风险的建议

推荐	建议类别	证据级别
建议对临床房颤患者中血栓栓塞风险升高的个体使用口服抗凝药物,以预防缺血性卒中和血栓栓塞 ^[56-57]	I	A
推荐 CHA ₂ DS ₂ -VA 评分为 2 分或以上作为评估血栓栓塞风险升高的指标,以决定是否开始口服抗凝治疗	I	C
对于所有合并肥厚型心肌病或心脏淀粉样变性的房颤患者,无论 CHA ₂ DS ₂ -VA 评分如何,建议使用口服抗凝药物,以预防缺血性卒中和血栓栓塞 ^[58-64]	I	B
建议定期对房颤患者进行个体化的血栓栓塞风险重新评估,以确保在适当的患者中开始抗凝治疗 ^[65-68]	I	B
CHA ₂ DS ₂ -VA 评分为 1 分应被视为血栓栓塞风险升高的指标,以决定是否开始口服抗凝治疗	II a	C
对于无症状的经设备检测到的亚临床房颤且血栓栓塞风险升高的患者,可以考虑直接口服抗凝药物治疗,以预防缺血性卒中和血栓栓塞,但应排除高出血风险的患者 ^[69-70]	II b	B
在房颤患者中,抗血小板治疗不推荐作为抗凝治疗的替代方案来预防缺血性卒中和血栓栓塞 ^[71-72]	III	A
不建议根据房颤的时间模式(阵发性、持续性或永久性)来决定是否需要口服抗凝治疗 ^[73-74]	III	B

5 通过控制心率和节律减轻症状更新

详见表 5。

表 5 推荐:房颤患者心率管理更新内容

推荐	建议类别	证据级别
对于房颤患者,建议使用心率控制治疗,作为急性期的初始治疗、节律控制治疗的辅助措施,或作为单独治疗策略来控制心率和减轻症状 ^[75-77]	I	B
在 LVEF > 40% 的房颤患者中,建议使用 β 受体拮抗剂、地尔硫草、维拉帕米或地高辛作为首选药物来控制心率和减轻症状 ^[78-80]	I	B
对于症状严重的永久性房颤患者,且至少有一次因心力衰竭住院的患者,应该考虑房室结消融联合心脏再同步治疗,以减轻症状、活动受限、反复的心力衰竭住院以及死亡率 ^[81-82]	II a	B

6 房颤导管消融更新

详见表 6。

表 6 推荐:房颤导管消融更新内容

推荐	建议类别	证据级别
窦房结病变/心动过速-心动过缓综合征对于有房颤相关心动过缓或在房颤终止时出现窦性停搏的患者,应考虑进行房颤导管消融,以改善症状并避免植入起搏器 ^[83-86]	II a	C
导管消融后的复发对于在初次导管消融后出现房颤复发的患者,如果患者在初次肺静脉隔离(PVI)后症状有所改善或初次 PVI 失败,应考虑再次进行房颤导管消融,以减轻症状、复发和房颤的进展 ^[87-89]	II a	B

导管消融在症状性阵发性或持续性房颤患者中,能够预防房颤复发、减少房颤负荷,并改善生活质量,尤其是对于那些对抗心律失常药物耐受性差或无反应的患者^[90-96]。对于因房颤终止后出现长时间停搏而有症状的患者,非随机数据已显示导管消融可以改善症状,并避免起搏器植入^[83-86]。

PVI 仍然是导管消融的核心^[90,95,97-98],但在非阵发性房颤人群中,最佳消融策略尚未明确^[99]。新兴技术如脉冲消融也在不断发展,该技术使用高幅度电脉冲通过电穿孔来消融心肌,具有较高的组织特异性。在一项单盲随机对照试验(RCT)中,607 名患者接受了脉冲消融,其疗效和安全性终点与传统射频或冷冻球囊消融相当^[100]。

7 房颤病情的动态再评估

房颤患者需要进行动态评估和再评估,初级和次级管理中的医疗团队需要定期重新评估以调节风险因素。房颤的发展和进展是由基础机制与广泛的临床因素和相关共病的持续相互作用所驱动的。每一个因素的作用随着时间而显著变化,影响其对房颤进展。每位患者的风险概况也远非静态,需采用动态管理模式以确保房颤的最佳管理^[101-102]。为了提高整体管理质量,对房颤患者评估治疗,应关注可能减缓或逆转房颤进展、提高生活质量以及预防不良结果等,需根据这种变化的风险状态定期重新评估治疗。及时关注可改变的因素和基础共病有可能减缓或逆转房颤的进展,提高生活质量,并预防心力衰竭、血栓栓塞和重大出血等不良结果。

AF-CARE 中的[E]部分涵盖了医疗专业人员

和患者所需的活动范围,包括:①彻底评估相关共病和风险因素,以指导治疗;②提供动态评估,以确保治疗计划始终适合特定患者。2024 ESC 指南工作组建议采取一种适应性策略,不仅对患者反映的变化作出反应,还主动寻找可能影响患者健康的管理调整点。这一框架还旨在避免不必要的昂贵的随访,通过教育和赋能患者,帮助识别是否需要专业护理或管理升级。以患者为中心的共享决策理念被嵌入其中,以提高管理模式的效率,并满足房颤患者的需求。

合并疾病和任何检查结果应定期重新评估,以应对共病和风险因素的动态变化^[103]。这可能会影响治疗决策,例如在患者肾功能改善后恢复全剂量的直接口服抗凝药治疗。AF-CARE 路径的复审时间应根据患者的具体情况进行,通常建议在初次就诊后的 6 个月进行重新评估,然后至少每年进行一次。

参考文献

- Van Gelder IC, Rienstra M, Bunting KV, et al. 2024 ESC Guidelines for the management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS)[J]. Eur Heart J, 2024;ehae176.doi: 10.1093/eurheartj/ehae176
- De With RR, Erkuner Ö, Rienstra M, et al. Temporal patterns and short-term progression of paroxysmal atrial fibrillation: data from RACE V[J]. Europace, 2020,22(8):1 162
- Packer DL, Mark DB, Robb RA, et al. 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[J]. JAMA, 2019, 321(13):1 261
- Marrouche NF, Brachmann J, Andresen D, et al. Catheter ablation for atrial fibrillation with heart failure[J]. N Engl J Med, 2018,378(5): 417
- Rienstra M, Hobbelt AH, Alings M, et al. Targeted therapy of underlying conditions improves sinus rhythm maintenance in patients with persistent atrial fibrillation: results of the RACE 3 trial[J]. Eur Heart J, 2018,39(32):2 987
- Abed HS, Wittert GA, Leong DP, et al. Effect of weight reduction and cardiometabolic risk factor management on symptom burden and severity in patients with atrial fibrillation: a randomized clinical trial[J]. JAMA, 2013,310(19):2 050
- Pathak RK, Middeldorp ME, Meredith M, et al. Long-term effect of goal-directed weight management in an atrial fibrillation cohort: a long-term follow-up study (LEGACY)[J]. J Am Coll Cardiol, 2015,65(20):2 159
- Middeldorp ME, Pathak RK, Meredith M, et al. PREVENTion and regRESSive effect of weight-loss and risk factor modification on atrial fibrillation: the REVERSE-AF study[J]. Europace, 2018,20(6):1 929
- Pathak RK, Middeldorp ME, Lau DH, et al. Aggressive risk factor reduction study for atrial fibrillation and implications for the outcome of ablation: the ARREST-AF cohort study[J]. J Am Coll Cardiol, 2014,64(21):2 222
- Pinho-Gomes AC, Azevedo L, Copland E, et al. Blood pressure-lowering treatment for the prevention of cardiovascular events in patients with atrial fibrillation: an individual participant data meta-analysis[J]. PLoS Med, 2021,18(6):e1 003 599
- Parkash R, Wells GA, Sapp JL, et al. Effect of aggressive blood pressure control on the recurrence of atrial fibrillation after catheter ablation: a randomized, open-label clinical trial (SMAC-AF [Substrate Modification with Aggressive Blood Pressure Control])[J]. Circulation, 2017,135(19):1 788
- McMurray JJ, Adamopoulos S, Anker SD, et al. ESC guidelines for the diagnosis and treatment of acute and chronic heart failure 2012: the task force for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC[J]. Eur Heart J, 2012,33(14):1 787
- Olsson LG, Swedberg K, Ducharme A, et al. Atrial fibrillation and risk of clinical events in chronic heart failure with and without left ventricular systolic dysfunction: results from the Candesartan in Heart failure-Assessment of Reduction in Mortality and morbidity (CHARM) program[J]. J Am Coll Cardiol, 2006,47(10):1 997
- Kotecha D, Holmes J, Krum H, et al. Efficacy of beta blockers in patients with heart failure plus atrial fibrillation: an individual-patient data meta-analysis[J]. Lancet, 2014, 384 (9961): 2 235
- Zannad F, McMurray JJ, Krum H, et al. Eplerenone in patients with systolic heart failure and mild symptoms[J]. N Engl J Med, 2011,364(1):11
- McMurray JJ, Packer M, Desai AS, et al. Angiotensin-neprilysin inhibition versus enalapril in heart failure[J]. N Engl J Med, 2014,371(11):993
- Pandey AK, Okaj I, Kaur H, et al. Sodium-glucose co-transporter inhibitors and atrial fibrillation: a systematic review and meta-analysis of randomized controlled trials[J]. J Am Heart Assoc, 2021,10(17):e 022 222
- McDonagh TA, Metra M, Adamo M, et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure[J]. Eur Heart J, 2021,42(36):3 599
- Solomon SD, McMurray JJV, Claggett B, et al. Dapagliflozin in heart failure with mildly reduced or preserved ejection fraction [J]. N Engl J Med, 2022,387(12):1 089
- Anker SD, Butler J, Filippatos G, et al. Empagliflozin in heart failure with a preserved ejection fraction[J]. N Engl J Med, 2021,385(16):1 451
- Bhatt DL, Szarek M, Steg PG, et al. Sotagliflozin in patients with diabetes and recent worsening heart failure[J]. N Engl J

- Med, 2021, 38(2): 117
- 22 Pathak RK, Elliott A, Middeldorp ME, et al. Impact of CARDIOrespiratory FITness on arrhythmia recurrence in obese individuals with atrial fibrillation: the CARDIO-FIT study[J]. J Am Coll Cardiol, 2015, 66(9): 985
- 23 Hegbom F, Stavem K, Sire S, et al. Effects of short-term exercise training on symptoms and quality of life in patients with chronic atrial fibrillation[J]. Int J Cardiol, 2007, 116(1): 86
- 24 Osbak PS, Mourier M, Kjaer A, et al. A randomized study of the effects of exercise training on patients with atrial fibrillation [J]. Am Heart J, 2011, 162(6): 1 080
- 25 Malmo V, Nes BM, Amundsen BH, et al. Aerobic interval training reduces the burden of atrial fibrillation in the short term: a randomized trial[J]. Circulation, 2016, 133(5): 466
- 26 Oesterle A, Giancaterino S, Van Noord MG, et al. Effects of supervised exercise training on atrial fibrillation: a meta-analysis of randomized controlled trials[J]. J Cardiopulm Rehabil Prev, 2022, 42(4): 258
- 27 Elliott AD, Verdicchio CV, Mahajan R, et al. An exercise and physical activity program in patients with atrial fibrillation: the ACTIVE-AF randomized controlled trial[J]. JACC Clin Electrophysiol, 2023, 9(4): 455
- 28 Voskoboinik A, Kalman JM, De Silva A, et al. Alcohol abstinence in drinkers with atrial fibrillation[J]. N Engl J Med, 2020, 382(1): 20
- 29 Holmqvist F, Guan N, Zhu Z, et al. Impact of obstructive sleep apnea and continuous positive airway pressure therapy on outcomes in patients with atrial fibrillation—results from the Outcomes Registry for Better Informed Treatment of Atrial Fibrillation (ORBIT-AF)[J]. Am Heart J, 2015, 169(5): 647
- 30 Fein AS, Shvilkin A, Shah D, et al. Treatment of obstructive sleep apnea reduces the risk of atrial fibrillation recurrence after catheter ablation[J]. J Am Coll Cardiol, 2013, 62(4): 300
- 31 Li L, Wang ZW, Li J, et al. Efficacy of catheter ablation of atrial fibrillation in patients with obstructive sleep apnoea with and without continuous positive airway pressure treatment: a meta-analysis of observational studies[J]. Europace, 2014, 16(9): 1 309
- 32 Naruse Y, Tada H, Satoh M, et al. Concomitant obstructive sleep apnea increases the recurrence of atrial fibrillation following radiofrequency catheter ablation of atrial fibrillation: clinical impact of continuous positive airway pressure therapy [J]. Heart Rhythm, 2013, 10(3): 331
- 33 Qureshi WT, Nasir UB, Alqalyoubi S, et al. Meta-analysis of continuous positive airway pressure as a therapy of atrial fibrillation in obstructive sleep apnea[J]. Am J Cardiol, 2015, 116(11): 1 767
- 34 Shukla A, Aizer A, Holmes D, et al. Effect of obstructive sleep apnea treatment on atrial fibrillation recurrence: a meta-analysis[J]. JACC Clin Electrophysiol, 2015, 1(1-2): 41
- 35 Nalliah CJ, Wong GR, Lee G, et al. Impact of CPAP on the atrial fibrillation substrate in obstructive sleep apnea: the SLEEP-AF study[J]. JACC Clin Electrophysiol, 2022, 8(7): 869
- 36 Kadhim K, Middeldorp ME, Elliott AD, et al. Self-reported daytime sleepiness and sleep-disordered breathing in patients with atrial fibrillation: SNOozE-AF[J]. Can J Cardiol, 2019, 35(11): 1 457
- 37 Traaen GM, Overland B, Aakeroy L, et al. Prevalence, risk factors, and type of sleep apnea in patients with paroxysmal atrial fibrillation[J]. Int J Cardiol Heart Vasc, 2020, 26: 100 447
- 38 Kadhim K, Middeldorp ME, Elliott AD, et al. Prevalence and assessment of sleep-disordered breathing in patients with atrial fibrillation: a systematic review and meta-analysis[J]. Can J Cardiol, 2021, 37(11): 1 846
- 39 Chung S, Kim TH, Uhm JS, et al. Stroke and systemic embolism and other adverse outcomes of heart failure with preserved and reduced ejection fraction in patients with atrial fibrillation (from the COmparison study of Drugs for symptom control and complication prEvention of Atrial Fibrillation [CODE-AF]) [J]. Am J Cardiol, 2020, 125(1): 68
- 40 Uhm JS, Kim J, Yu HT, et al. Stroke and systemic embolism in patients with atrial fibrillation and heart failure according to heart failure type[J]. ESC Heart Fail, 2021, 8(2): 1 582
- 41 McMurray JJ, Ezekowitz JA, Lewis BS, et al. Left ventricular systolic dysfunction, heart failure, and the risk of stroke and systemic embolism in patients with atrial fibrillation: insights from the ARISTOTLE trial[J]. Circ Heart Fail, 2013, 6(3): 451
- 42 McEvoy JW, Touyz RM, McCarthy CP, et al. 2024 ESC Guidelines for the management of elevated blood pressure and hypertension[J]. Eur Heart J, 2024, <https://doi.org/10.1093/euroheartj/ehae178>
- 43 Kim D, Yang PS, Kim TH, et al. Ideal blood pressure in patients with atrial fibrillation[J]. J Am Coll Cardiol, 2018, 72(11): 1 233
- 44 Lip GY, Clementy N, Pericart L, et al. Stroke and major bleeding risk in elderly patients aged ≥ 75 years with atrial fibrillation: the Loire valley atrial fibrillation project[J]. Stroke, 2015, 46(1): 143
- 45 American Diabetes Association Professional Practice Committee. 2. Classification and diagnosis of diabetes; standards of medical care in diabetes-2022[J]. Diabetes Care, 2022, 45(Suppl 1): S17
- 46 Steensig K, Olesen KKW, Thim T, et al. Should the presence or extent of coronary artery disease be quantified in the CHA₂DS₂-VASc score in atrial fibrillation? A report from the western Denmark heart registry[J]. Thromb Haemost, 2018, 118(12): 2 162
- 47 Zabalgoitia M, Halperin JL, Pearce LA, et al. Transesophageal echocardiographic correlates of clinical risk of thromboembolism in nonvalvular atrial fibrillation. Stroke prevention in atrial fibrillation III investigators[J]. J Am Coll Cardiol, 1998, 31(7): 1 622
- 48 Stroke Prevention in Atrial Fibrillation Investigators Committee on Echocardiography. Transesophageal echocardiography in at-

- trial fibrillation: standards for acquisition and interpretation and assessment of interobserver variability. Stroke prevention in atrial fibrillation investigators committee on echocardiography [J]. *J Am Soc Echocardiogr*, 1996, 9(4): 556
- 49 Tomasdottir M, Friberg L, Hijazi Z, et al. Risk of ischemic stroke and utility of CHA₂DS₂-VASc score in women and men with atrial fibrillation[J]. *Clin Cardiol*, 2019, 42(10): 1 003
- 50 Wu VC, Wu M, Aboyans V, et al. Female sex as a risk factor for ischaemic stroke varies with age in patients with atrial fibrillation[J]. *Heart*, 2020, 106(7): 534
- 51 Mikkelsen AP, Lindhardsen J, Lip GY, et al. Female sex as a risk factor for stroke in atrial fibrillation: a nationwide cohort study[J]. *J Thromb Haemost*, 2012, 10(9): 1 745
- 52 Antonenko K, Paciaroni M, Agnelli G, et al. Sex-related differences in risk factors, type of treatment received and outcomes in patients with atrial fibrillation and acute stroke: results from the RAF study (early recurrence and cerebral bleeding in patients with acute ischemic stroke and atrial fibrillation)[J]. *Eur Stroke J*, 2017, 2(1): 46
- 53 Mobley AR, Subramanian A, Champsí A, et al. Thromboembolic events and vascular dementia in patients with atrial fibrillation and low apparent stroke risk[J]. *Nat Med*, 2024, 30(8): 2 288
- 54 Wang X, Mobley AR, Tica O, et al. Systematic approach to outcome assessment from coded electronic healthcare records in the DaRe2THINK NHS-embedded randomized trial [J]. *Eur Heart J Digit Health*, 2022, 3(3): 426
- 55 Rivard L, Khairy P, Talajic M, et al. Blinded randomized trial of anticoagulation to prevent ischemic stroke and neurocognitive impairment in atrial fibrillation (BRAIN-AF): methods and design[J]. *Can J Cardiol*, 2019, 35(8): 1 069
- 56 Hart RG, Pearce LA, Aguilar MI. Meta-analysis: antithrombotic therapy to prevent stroke in patients who have nonvalvular atrial fibrillation[J]. *Ann Intern Med*, 2007, 146(12): 857
- 57 Ruff CT, Giugliano RP, Braunwald E, et al. Comparison of the efficacy and safety of new oral anticoagulants with warfarin in patients with atrial fibrillation: a meta-analysis of randomised trials[J]. *Lancet*, 2014, 383(9921): 955
- 58 Lozier MR, Sanchez AM, Lee JJ, et al. Thromboembolic outcomes of different anticoagulation strategies for patients with atrial fibrillation in the setting of hypertrophic cardiomyopathy: a systematic review[J]. *J Atr Fibrillation*, 2019, 12(4): 2 207
- 59 Guttman OP, Rahman MS, O'Mahony C, et al. Atrial fibrillation and thromboembolism in patients with hypertrophic cardiomyopathy: systematic review[J]. *Heart*, 2014, 100(6): 465
- 60 Guttman OP, Pavlou M, O'Mahony C, et al. Prediction of thromboembolic risk in patients with hypertrophic cardiomyopathy (HCM risk-CVA)[J]. *Eur J Heart Fail*, 2015, 17(8): 837
- 61 Vilches S, Fontana M, Gonzalez-Lopez E, et al. Systemic embolism in amyloid transthyretin cardiomyopathy [J]. *Eur J Heart Fail*, 2022, 24(8): 1 387
- 62 Lee SE, Park JK, Uhm JS, et al. Impact of atrial fibrillation on the clinical course of apical hypertrophic cardiomyopathy[J]. *Heart*, 2017, 103(19): 1 496
- 63 Hirota T, Kubo T, Baba Y, et al. Clinical profile of thromboembolic events in patients with hypertrophic cardiomyopathy in a regional Japanese cohort – results from Kochi RYOMA study[J]. *Circ J*, 2019, 83(8): 1 747
- 64 Hsu JC, Huang YT, Lin LY. Stroke risk in hypertrophic cardiomyopathy patients with atrial fibrillation: a nationwide database study[J]. *Aging (Albany NY)*, 2020, 12(23): 24 219
- 65 Chao TF, Lip GYH, Liu CJ, et al. Relationship of aging and incident comorbidities to stroke risk in patients with atrial fibrillation[J]. *J Am Coll Cardiol*, 2018, 71(2): 122
- 66 Weijis B, Dudink E, de Vos CB, et al. Idiopathic atrial fibrillation patients rapidly outgrow their low thromboembolic risk: a 10-year follow-up study[J]. *Neth Heart J*, 2019, 27(10): 487
- 67 Bezabhe WM, Bereznicki LR, Radford J, et al. Stroke risk reassessment and oral anticoagulant initiation in primary care patients with atrial fibrillation: A ten-year follow-up[J]. *Eur J Clin Invest*, 2021, 51(6): e13 489
- 68 Fauchier L, Bodin A, Bisson A, et al. Incident comorbidities, aging and the risk of stroke in 608,108 patients with atrial fibrillation: a nationwide analysis[J]. *J Clin Med*, 2020, 9(4): 1 234
- 69 Kirchhof P, Toennis T, Goette A, et al. Anticoagulation with edoxaban in patients with atrial high-rate episodes[J]. *N Engl J Med*, 2023, 389(13): 1 167
- 70 Healey JS, Lopes RD, Granger CB, et al. Apixaban for stroke prevention in subclinical atrial fibrillation[J]. *N Engl J Med*, 2024, 390(2): 107
- 71 Connolly SJ, Eikelboom J, Joyner C, et al. Apixaban in patients with atrial fibrillation[J]. *N Engl J Med*, 2011, 364(9): 806
- 72 van Walraven C, Hart RG, Singer DE, et al. Oral anticoagulants vs aspirin in nonvalvular atrial fibrillation: an individual patient meta-analysis[J]. *JAMA*, 2002, 288(19): 2 441
- 73 Hart RG, Pearce LA, Rothbart RM, et al. Stroke with intermittent atrial fibrillation: incidence and predictors during aspirin therapy. Stroke prevention in atrial fibrillation investigators [J]. *J Am Coll Cardiol*, 2000, 35(1): 183
- 74 Nieuwlaat R, Dinh T, Olsson SB, et al. Should we abandon the common practice of withholding oral anticoagulation in paroxysmal atrial fibrillation[J]? *Eur Heart J*, 2008, 29(7): 915
- 75 Hess PL, Sheng S, Matsouaka R, et al. Strict versus lenient versus poor rate control among patients with atrial fibrillation and heart failure (from the get with the guidelines—heart failure program)[J]. *Am J Cardiol*, 2020, 125(6): 894
- 76 Van Gelder IC, Groenveld HF, Crijns HJ, et al. Lenient versus strict rate control in patients with atrial fibrillation[J]. *N Engl J Med*, 2010, 362(15): 1 363
- 77 Olshansky B, Rosenfeld LE, Warner AL, et al. The Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM) study: approaches to control rate in atrial fibrillation[J]. *J Am Coll Cardiol*, 2004, 43(7): 1 201
- 78 Kotecha D, Bunting KV, Gill SK, et al. Effect of digoxin vs bi-

- soprolol for heart rate control in atrial fibrillation on patient-reported quality of life: the RATE-AF randomized clinical trial [J]. *JAMA*, 2020, 324(24): 2 497
- 79 Ulmoen SR, Enger S, Carlson J, et al. Comparison of four single-drug regimens on ventricular rate and arrhythmia-related symptoms in patients with permanent atrial fibrillation[J]. *Am J Cardiol*, 2013, 111(2): 225
- 80 Tisdale JE, Padhi ID, Goldberg AD, et al. A randomized, double-blind comparison of intravenous diltiazem and digoxin for atrial fibrillation after coronary artery bypass surgery[J]. *Am Heart J*, 1998, 135(5 Pt 1): 739
- 81 Brignole M, Pokushalov E, Pentimalli F, et al. A randomized controlled trial of atrioventricular junction ablation and cardiac resynchronization therapy in patients with permanent atrial fibrillation and narrow QRS[J]. *Eur Heart J*, 2018, 39(45): 3 999
- 82 Brignole M, Pentimalli F, Palmisano P, et al. AV junction ablation and cardiac resynchronization for patients with permanent atrial fibrillation and narrow QRS: the APAF-CRT mortality trial[J]. *Eur Heart J*, 2021, 42(46): 4 731
- 83 Hocini M, Sanders P, Deisenhofer I, et al. Reverse remodeling of sinus node function after catheter ablation of atrial fibrillation in patients with prolonged sinus pauses[J]. *Circulation*, 2003, 108(10): 1 172
- 84 Inada K, Yamane T, Tokutake K, et al. The role of successful catheter ablation in patients with paroxysmal atrial fibrillation and prolonged sinus pauses: outcome during a 5-year follow-up [J]. *Europace*, 2014, 16(2): 208
- 85 Chen YW, Bai R, Lin T, et al. Pacing or ablation: which is better for paroxysmal atrial fibrillation-related tachycardia-bradycardia syndrome[J]? *Pacing Clin Electrophysiol*, 2014, 37(4): 403
- 86 Zhang R, Wang Y, Yang M, et al. Risk stratification for atrial fibrillation and outcomes in tachycardia-bradycardia syndrome: ablation vs. pacing[J]. *Front Cardiovasc Med*, 2021, 8: 674 471
- 87 Zhang XD, Gu J, Jiang WF, et al. Optimal rhythm-control strategy for recurrent atrial tachycardia after catheter ablation of persistent atrial fibrillation: a randomized clinical trial[J]. *Eur Heart J*, 2014, 35(20): 1 327
- 88 Zhou L, He L, Wang W, et al. Effect of repeat catheter ablation vs. antiarrhythmic drug therapy among patients with recurrent atrial tachycardia/atrial fibrillation after atrial fibrillation catheter ablation: data from CHINA-AF registry[J]. *Europace*, 2023, 25(2): 382
- 89 Fink T, Metzner A, Willems S, et al. Procedural success, safety and patients satisfaction after second ablation of atrial fibrillation in the elderly: results from the German ablation registry [J]. *Clin Res Cardiol*, 2019, 108(12): 1 354
- 90 Wilber DJ, Pappone C, Neuzil P, et al. Comparison of antiarrhythmic drug therapy and radiofrequency catheter ablation in patients with paroxysmal atrial fibrillation: a randomized controlled trial[J]. *JAMA*, 2010, 303(4): 333
- 91 Calkins H, Reynolds MR, Spector P, et al. Treatment of atrial fibrillation with antiarrhythmic drugs or radiofrequency ablation: two systematic literature reviews and meta-analyses[J]. *Circ Arrhythm Electrophysiol*, 2009, 2(4): 349
- 92 Jais P, Cauchemez B, Macle L, et al. Catheter ablation versus antiarrhythmic drugs for atrial fibrillation: the A4 study[J]. *Circulation*, 2008, 118(24): 2 498
- 93 Packer DL, Kowal RC, Wheelan KR, et al. Cryoballoon ablation of pulmonary veins for paroxysmal atrial fibrillation: first results of the North American Arctic Front (STOP AF) pivotal trial[J]. *J Am Coll Cardiol*, 2013, 61(16): 1 713
- 94 Poole JE, Bahnsen TD, Monahan KH, et al. Recurrence of atrial fibrillation after catheter ablation or antiarrhythmic drug therapy in the CABANA trial[J]. *J Am Coll Cardiol*, 2020, 75(25): 3 105
- 95 Mont L, Bisbal F, Hernandez-Madrid A, et al. Catheter ablation vs. antiarrhythmic drug treatment of persistent atrial fibrillation: a multicentre, randomized, controlled trial (SARA study)[J]. *Eur Heart J*, 2014, 35(8): 501
- 96 Scherr D, Khairy P, Miyazaki S, et al. Five-year outcome of catheter ablation of persistent atrial fibrillation using termination of atrial fibrillation as a procedural endpoint[J]. *Circ Arrhythm Electrophysiol*, 2015, 8(1): 18
- 97 Morillo CA, Verma A, Connolly SJ, et al. Radiofrequency ablation vs antiarrhythmic drugs as first-line treatment of paroxysmal atrial fibrillation (RAAFT-2): a randomized trial[J]. *JAMA*, 2014, 311(7): 692
- 98 Oral H, Pappone C, Chugh A, et al. Circumferential pulmonary-vein ablation for chronic atrial fibrillation[J]. *N Engl J Med*, 2006, 354(9): 934
- 99 Yan Huo TG, Schünbauer R, Wójcik M, et al. Low-voltage myocardium-guided ablation trial of persistent atrial fibrillation [J]. *NEJM Evid*, 2022, 1(11): EVIDo2 200 141
- 100 Reddy VY, Gerstenfeld EP, Natale A, et al. Pulsed field or conventional thermal ablation for paroxysmal atrial fibrillation [J]. *N Engl J Med*, 2023, 389(18): 1 660
- 101 Heijman J, Linz D, Schotten U. Dynamics of atrial fibrillation mechanisms and comorbidities[J]. *Annu Rev Physiol*, 2021, 83: 83
- 102 Fabritz L, Crijns H, Guasch E, et al. Dynamic risk assessment to improve quality of care in patients with atrial fibrillation: the 7th AFNET/EHRA consensus conference[J]. *Europace*, 2021, 23(3): 329
- 103 Brandes A, Smit MD, Nguyen BO, et al. Risk factor management in atrial fibrillation[J]. *Arrhythm Electrophysiol Rev*, 2018, 7(2): 118

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