

心房颤动合并心力衰竭的导管消融治疗

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【摘要】 心房颤动和心力衰竭是常见的心血管疾病,二者关系密切并可相互影响。近年来,随着导管消融技术的不断发展成熟,其在心房颤动伴心力衰竭患者中的治疗价值也日益提高。现结合最新研究进展进一步阐述导管消融在不同条件下的临床价值,以期为临床治疗提供参考。

【关键词】 心房颤动;心力衰竭;导管消融;心肌病

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Role of Radiofrequency Ablation in Patients with Atrial Fibrillation and Heart Failure

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【Abstract】 Atrial fibrillation and heart failure are common cardiovascular diseases, they are closely related and can influence each other. In recent years, with the development and maturity of catheter ablation technology, its value in the treatment of patients with atrial fibrillation associated with heart failure has also increased significantly. In this paper, the clinical value of catheter ablation under different conditions will be further elaborated based on the latest research progress, so as to provide reference for clinical treatment.

【Key words】 Atrial fibrillation; Heart failure; Catheter ablation; Cardiomyopathy

临床上,心房颤动(房颤)和心力衰竭(心衰)二者关系密切——房颤既可导致心衰(房颤诱导的心律失常性心肌病),又可作为心衰的电学表现而进一步加重心衰(图1)^[1]。10%~50%的心衰患者会伴发房颤,而房颤也可使心衰的发生率增加5倍。由于二者均可导致不良预后,因而临床上需对其进行兼顾而优化的管理。相比于药物治疗,导管消融在房颤节律控制领域具有显著优势,尽管CABANA研究^[2]未显示房颤患者在硬终点上的获益,但对于合并心衰的房颤患者,导管消融的价值已得到既往多项研究的肯定(表1)^[3-9],因其可潜在降低这类患者的死亡率和心衰住院率,2019版AHA/ACC/HRS房颤指南更新将症状性房颤伴左心室射血分数降低性心衰(heart failure with reduced ejection fraction, HFrEF)列为导管消融Ⅱb类适应证^[10]。此外,与胺碘酮相比,导管消融可显著降低HFrEF患者的房颤复发率,并有助于心功能的恢复^[11]。因而中国将心衰合并房颤列为射频消融的Ⅱa类推荐^[12]。由此可见,导管消融已成为房颤合并心衰患者的重要治疗手段。现结合最新研究进展进一步阐

述不同临床条件下导管消融的临床价值。

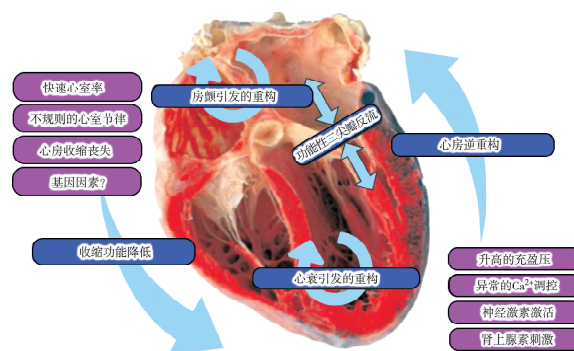


图1 心衰和房颤相互影响的机制^[1]

1 房颤合并不同类型的心衰

1.1 HFrEF

房颤的治疗原则为抗凝、室率控制及节律控制^[13],而对于合并心衰的患者,还应实施规范化抗心衰治疗。后期研究认为节律控制优于室率控制,一方面,是由于恢复窦性心律本身就有利于缓解症状,改善血流动力学,维持心房的正常收缩和充盈压,减少电/解剖重构,从而改善心功能。另一方面,早期研究的节

律控制手段是服用抗心律失常药 (antiarrhythmic drugs, AAD), 其维持窦性心律对于死亡率的潜在益处可能已被 AAD 的副作用所抵消。导管消融因能更有效地维持窦性心律并规避 AAD 的副作用, 因而成为房颤伴 HFrEF 患者的有效治疗手段^[9], 目前 ESC 指南也将有症状的阵发性房颤作为导管消融的 I 类适应证^[11]。此外, 这也是导管消融技术不断发展和术者水

平不断提高的结果。消融导管技术的两个重要里程碑是开放灌注系统和接触力传感系统的发展, STSF 导管的问世将两种技术同时集成在一根导管内。相比于 ST 导管, STSF 导管显示出了更高的安全性和有效性^[14]。消融指数的发明, 又开启了射频消融的新时代, 消融指数指导下的高功率短时程消融也具有更高的消融成功率及更低的并发症发生率^[15-18]。

表 1 房颤合并心衰患者导管消融的有效性评估

年份	纳入人数	LVEF	房颤类型	主要结果	研究来源
2004	116	<45%	持续性 (91%) 阵发性 (9%)	LVEF 改善	[3]
2004	377	<40%	持续性 (57%) 阵发性 (43%)	LVEF 无显著改善	[4]
2008	81	<40%	持续性 (50%) 阵发性 (50%)	射频消融优于房室结消融联合起搏器植入	[5]
2011	41	<35%	持续性 (100%)	射频消融优于药物节律控制	[6]
2013	52	≤35%	持续性 (100%)	射频消融优于室率控制	[7]
2014	50	<50%	持续性 (100%)	射频消融优于室率控制	[8]
2016	203	<40%	持续性 (100%)	射频消融优于胺碘酮	[9]
2017	101	≤45%	持续性 (78%) 阵发性 (22%)	射频消融优于室率控制	[1]

注: LVEF: 左室射血分数。

CAMTAF 研究^[8]认为与室率控制相比, 导管消融可改善持续性房颤伴心衰患者的左室功能和生活质量, 减轻心衰症状。新近完成的 CASTLE-AF 研究^[19]认为心衰伴房颤患者导管消融治疗的复合终点事件 (全因死亡及心衰再入院) 发生率明显低于药物治疗, 且能降低房颤负荷, 提高左室射血分数 (left ventricular ejection fraction, LVEF)。AMICA 研究^[20]则认为房颤射频消融相比 AAD 有更高的窦性心律维持率, 但对于心功能的改善并无明显优势。一项荟萃分析纳入了 7 项研究共计 856 例 HFrEF 患者, 结果显示与药物治疗相比, 导管消融可降低全因死亡率、减少房颤复发、提高 LVEF, 且不增加并发症发生率^[21]。Long 等^[22]的研究纳入了三组房颤患者: 120 例首次接受消融治疗的心衰患者, 150 例接受药物治疗的心衰患者, 以及 150 例 LVEF 正常的患者, 结果同样支持导管消融更具优势。

1.2 射血分数正常的心衰

射血分数正常的心衰 (heart failure with normal ejection fraction, HFNEF) 是指有心衰症状且脑钠肽升高, 但 LVEF ≥ 50%, 通常伴有相关结构性心脏病或舒张功能障碍的心衰^[23]。目前对 HFNEF 患者房

颤机制的理解大多源自 HFrEF 实验模型, 包括心房纤维化、Ca²⁺ 调控和电学重构等几方面 (图 2)^[24]。其中心房纤维化, 即 HFNEF 相关的左房重构, 不仅能引发房颤, 还能导致左房的功能障碍, 进而使 HFNEF 进一步恶化。虽然房颤与 HFNEF 和 HFrEF 均有关, 但在 HFNEF 患者中更多见; 在房颤负荷方面, HFNEF 患者相对较重^[25], 且房颤似乎不影响 HFNEF 患者再入院率^[26]; 在死亡率方面, HFNEF 和 HFrEF 患者是相似的^[25]。从心房基质角度看, HFrEF 更易发生左房重构, 其直径和容量也相应增大; 但 HFNEF 中更强的动脉搏动及更大的压力导致左房僵硬度增加^[27], 进而引起左室舒张功能障碍, 这也是 HFNEF 的重要特征, 可进一步加重左房重构, 促进房颤的发生发展。因此, 不同类型心衰驱动房颤的电学基质可能是不同的, 其对于房颤的影响也可能不同, 进而消融对于不同类型心衰伴房颤患者的疗效也可能存在差异。

虽然临床研究通常以左心室收缩功能障碍患者作为研究对象, 但近年来涌现出多项针对 HFNEF 患者评估房颤导管消融疗效的研究。Black-Maier 等^[28]的回顾性研究显示, 在房颤伴心衰患者中, 尽管导管消融

对 HFNEF 和 HFrEF 患者的房颤复发率和心功能改善无明显差异,但对于 HFNEF 患者的症状有显著改善。Fukui 等^[29]的回顾性研究纳入了 85 例伴 HFNEF 的房颤患者,相比药物治疗,导管消融能显著降低心衰再入院率,且可作为心衰再住院的唯一预防因素 (OR 0.15, 95% CI 0.04~0.46, $P<0.01$)。最近另一项大型回顾性研究表明,对于老年房颤伴 HFNEF 患者,节律控制(射频消融、AAD、电复律或外科手术)相比室率控制能更为有效地降低全因死亡率^[30]。Machino-Ohtsuka 等^[31]也认为消融联合药物治疗可安全有效地治疗房颤伴 HFNEF,然而许多患者需多次手术且术后需辅以药物。该团队近日进一步证明了维持窦性心律在房颤伴 HFNEF 患者中对于心血管死亡和心衰再住院风险的益处^[32]。Vecchio 等^[33]的研究同样证明射频消融可改善房颤伴 HFNEF 患者的心衰症状,降低

心衰再住院率。荟萃分析显示,尽管房颤伴 HFNEF 和伴 HFrEF 的患者在卒中和系统性栓塞发生率方面相似,但 HFNEF 患者的全因死亡率更低^[34]。由于房颤是舒张功能衰竭的常见原因,而舒张功能衰竭又容易导致房颤复发,因此 HFNEF 患者也将受益于导管消融。另外,对于部分药物治疗不理想的患者,除了常规的环肺静脉电隔离外,房室结消融联合希氏束起搏也不失为一种选择,Huang 等^[35]的研究认为这种方法也能明显改善房颤伴 HFNEF/HFrEF 患者的超声心动图指标和 NYHA 分级,并且减少利尿剂的使用。然而,基于复杂的病理生理学改变和多变的临床表现,以及目前尚缺乏具备可靠疗效的药物,HFNEF 仍是一个巨大的临床挑战。导管消融是否能改善房颤伴 HFNEF 患者的症状和死亡率仍需进一步大规模研究来证实。

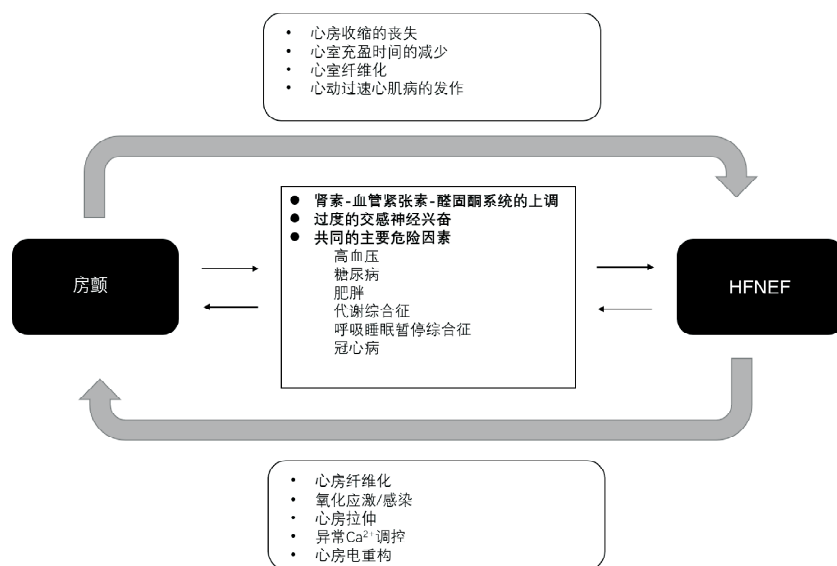


图2 房颤与 HFNEF 相互影响的机制^[24]

2 房颤合并因心肌病导致的心衰

2.1 肥厚型心肌病

肥厚型心肌病 (hypertrophic cardiomyopathy, HCM) 患者发生房颤通常会导致临床状态、心功能和生活质量恶化,同时也是卒中和死亡的独立危险因素。这方面研究相对较少,结果也并不统一。Magnusson 等^[36]的研究表明,HCM 患者在出现房颤或心衰时临床结果会更差。而 Rowin 等^[37]的回顾性研究显示,房颤大约见于 20% 的 HCM 患者,但它对心衰发生率和猝死率无显著影响。总之,对于 HCM 伴房颤的患者,导管消融是长期维持窦性心律的有效手段(尤其是阵发性房颤),这将有助于改善 HCM 患者的舒张功能并延缓血流动力学恶化进程,故中国将其列为 II a 类适应证^[12]。

2.2 扩张型心肌病

新近一项动物实验表明,扩张型心肌病 (dilated cardiomyopathy, DCM) 患者伴发房颤和心衰同预期寿命降低和心源性死亡相关^[38]。针对不可逆结构改变程度较轻的患者,导管消融可恢复并维持窦性心律,并且可改善 LVEF。在 DCM 患者中,目前常用的消融策略包括环肺静脉电隔离、线性消融和心房碎裂电位消融。研究表明,伴有 DCM 并不影响其 5 年内的无房颤生存率;窦性心律的维持也有利于消融后 3 年内心功能的改善^[39]。与缺血性心肌病相比,房室结消融联合双心室起搏对继发于 DCM 的房颤和心衰有更好的疗效,可改善心脏重构,降低心衰住院率并减少植入式心律转复除颤器的应用必要性^[40]。

3 房颤合并接受左室辅助装置治疗的心衰

左室辅助装置 (left ventricular assist device, LVAD) 是难治性心衰患者的有效手段; 然而 46% ~ 52% 接受 LVAD 治疗的患者伴有房颤, 且新发房颤发生率约为 11%^[41]。

血栓形成和血栓栓塞仍是 LVAD 治疗中的主要不良事件, 年发生率为 6% ~ 8%^[42]。尽管房颤在接受 LVAD 的患者中非常普遍, 但其对于预后的影响尚不明确, 射频消融相关研究也非常有限。一项来自德国的回顾性分析研究了伴有房颤的 LVAD 患者, 表明尽管房颤和窦性心律组的术前危险因素特征不同, 但术前心律对生存率、血栓和栓塞发生率均无影响, 故迷宫手术、导管消融或左心耳封堵的价值值得怀疑^[42]。另一项研究分析了患者的预后, 结果发现在接受 LVAD 的患者中, 术前房颤并未降低患者围术期以及长期生存率, 也并不增加脑卒中风险, 因此在 LVAD 植入过程中进行房颤消融可能并无必要^[43]。

4 总结

房颤常与心衰共存, 引起生活质量下降和死亡率增加。以抗凝治疗、心率或节律控制为主的传统治疗, 在房颤合并心衰的患者中仍不可缺少, 同时针对心衰的治疗也同样重要。而导管消融作为更好的节律控制手段, 相比 AAD 有更显著的疗效和更小的副作用, 其疗效在多项研究中已得到充分证实。在房颤合并心衰 (尤其是 HF_{rEF}) 的患者中, 导管消融的成功率和并发症发生率与无心衰患者相似, 然而心衰患者术后左心功能和生活质量均明显改善, 因此指南针对无射频消融禁忌证的心衰患者, 推荐进行房颤导管消融治疗^[12]。但对于某些类型的心衰患者, 如 HF_{NEF}、伴有心肌病或瓣膜性心脏病的患者, 导管消融的效果尚不确定, 还需开展更多研究并细化临床适应证。随着术者经验的丰富, 相关器械的不断改进以及消融策略的不断完善, 导管消融在房颤伴心衰患者的治疗中前景光明。

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