

冠心病合并重度颈动脉狭窄的血运重建

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【摘要】 动脉粥样硬化是临床常见的慢性系统性血管病变,可引起冠心病和颈动脉狭窄,二者常共病且互为血运重建手术后并发症的重要危险因素,如何选择血运重建策略尚未达成共识。本文综述冠心病合并颈动脉狭窄的流行病学和血运重建策略,以为共病的有效治疗提供理论依据。

【关键词】 冠心病; 颈动脉狭窄; 血流动力学; 综述

Revascularization strategy of coronary artery heart disease combined with severe carotid artery stenosis

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【Abstract】 Atherosclerosis is a common chronic systemic vascular disease that can cause coronary artery heart disease (CHD) and carotid artery stenosis. CHD and carotid artery stenosis usually coexist, and they are important risk factors for complications after revascularization. There is still no consensus on how to choose a revascularization strategy when both diseases are present. This article reviews the epidemiology and revascularization strategies of CHD combined with carotid artery stenosis in order to provide a theoretical basis for the effective treatment of comorbidity.

【Key words】 Coronary disease; Carotid stenosis; Hemodynamics; Review

Conflicts of interest: none declared

动脉粥样硬化是临床常见的慢性系统性血管病变^[1],累及冠状动脉可引起冠心病,导致心绞痛或心肌梗死;累及颈动脉可引起颈动脉狭窄,导致短暂性脑缺血发作(TIA)或脑卒中。由于具有相同的病理生理学机制,冠心病患者常伴发颈动脉狭窄,当冠状动脉和颈动脉狭窄病变同时具备临床干预指征时,最佳血运重建策略尚未达成共识,若先行冠状动脉血运重建可能增加围手术期卒中风险,若先行颈动脉血运重建亦可能增加围手术期心肌梗死风险,因此,冠心病与颈动脉狭窄互为血运重建手术后并发症的重要危险因素^[2,4]。目前指南并未对冠心病合并颈动脉狭窄的血运重建方式作出明确推荐^[5-10],一直是国内外研究热点。本文拟综述冠心病合并颈动脉狭窄流行病学及血运重建策

略,以为共病的有效治疗提供理论依据。

一、流行病学

随着社会经济的发展以及人口老龄化的加剧,我国心脑血管疾病发病率持续升高^[11-12],且二者共病现象临床并不少见^[4,13-15]。冠心病患者颈动脉狭窄患病率较高:有研究对 1405 例疑似冠心病患者行冠状动脉造影及颈动脉超声,1116 例经冠状动脉造影明确诊断为冠心病,其中 5.20% (58/1116) 合并重度颈动脉狭窄(狭窄率 > 70%)^[13];国内一项纳入 989 例疑似冠心病患者的研究显示,病变累及 0、1、2 和 3 支冠状动脉的患者颈动脉狭窄率 ≥ 50% 的发生率分别为 10.29% (14/136)、13.09% (25/191)、19.92% (49/246) 和 22.84% (95/416),且颈动脉狭窄程度与冠状动脉狭窄程度呈正相关关系 ($r = 0.194, P < 0.001$)^[16];日本一项纳入 632 例冠心病患者的临床研究发现,冠状动脉 0、1、2 和 3 支病变患者颈动脉狭窄率 > 50% 的发生率分别为 7.04% (14/199)、14.52% (18/124)、21.37% (28/131) 和 35.96% (64/178)^[17];拟行冠状动脉旁路移植术(CABG)的患者

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颈动脉狭窄患病率为 3% ~ 36%^[4,7,18-22]。颈动脉狭窄患者冠心病患病率亦较高:多项随机对照临床试验结果显示,颈动脉狭窄患者冠心病患病率达 8% ~ 86%^[4,13-15,18,20,23-25],且冠状动脉狭窄程度与颈动脉狭窄程度存在一定相关性,重度颈动脉狭窄患者合并冠心病的比例更高^[26]。因此,积极筛查冠心病合并颈动脉狭窄,及时予以合理的规范化治疗,对提高患者预后具有重要意义。

二、治疗策略

对于冠状动脉或颈动脉狭窄程度较轻且病情平稳的患者,可予以药物治疗并定期随访观察,若狭窄程度较严重,血运重建是有效治疗手段^[4]。冠心病血运重建方式主要为冠状动脉旁路移植术和经皮冠状动脉介入术(PCI)^[10],颈动脉狭窄血运重建方式主要为颈动脉内膜切除术(CEA)和颈动脉支架成形术(CAS)^[27],二者共病且具有血运重建指征时,对单一血管病变进行处理有可能诱发其他血管病变并发症,临床医师应在掌握不同术式特点的基础上结合血管病变、患者意愿等因素,综合评估后选择适宜的血运重建方式,实现血运重建的同时减少并发症的发生。

1. 颈动脉内膜切除术联合冠状动脉旁路移植术 颈动脉内膜切除术是治疗颈动脉狭窄的最经典术式,是预防脑卒中的有效方法。对于具有血运重建指征的重度颈动脉狭窄患者,欧洲卒中组织(ESO)制定的《颈动脉狭窄内膜切除术和支架成形术指南》^[28]以及我国《颈动脉狭窄诊治指南》^[29]均推荐首选颈动脉内膜切除术,其疗效确切,视为症状性颈动脉中度和重度狭窄的标准治疗方法。对于冠状动脉造影提示具有冠状动脉旁路移植术指征且颈动脉狭窄程度符合颈动脉内膜切除术指征的患者,可考虑颈动脉内膜切除术联合冠状动脉旁路移植术同期或分期手术。重度颈动脉狭窄是冠状动脉旁路移植术患者围手术期脑卒中的重要危险因素,可能与术中血流动力学波动较大相关。研究显示,接受冠状动脉旁路移植术的颈动脉狭窄患者围手术期脑卒中发生率为 3% ~ 11%,并与颈动脉狭窄程度相关^[2,4]。先行冠状动脉旁路移植术再行颈动脉内膜切除术的患者围手术期脑卒中风险较高,该术式更多适用于冠状动脉病变严重且易出现循环不稳定的患者,临床应用较少,而对于冠状动脉病变相对平稳的患者通常采取颈动脉内膜切除术联合冠状动脉旁路移植术同期手术或先行颈动脉

内膜切除术再行冠状动脉旁路移植术的分期手术策略^[4]。国内外多项研究证实,颈动脉内膜切除术联合冠状动脉旁路移植术治疗冠心病合并颈动脉狭窄安全、有效^[20-21,30-32]。一项 Meta 分析纳入 19 项临床研究计 39 269 例颈动脉内膜切除术联合冠状动脉旁路移植术同期手术患者和 300 066 例分期手术患者,对比两种术式术后早期不良事件发生率及远期预后,结果显示,同期手术组术后早期病死率以及脑卒中、短暂性脑缺血发作发生率高于分期手术组,心肌缺血发生率低于分期手术组,而两组远期病死率以及脑卒中、心肌缺血发生率无明显差异^[3]。因此,对于拟行颈动脉内膜切除术联合冠状动脉旁路移植术的患者,应综合评估冠状动脉和颈动脉病变程度以制定同期或分期手术方案。

2. 颈动脉支架成形术联合冠状动脉旁路移植术 尽管颈动脉内膜切除术是治疗颈动脉狭窄的主要方法,但并非适用所有颈动脉狭窄病变,对于合并严重心肺功能障碍、病变解剖结构复杂、无法耐受全身麻醉的颈动脉内膜切除术高风险、颈动脉夹层、串联病变、双侧颈动脉狭窄患者,颈动脉支架成形术更为适用^[28-29]。随着介入技术的发展,颈动脉支架成形术日趋成熟,逐渐成为颈动脉内膜切除术的可靠替代方法。研究显示,对于 70 岁以下的颈动脉狭窄患者,颈动脉支架成形术与颈动脉内膜切除术的围手术期并发症风险和同侧脑卒中风险无明显差异^[28]。颈动脉支架成形术微创和较高安全性的特点,使其联合冠状动脉旁路移植术同期或分期手术逐渐应用于临床,且联合手术有效性和安全性得到广泛证实^[2,19,33-34]。首都医科大学附属北京安贞医院开展的回顾性研究对比颈动脉支架成形术(25 例)与颈动脉内膜切除术(63 例)联合冠状动脉旁路移植术同期手术后早期不良事件及中期随访结果,结果显示,颈动脉支架成形术联合冠状动脉旁路移植术治疗冠心病合并重度颈动脉狭窄安全、有效,而颈动脉内膜切除术联合冠状动脉旁路移植术是术后早期死亡的重要危险因素($HR = 13.150, 95\%CI: 1.100 \sim 157.690; P = 0.040$);进一步行 Cox 比例风险回归分析显示,纽约心脏协会(NYHA)心功能分级 IV 级和既往心肌梗死病史是颈动脉内膜切除术联合冠状动脉旁路移植术患者中期随访死亡的危险因素($HR = 5.010, 95\%CI: 1.160 \sim 21.640; P = 0.030$)^[2]。因此,对于心功能较差或冠状动脉严重病变易诱发急性心肌缺血的患者,颈动脉

支架成形术联合冠状动脉旁路移植术可能更安全。一项回顾性研究纳入 69 例行颈动脉支架成形术联合冠状动脉旁路移植术同期手术患者,术后 30 天内无一例死亡,脑卒中和急性心肌缺血发生率均为 1.45% (1/69); 术后平均随访 28 个月,随访期间未发生急性心肌缺血,脑卒中发生率为 4.35% (3/69), 总体生存率为 91.30% (63/69), 表明该治疗策略安全、有效^[33]。2022 年,国内一项单中心临床研究同样证实颈动脉支架成形术联合冠状动脉旁路移植术同期手术安全、可行,同期手术组与分期手术组患者累计手术时间、机械通气比例、重症监护病房(ICU)留观时间以及围手术期脑卒中、心肌梗死发生率均无明显差异,术后 3 个月随访时两组新发脑卒中比例和心功能分级亦无明显差异,同期手术组术中出血量高于分期手术组,但均无需开胸止血,究其原因,同期手术前需持续应用抗血小板药物,这是否增加术中出血风险以及如何进行抗凝治疗和抗血小板治疗以最大限度避免出血和血栓形成相关并发症,尚待进一步探究^[19]。

3. 颈动脉支架成形术联合经皮冠状动脉介入术 血管内介入治疗与其他血运重建方式相比具有微创特点,更加适用于无法耐受外科手术的复杂高危患者^[4]。目前关于颈动脉支架成形术联合经皮冠状动脉介入术的报道较少,意大利开展的一项前瞻性多中心研究纳入 239 例行颈动脉支架成形术联合经皮冠状动脉介入术同期(38 例)或分期(192 例)手术患者,结果显示,术后 30 天心脑血管事件发生率为 5.86% (14/239)、术后随访 2 年时为 10.04% (24/239), 均低于既往研究结果,但分期手术与同期手术之间无显著差异^[35]。然而,上述研究均基于临床资源丰富的医学中心开展,由熟练掌握血管病变治疗技术的专家团队合作完成,是否具有广泛适用性尚待进一步证实。

4. 颈动脉内膜切除术联合经皮冠状动脉介入术 先行经皮冠状动脉介入术再择期行颈动脉内膜切除术的主要问题为,术前是否需停用双联抗血小板药以降低颈动脉内膜切除术中和术后早期出血风险。颈动脉内膜切除术前停用抗血小板药虽可降低出血风险,但增加冠状动脉支架内血栓形成风险。研究显示,颈动脉内膜切除术前维持双联抗血小板治疗可以降低术后病死率和缺血性卒中风险,且不增加出血风险^[36-37]。如何衔接两次手术之间的抗凝治疗和抗血小板治疗策略以降低出血和

血栓形成相关并发症风险,尚待进一步探索。若先行颈动脉内膜切除术再择期行经皮冠状动脉介入术,虽然无需考虑手术间期抗凝治疗与抗血小板治疗的衔接问题,但颈动脉内膜切除术可能引起血流动力学改变,增加急性冠状动脉缺血或心肌梗死风险^[38],故极少采用。关于是否可以同期行颈动脉内膜切除术联合经皮冠状动脉介入术,目前尚无定论,有研究认为这两种术式在抗血小板治疗与血流动力学改变方面互有不利影响,因此不推荐^[4]。

综上所述,冠心病合并颈动脉狭窄临床并不少见,因其治疗难度大、风险高,目前尚无统一指南或专家共识,尚待大样本随机对照试验和长期随访研究以指导临床治疗方案的选择。在冠心病合并重度颈动脉狭窄血运重建策略的选择过程中,临床医师应充分评估病变,根据患者整体状况,结合现有医疗资源,选择合理的血运重建方式,制定个体化治疗方案,使患者获益最大化。

利益冲突 无

参 考 文 献

- [1] Ridker PM, Stampfer MJ, Rifai N. Novel risk factors for systemic atherosclerosis: a comparison of C-reactive protein, fibrinogen, homocysteine, lipoprotein(a), and standard cholesterol screening as predictors of peripheral arterial disease [J]. *JAMA*, 2001, 285:2481-2485.
- [2] Jia S, Wang M, Gong M, Zhang H, Jiang W. Midterm outcomes of simultaneous carotid revascularization combined with coronary artery bypass grafting [J]. *BMC Cardiovasc Disord*, 2022, 22:535.
- [3] Peng C, Yang YF, Zhao Y, Yang XY. Staged versus synchronous carotid endarterectomy and coronary artery bypass grafting: a Meta-analysis and systematic review [J]. *Ann Vasc Surg*, 2022, 86:428-439.
- [4] Beijing Neurology Association; Beijing Society of Cardiology. Expert consensus on simultaneous revascularization of carotid artery and coronary artery [J]. *Zhongguo Nao Xue Guan Bing Za Zhi*, 2020, 17:772-783. [北京神经内科学会, 北京心脏学会. 颈动脉与冠状动脉同期血运重建专家共识 [J]. *中国脑血管病杂志*, 2020, 17:772-783.]
- [5] Drakopoulou M, Oikonomou G, Soulaïdopoulos S, Toutouzas K, Tousoulis D. Management of patients with concomitant coronary and carotid artery disease [J]. *Expert Rev Cardiovasc Ther*, 2019, 17:575-583.
- [6] Poi MJ, Echeverria A, Lin PH. Contemporary management of patients with concomitant coronary and carotid artery disease [J]. *World J Surg*, 2018, 42:272-282.
- [7] Manthey S, Spears J, Goldberg S. Coexisting coronary and carotid artery disease: which technique and in which order? Case report and review of literature [J]. *Clin Med Insights Cardiol*, 2020, 14:1179546820951797.
- [8] Lawton JS, Tamis-Holland JE, Bangalore S, Bates ER, Beckie TM, Bischoff JM, Bittl JA, Cohen MG, DiMaio JM, Don CW, Fremes SE, Gaudino MF, Goldberger ZD, Grant MC, Jaswal JB, Kurlansky PA, Mehran R, Metkus TS Jr, Nnacheta LC, Rao SV,

- Sellke FW, Sharma G, Yong CM, Zwischenberger BA. 2021 ACC/AHA/SCAI guideline for coronary artery revascularization: a report of the American College of Cardiology/American Heart Association Joint Committee on clinical practice guidelines[J]. *Circulation*, 2022, 145:e18-e114.
- [9] Naylor R, Rantner B, Ancetti S, de Borst GJ, De Carlo M, Halliday A, Kakkos SK, Markos HS, McCabe DJH, Sillesen H, van den Berg JC, Vega de Ceniga M, Venermo MA, Vermassen FEG; ESVS Guidelines Committee; Antoniou GA, Bastos Goncalves F, Bjorck M, Chakfe N, Coscas R, Dias NV, Dick F, Hinchliffe RJ, Kolh P, Koncar IB, Lindholt JS, Mees BME, Resch TA, Trimarchi S, Tulamo R, Twine CP, Wanhainen A, Document Reviewers, Bellmunt-Montoya S, Bulbulia R, Darling RC 3rd, Eckstein HH, Giannoukas A, Koelemay MJW, Lindström D, Schermerhorn M, Stone DH. Editor's choice: European Society for Vascular Surgery (ESVS) 2023 clinical practice guidelines on the management of atherosclerotic carotid and vertebral artery disease [J]. *Eur J Vasc Endovasc Surg*, 2023, 65:7-111.
- [10] Lawton JS, Tamis-Holland JE, Bangalore S, Bates ER, Beckie TM, Bischoff JM, Bittl JA, Cohen MG, DiMaio JM, Don CW, Fremes SE, Gaudino MF, Goldberger ZD, Grant MC, Jaswal JB, Kurlansky PA, Mehran R, Metkus TS Jr, Nnacheta LC, Rao SV, Sellke FW, Sharma G, Yong CM, Zwischenberger BA. 2021 ACC/AHA/SCAI guideline for coronary artery revascularization: executive summary. A report of the American College of Cardiology/American Heart Association Joint Committee on clinical practice guidelines[J]. *Circulation*, 2022, 145:e4-e17.
- [11] Writing Committee of Report on Cardiovascular Health and Diseases in China 2022. Overview of report on cardiovascular health and diseases in China 2022[J]. *Zhongguo Xin Xue Guan Bing Yan Jiu*, 2023, 21:577-600.[《中国心血管健康与疾病报告 2022》编写组.《中国心血管健康与疾病报告 2022》概述[J]. *中国心血管病研究*, 2023, 21:577-600.]
- [12] Wang YJ, Li ZX, Gu HQ, Zhai Y, Jiang Y, Zhou Q, Zhao XQ, Wang YL, Yang X, Wang CJ, Meng X, Li H, Liu LP, Jin J, Wu J, Xu AD, Dong Q, WANG D, Wang WZ, Ma XD, Zhao JZ; Writing Committee of China Stroke Report. China stroke report 2020 (Chinese version) (1) [J]. *Zhongguo Zu Zhong Za Zhi*, 2022, 17:433-447.[王拥军, 李子孝, 谷鸿秋, 翟屹, 姜勇, 周齐, 赵性泉, 王伊龙, 杨昕, 王春娟, 孟霞, 李昊, 刘丽萍, 荆京, 吴静, 徐安定, 董强, David WANG, 王文志, 马旭东, 赵继宗;《中国卒中报告》编写委员会. *中国卒中报告 2020(中文版)* (1)[J]. *中国卒中杂志*, 2022, 17:433-447.]
- [13] Steinvil A, Sadeh B, Arbel Y, Justo D, Belei A, Borenstein N, Banai S, Halkin A. Prevalence and predictors of concomitant carotid and coronary artery atherosclerotic disease [J]. *J Am Coll Cardiol*, 2011, 57:779-783.
- [14] Squizzato F, Spertino A, Lupia M, Grego F, Gerosa G, Tarantini G, Piazza M, Antonello M. Prevalence, risk factors, and clinical effect of coronary artery disease in patients with asymptomatic bilateral carotid stenosis[J]. *J Vasc Surg*, 2023, 77:1182-1191.e1.
- [15] Sulženko J, Paluszek P, Machnik R, Widimský P, Jarkovský J, Pieniazek P. Prevalence and predictors of coronary artery disease in patients undergoing carotid artery stenting[J]. *Coron Artery Dis*, 2019, 30:204-210.
- [16] Zhang J, Xu R, Liu P, Fan X, Ye Z. Prevalence of carotid artery stenosis in Chinese patients with angina pectoris [J]. *J Thorac Dis*, 2015, 7:2300-2306.
- [17] Tanimoto S, Ikari Y, Tanabe K, Yachi S, Nakajima H, Nakayama T, Hatori M, Nakazawa G, Onuma Y, Higashikuni Y, Yamamoto H, Tooda E, Hara K. Prevalence of carotid artery stenosis in patients with coronary artery disease in Japanese population[J]. *Stroke*, 2005, 36:2094-2098.
- [18] Giannopoulos S, Texakalidis P, Charisis N, Jonnalagadda AK, Chaitidis N, Giannopoulos S, Kaskoutis C, Machinis T, Koullias GJ. Synchronous carotid endarterectomy and coronary artery bypass graft versus staged carotid artery stenting and coronary artery bypass graft for patients with concomitant severe coronary and carotid stenosis: a systematic review and Meta-analysis[J]. *Ann Vasc Surg*, 2020, 62:463-473.e4.
- [19] Liang L, Zheng TJ, Liu JJ, Ma XL, Pan F, Geng DQ, Zhao GX, Chi LQ. Early effects of simultaneous carotid artery stenting combined with off-pump coronary artery bypass grafting in the treatment of severe coronary heart disease complicated with carotid artery stenosis[J]. *Zhonghua Xiong Xin Xue Guan Wai Ke Za Zhi*, 2022, 38:80-83.[梁林, 郑铁晋, 柳佳吉, 马小龙, 潘锋, 耿丹青, 赵广鑫, 迟立群. “一站式”颈动脉支架置入加不停跳冠状动脉旁路移植治疗重度冠心病合并颈动脉狭窄的早期疗效分析[J]. *中华胸心血管外科杂志*, 2022, 38:80-83.]
- [20] Li WH, Zhang XM, Zhang T, Chen Y, Liu G, Chen SL, Yang W, Li W, Zhang XM. Outcomes of simultaneous carotid endarterectomy and coronary artery bypass grafting for patients with concomitant carotid artery stenosis and coronary artery disease[J]. *Zhonghua Pu Tong Wai Ke Za Zhi*, 2021, 36:30-33.[李伟浩, 张学民, 张韬, 陈彧, 刘刚, 陈生龙, 杨威, 李伟, 张小明. 同期颈动脉内膜剥脱术联合冠状动脉搭桥术治疗冠心病合并颈动脉狭窄[J]. *中华普通外科杂志*, 2021, 36:30-33.]
- [21] Huang JB, Jiang ZL, Mei J, Tang M, Liu H, Shen SE, Ding FB. Carotid endarterectomy combined with off-pump coronary artery bypass grafting in the treatment of coronary atherosclerotic heart disease with carotid stenosis [J]. *Zhongguo Xiong Xin Xue Guang Wai Ke Lin Chuang Za Zhi*, 2023, 30:1720-1724.[黄健兵, 姜兆磊, 梅举, 汤敏, 刘浩, 沈赛娥, 丁芳宝. “一站式”颈动脉内膜剥脱术联合非体外循环下冠状动脉旁路移植术治疗冠状动脉粥样硬化性心脏病合并颈动脉狭窄[J]. *中国胸心血管外科临床杂志*, 2023, 30:1720-1724.]
- [22] Kazum S, Eisen A, Lev EI, Iakobishvili Z, Solodky A, Hasdai D, Kornowski R, Mager A. Prevalence of carotid artery disease among ambulatory patients with coronary artery disease [J]. *Isr Med Assoc J*, 2016, 18:100-103.
- [23] Suzuki M, Okawa M, Okuno Y, Yang T, Takenobu Y, Shiomi H, Katano T, Suzuki K, Takayama N, Yamamoto Y, Yamada K, Yoshida K, Miyamoto S. Prevalence of carotid artery stenosis with coronary artery disease in Japanese patients: a single-center study[J]. *J Neurol Sci*, 2022, 443:120492.
- [24] Uchida T, Kanazawa R, Higashida T, Watanabe S, Kono T. Importance of preoperative coronary artery examination before performing procedures for carotid artery stenosis [J]. *Surg Neurol Int*, 2023, 14:229.
- [25] Liu ZJ, Fu WG, Guo ZY, Shen LG, Shi ZY, Li JH. Updated systematic review and Meta-analysis of randomized clinical trials comparing carotid artery stenting and carotid endarterectomy in the treatment of carotid stenosis [J]. *Ann Vasc Surg*, 2012, 26:576-590.
- [26] Zhao PH, Zhou CH, Yu JH, Su XD, Liu ZP. Safety and effectiveness of interventional therapy in treatment of stenosis of carotid artery before coronary artery bypass graft surgery [J]. *Nao Yu Shen Jing Ji Bing Za Zhi*, 2018, 26:171-175.[赵鹏浩, 周存河, 于江华, 苏旭东, 刘增品. 冠心病冠脉旁路移植术前颈动脉狭窄介入治疗的安全性及有效性研究[J]. *脑与神经疾病杂志*, 2018, 26:171-175.]
- [27] Peng C, Zhao Y, Wu YZ, Yang XY. Bilateral carotid artery occlusion stenosis combined with severe coronary artery stenosis: a report of 2 cases and literature review[J]. *Zhonghua*

- Shen Jing Wai Ke Za Zhi, 2023, 39:182-185.[彭超, 赵岩, 吴玉璋, 杨新宇. 双侧颈动脉近闭塞性狭窄合并严重冠状动脉狭窄 2 例并文献复习[J]. 中华神经外科杂志, 2023, 39:182-185.]
- [28] Bonati LH, Kakkos S, Berkefeld J, de Borst GJ, Bulbulia R, Halliday A, van Herzele I, Koncar I, McCabe DJ, Lal A, Ricco JB, Ringleb P, Taylor-Rowan M, Eckstein HH. European Stroke Organisation guideline on endarterectomy and stenting for carotid artery stenosis[J]. Eur Stroke J, 2021, 6: I-XLVII.
- [29] Vascular Surgery Group, Surgery Branch, Chinese Medical Association. Guidelines for the diagnosis and treatment of carotid artery stenosis[J]. Zhongguo Xue Guan Wai Ke Za Zhi (Dian Zi Ban), 2017, 9:169-175.[中华医学会外科学分会血管外科学组. 颈动脉狭窄诊治指南[J]. 中国血管外科杂志(电子版), 2017, 9:169-175.]
- [30] Li X, Zong L, Ni LC, Yao B, Liu CL, Cheng QJ, Zhao YL. Experience of coronary artery bypass grafting combined with carotid endarterectomy in the treatment of coronary heart diseases and carotid stenosis[J]. Lin Chuang Xin Xue Guan Bing Za Zhi, 2021, 37:772-775.[李祥, 宗良, 倪良春, 姚碧, 刘朝亮, 程前进, 赵永亮. 冠状动脉旁路移植联合颈动脉内膜剥脱术治疗冠心病合并颈动脉狭窄的体会[J]. 临床心血管病杂志, 2021, 37:772-775.]
- [31] Modugno P, Picone V, Centritto EM, Calvo E, Canosa C, Piancone F, Testa N, Camposarcone N, Castellano G, Astore P, Di Martino L, Di Iusto F, De Filippo CM, Massetti M. Combined treatment with carotid endarterectomy and coronary artery bypass grafting: a single-institutional experience in 222 patients[J]. Vasc Endovascular Surg, 2022, 56:566-570.
- [32] Tsukagoshi J, Yokoyama Y, Fujisaki T, Takagi H, Shirasu T, Kuno T. Systematic review and Meta-analysis of the treatment strategies for coronary artery bypass graft patients with concomitant carotid artery atherosclerotic disease [J]. J Vasc Surg, 2023, 78:1083-1094.e8.
- [33] Zivkovic I, Krasic S, Milacic P, Milicic M, Vukovic P, Tabakovic Z, Sagic D, Ilijevski N, Petrovic I, Peric M, Bojic M, Micovic S. Same-day carotid artery stenting and coronary artery bypass surgery[J]. Tex Heart Inst J, 2023, 50:e217781.
- [34] Mohammadian R, Tarighatnia A, Sharifipour E, Nourizadeh E, Parvizi R, Applegate CT, Nader ND. Carotid artery stenting prior to coronary artery bypass grafting in patients with carotid stenosis: clinical outcomes[J]. Interv Neuroradiol, 2023, 29:30-36.
- [35] Tomai F, Pesarini G, Castriota F, Reimers B, De Luca L, De Persio G, Spartù D, Aurigemma C, Pacchioni A, Spagnolo B, Cremonesi A, Ribichini F; Finalized Research in Endovascular Strategies Study Group. Early and long-term outcomes after combined percutaneous revascularization in patients with carotid and coronary artery stenoses [J]. JACC Cardiovasc Interv, 2011, 4:560-568.
- [36] Manunga J, Pedersen C, Stanberry L, Pai A, Skeik N, Sullivan TM. Impact of continued clopidogrel use on outcomes of patients undergoing carotid endarterectomy [J]. J Vasc Surg, 2023, 78:438-445.
- [37] Patel RJ, Marmor R, Dakour H, Elsayed N, Ramachandran M, Malas MB. Dual antiplatelet therapy is associated with increased risk of bleeding and decreased risk of stroke following carotid endarterectomy [J]. Ann Vasc Surg, 2023, 88:191-198.
- [38] Yei KS, Cui CL, Ramachandran M, Malas MB, Al-Nouri O. Effect of postoperative stroke timing on perioperative mortality after carotid revascularization [J]. Ann Vasc Surg, 2023, 92:124-130.

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《中国现代神经疾病杂志》2024 年广告征订启事

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本刊订阅用户遍及全国各级医疗单位、高等医学院校、各级医学院校图书馆、科研单位和个人。为加强本刊与神经内外科医学科研、医药、医疗器械行业的合作,共同宣传推广新药、新器械和新技术,促进互惠双赢,现诚邀广告合作方。现将刊登广告注意事项告知:

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