

• 专题研究:卒中 •

脑卒中既往史与冠心病患者临床表现的相关性研究

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[摘要] 目的:探讨脑卒中既往史与冠心病患者临床表现的相关性。方法:选取2018年9月—2021年9月在南京医科大学第一附属医院和无锡市第二人民医院住院的2 327例冠心病患者,收集患者临床特征及一般资料。根据有无脑卒中既往史将患者分为两组:卒中组和非卒中组。根据美国纽约心脏病学会(New York Heart Association, NYHA)分级,分为Ⅲ级以下组,Ⅲ级及以上组。采用多因素Logistic回归分析评估脑卒中既往史与冠心病患者临床表现的关系。结果:本研究共纳入冠心病患者2 327例,其中有脑卒中既往史患者280例,无脑卒中既往史患者2 047例。两组患者总胆固醇(total cholesterol, TC)、甘油三酯(triglyceride, TG)、高密度脂蛋白胆固醇(high-density lipoprotein cholesterol, HDL-C)、糖尿病、高血压以及肾功能不全病史的差异均有统计学意义(P 均 <0.05)。通过对年龄、性别以及体重指数(body mass index, BMI)等重要协变量进行调整后,多因素Logistic回归分析结果显示,脑卒中既往史与冠心病患者NYHA心功能分级独立正相关($OR=1.85$, 95%CI: 1.14~3.01, $P=0.013$)。结论:脑卒中既往史与冠心病患者的心功能分级密切相关,可能对冠心病患者的心功能分级具有提示作用。

[关键词] 脑卒中;冠心病;心功能不全**[中图分类号]** R541.4**[文献标志码]** A**[文章编号]** 1007-4368(2025)05-612-07**doi:** 10.7655/NYDXBNSN241064

A study on the correlation between stroke history and clinical manifestations in patients with coronary heart disease

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[Abstract] **Objective:** To investigate the correlation between a history of stroke and the clinical manifestations in patients with coronary heart disease (CHD). **Methods:** A total of 2 327 CHD patients hospitalized at the First Affiliated Hospital of Nanjing Medical University and Wuxi Second People's Hospital from September 2018 to September 2021 were enrolled. The clinical manifestations and general information of the patients were collected. Patients were divided into two groups based on their history of stroke: the stroke group and the non-stroke group. Additionally, patients were stratified according to the New York Heart Association (NYHA) functional classification into groups with less than grade III and grade III or above. Multivariable logistic regression analysis was used to assess the relationship between a history of stroke and the clinical manifestations of CHD patients. **Results:** Among the 2 327 CHD patients, 280 had a history of stroke, while 2 047 did not. Significant differences were observed between the two groups in terms of total cholesterol (TC), triglyceride (TG), high-density lipoprotein cholesterol (HDL-C), diabetes, hypertension and a history of renal insufficiency (all $P < 0.05$). After adjusting for important covariates such as age, gender, and body mass index (BMI), multivariable logistic regression analysis revealed that a history of stroke was independently and positively associated with the NYHA functional classification of CHD patients

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(OR=1.85, 95%CI: 1.14-3.01, $P=0.013$). The correlation between stroke history and NYHA functional classification in coronary heart disease patients was further confirmed in subgroup analysis. **Conclusion:** A history of stroke is closely associated with functional classification of CHD patients, and may potentially serve as an indicator for the functional status of patients with CHD.

[Key words] stroke; coronary heart disease; cardiac insufficiency

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心脑血管疾病作为全球范围内导致死亡和残疾的主要因素,其发生机制和病因复杂多样。其中,动脉粥样硬化被认为是多种心脑血管疾病的主要病因,常累及全身多处血管床,当动脉粥样硬化累及心血管系统时,主要表现为冠状动脉硬化性心脏病(简称冠心病);而累及脑血管时,则主要表现为脑卒中^[1]。在动脉粥样硬化的背景下,脑卒中是由于脑血管突然破裂(称为出血性脑卒中)或血管阻塞(即缺血性脑卒中)而引发的脑血流中断,进而导致脑组织损害。据统计,1990—2021年脑卒中的发病率增加了75%,患病率增加了88%^[2]。

脑卒中和冠心病具有相似的病理生理基础,脑卒中患者合并冠状动脉硬化的比例较高,从而增加了他们发生急性心肌梗死的风险,因此,脑卒中后不良心血管事件的发生频率也相应增加。一项临床研究指出,脑卒中后的心血管并发症包括3%的心肌梗死和超过50%的无症状冠状动脉狭窄^[3]。此外,左心室损伤是发生冠心病的重要因素,脑卒中后24%~76%的患者出现自主神经功能障碍,28.5%的患者左心室射血分数下降,13.8%的患者左心室肥大^[4]。因此,发生过脑卒中的患者,再患冠心病的风险更高。然而,关于脑卒中既往史与冠心病患者之间的关系仍有待进一步探究。为了更好地预防和治疗冠心病,本研究旨在探讨脑卒中既往史与冠心病患者临床表现之间的关系。

1 对象和方法

1.1 对象

2019年2月—2021年9月在南京医科大学第一附属医院和无锡市第二人民医院住院的患者7 931例,最终2 327例样本资料符合纳排标准。纳入标准:①年龄>18岁;②确诊为冠心病。排除标准:①临床资料不全;②有认知功能障碍或精神病;③既往有恶性肿瘤、免疫系统疾病、血液系统疾病等其他严重慢性病;④妊娠期及围产期;⑤合并急慢性或重症感染;⑥先天性心脏病、心脏瓣膜病或心肌病。本研究经过无锡市第二人民医院医学伦理委员会

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1.2 方法

1.2.1 诊断标准

冠心病的诊断标准依据《2019ESC慢性冠状动脉综合征诊疗和管理指南》^[5]和《急性冠脉综合征急诊快速诊治指南(2019)》^[6]。根据患者的临床症状、实验室检查结合经冠状动脉造影术证实冠状动脉存在不同程度狭窄。

缺血性脑卒中的诊断均由二级及以上医院专科医师根据《中国急性缺血性脑卒中诊治指南2023》^[7]中的诊断标准:临床表现为局灶性运动神经功能缺损,有偏瘫症状;经影像学检查(头颅MRI/CT)确诊为脑梗死,有责任梗死病灶;实验室检查排除其他疾病的可能性,如低血糖、电解质紊乱等;排除非血管性病因。

出血性脑卒中的诊断依据《中国脑出血诊疗指南2021》^[8]中的诊断标准:临床表现为不同程度的意识障碍及神经系统阳性体征;经头颅MRI、CT及脑血管造影等影像学检查诊断为出血性脑卒中。

1.2.2 数据收集

记录所有患者的年龄、性别、吸烟状况、疾病史[高血压史、糖尿病史、心梗病史、脑梗病史、脑出血病史、肾功能不全病史、房颤病史、心衰病史、冠心病家族史、既往行经皮冠状动脉介入(percutaneous coronary intervention, PCI)术和冠状动脉旁路移植(coronary artery bypass grafting, CABG)术史]、血脂指标[低密度脂蛋白胆固醇(low-density lipoprotein cholesterol, LDL-C)、高密度脂蛋白胆固醇(high-density lipoprotein cholesterol, HDL-C)、总胆固醇(total cholesterol, TC)、甘油三酯(triglyceride, TG)]及入院后的其他相关临床特征[收缩压、舒张压、心率、体重指数(body mass index, BMI)、空腹血糖水平]。

1.2.3 患者临床表现分组

美国纽约心脏病学会(New York Heart Association, NYHA)心功能分级标准:Ⅰ级为患者有心脏病,体力活动不受限;Ⅱ级为患者有心脏病,体力活动轻度受限制;Ⅲ级为患者有心脏病,以致体力

活动明显受限制；Ⅳ级为患者有心脏病，休息状态下也出现心衰症状。将患者分为Ⅲ级以下组，Ⅲ级及以上组。

1.3 统计学方法

所有数据的统计分析均使用 SAS 9.4 及 SPSS20.0 进行。符合正态分布的计量资料以均数±标准差($\bar{x} \pm s$)表示, 并采用独立样本 *t* 检验进行组间比较; 不符合正态分布的计量资料用中位数(四分位数)[$M(P_{25}, P_{75})$]表示, 并使用 Wilcoxon 秩和检验进行组间比较; 计数资料以频数和百分比表示并使用 χ^2 检验进行组间比较。对年龄、性别及 BMI 等重要协变量进行调整后, 通过多因素 Logistic 回归分析评估脑卒中既往史与冠心病患者临床表现之间的关系。 $P < 0.05$ 为差异有统计学意义。

2 结果

2.1 冠心病患者一般特征的比较

在本研究中共有冠心病患者 2 327 例, 其中有脑卒中既往史患者 280 例(男 201 例, 女 79 例), 无脑卒中既往史患者 2 047 例(男 1 500 例, 女 547 例)。在有无脑卒中既往史两组患者中, TC、TG、HDL-C、糖尿病、高血压、肾功能不全等因素的差异具有统计学意义(P 均 <0.05 , 表 1~3)。

2.2 脑卒中既往史与冠心病患者临床表现的多因素 Logistic 回归分析

在校正了年龄、性别、吸烟情况、BMI、高血压病史、糖尿病史、冠心病家族史、肾功能不全史、房颤病史、心衰病史、既往心梗病史、既往 PCI 手术史、既

表 1 卒中组和非卒中组冠心病患者一般特征的比较

Table 1 Comparison of general characteristics between stroke and non-stroke groups in patients with coronary heart disease

Characteristic	Total (n=2 327)	Stroke history		P
		Non-stroke(n=2 047)	Stroke(n=280)	
Male[n(%)]	1 701(73.10)	1 500(73.28)	201(71.78)	0.597
Age(years, $\bar{x} \pm s$)	65.48 ± 11.06	65.60 ± 11.17	64.58 ± 10.18	0.150
Smoking[n(%)]	1 097(47.10)	965(47.10)	132(47.10)	1.000
Heart rate(beats/min, $\bar{x} \pm s$)	73.73 ± 11.28	73.78 ± 11.37	73.37 ± 10.66	0.567
BMI(kg/m ² , $\bar{x} \pm s$)	24.87 ± 5.69	24.91 ± 5.93	24.59 ± 3.46	0.369
Systolic blood pressure[mmHg, $M(P_{25}, P_{75})$]	131.00(120.00, 144.00)	130.00(120.00, 143.00)	134.89 ± 18.85	0.409
Diastolic blood pressure(mmHg, $\bar{x} \pm s$)	77.99 ± 11.65	78.13 ± 11.77	76.94 ± 10.72	0.109

表 2 卒中组和非卒中组冠心病患者生化指标的比较

Table 2 Comparison of biochemical indicators between stroke and non-stroke groups in patients with coronary heart disease

Variable	Total(n=2 327)	Stroke history		P
		Non-stroke(n=2 047)	Stroke(n=280)	
TC[mmol/L, $M(P_{25}, P_{75})$]	3.78(3.10, 4.56)	3.81(3.12, 4.59)	3.57(2.97, 4.21)	0.001
TG[mmol/L, $M(P_{25}, P_{75})$]	1.33(0.97, 1.89)	1.35(0.98, 1.92)	1.23(0.94, 1.74)	0.004
LDL-C[mmol/L, $M(P_{25}, P_{75})$]	2.20(1.68, 2.79)	2.22(1.70, 2.81)	2.01(1.62, 2.56)	0.502
HDL-C(mmol/L, $\bar{x} \pm s$)	1.04 ± 0.27	1.04 ± 0.28	1.00 ± 0.23	0.022
FPG[mmol/L, $M(P_{25}, P_{75})$]	5.21(4.64, 6.31)	5.22(4.65, 6.29)	5.20(4.57, 6.39)	0.896
WBC[×10 ⁹ /L, $M(P_{25}, P_{75})$]	6.92(5.73, 8.43)	6.93(5.73, 8.44)	6.77(5.72, 8.36)	0.589
PLT[×10 ⁹ /L, $M(P_{25}, P_{75})$]	200.00(163.00, 240.00)	201.00(163.00, 241.00)	200.00(162.25, 231.00)	0.161
CRP[mg/L, $M(P_{25}, P_{75})$]	3.45(1.58, 6.32)	3.45(1.54, 6.32)	4.00(1.84, 6.35)	0.246

TC: total cholesterol; TG: triglyceride; LDL-C: low-density lipoprotein cholesterol; HDL-C: high-density lipoprotein cholesterol; FPG: fasting plasma glucose; WBC: white blood cell; PLT: platelet; CRP: C-reactive protein.

往 CABG 手术史、TC、TG、LDL-C、HDL-C、空腹血糖、收缩压、舒张压、白细胞、血小板、C 反应蛋白以及心率等重要协变量后, 多因素 Logistic 回归分析结果显示, 脑卒中既往史与冠心病患者的 NYHA 心功能分

级密切相关($P=0.013$); 与无脑卒中既往史的冠心病患者相比, 有脑卒中既往史的冠心病患者出现更高 NYHA 心功能分级的风险增加了 85%(OR=1.85, 95%CI: 1.14~3.01); 脑卒中既往史与冠心病患者的

表3 卒中组和非卒中组冠心病患者既往史比较

Table 3 Comparison of medical history between stroke and non-stroke groups in patients with coronary heart disease [n(%)]

Characteristic	Total(n=2 327)	Stroke history		P
		Non-stroke(n=2 047)	Stroke(n=280)	
History of myocardial infarction	216(9.28)	189(9.23)	27(9.64)	0.825
Family history of coronary heart disease	145(6.23)	124(6.05)	21(7.50)	0.349
Diabetes mellitus	684(29.39)	576(28.13)	108(38.57)	<0.001
Hypertension	1 539(66.13)	1 312(64.09)	227(81.07)	<0.001
History of previous PCI	412(17.71)	354(17.29)	58(20.71)	0.160
History of previous CABG	29(1.25)	27(1.31)	2(0.71)	0.329
History of renal insufficiency	75(3.22)	59(2.88)	16(5.71)	0.012

PCI: percutaneous coronary intervention; CABG: coronary artery bypass grafting.

心肌梗死之间无显著关联($P > 0.05$, 表4)。

2.3 脑卒中既往史与冠心病患者临床表现关系的亚组分析

为进一步验证脑卒中既往史与冠心病患者NYHA心功能分级的关系,进行了亚组分析,在调整了重要潜在协变量后的Logistic回归分析中发现,在年龄<65岁、男性、BMI<24 kg/m²、空腹血糖≥6.1 mmol/L、收缩压<140 mmol/L无吸烟史、无糖尿病史、无血脂异常、有高血压病史或有既往PCI手术史的患者中,脑卒中既往史均与冠心病患者的NYHA心功能分级显著相关(P 均<0.05,表5)。

3 讨论

《中国心脑血管疾病报告2021》指出^[9],当前中国正面临人口老龄化和代谢危险因素流行的双重压力,心脑血管疾病发病率和死亡率持续上升,特别是冠心病和脑卒中的发病率呈现出持续上升的趋势。心脑血管疾病的危险因素,如高血压、糖尿

病、吸烟、高脂血症等,都可能促进动脉粥样硬化的发展,进而增加脑卒中和冠心病的患病风险^[10-11]。一项研究表明,约12%的冠心病患者曾患有脑血管疾病,既往脑血管疾病史也与冠心病患者的不良预后相关^[12]。此外,随着脑卒中严重程度的增加,患者发生急性心梗的风险也会增加^[13]。冠心病和脑卒中都给患者、家庭及社会造成了沉重的疾病负担,降低它们带来的疾病负担已成为亟待解决的关键问题。目前对两者间联系的认识尚不充分,因此,本研究旨在从2 327例冠心病患者的临床数据中,深入探索脑卒中既往史与冠心病患者临床表现之间的联系。

本研究通过对性别、年龄等因素调整后的Logistic回归分析发现,有脑卒中既往史的冠心病患者发生严重心功能不全的风险显著高于无脑卒中既往史的患者。此外,在亚组分析中也表明,在男性、年龄<65岁、无吸烟史、无糖尿病史、BMI<24 kg/m²、收缩压<140 mmHg、无血脂异常、有高血压史、既往

表4 脑卒中既往史与冠心病患者临床表现的Logistic回归分析

Table 4 Logisitic analysis of history of stroke and clinical presentation in patients with coronary heart disease [OR(95%CI)]

Variable	Stroke history		P
	Non-stroke	Stroke	
Clinical features of myocardial infarction			
Model 1	1.00	1.01(0.72-1.42)	0.962
Model 2	1.00	0.99(0.68-1.44)	0.946
NYHA functional classification			
Model 1	1.00	2.34(1.57-3.49)	<0.001
Model 2	1.00	1.85(1.14-3.01)	0.013

Model 1: adjusted covariates included age and sex; Model 2: covariates adjusted from Model 1 included smoking status, BMI, history of hypertension, history of diabetes mellitus, family history of coronary heart disease, history of renal insufficiency, history of atrial fibrillation, history of heart failure, history of previous infarctions, history of previous PCI, history of previous CABG, TC, TG, LDL-C, HDL-C, fasting plasma glucose, systolic blood pressure, diastolic blood pressure, white blood cells, platelets, C-reactive protein, and heart rate.

表5 脑卒中既往史与冠心病患者临床表现相关性的亚组分析

Table 5 Subgroup analysis of correlations of previous history of stroke and clinical presentation in patients with coronary artery disease

Variable	NYHA grade III and above[n(%)]	OR(95%CI)	P
Age			
<65 years	41(27.89)	5.64(1.99-16.03)	0.001
≥65 years	106(72.11)	1.56(0.90-2.71)	0.116
Sex			
Male	94(63.95)	1.96(1.06-3.63)	0.031
Female	53(36.05)	1.65(0.69-3.97)	0.262
Smoking			
No	80(54.22)	2.57(1.26-5.24)	0.010
Yes	67(45.58)	1.51(0.75-3.04)	0.245
History of hypertension			
No	32(21.77)	1.96(0.54-7.04)	0.304
Yes	115(78.23)	1.83(1.06-3.15)	0.029
History of diabetes			
No	89(60.54)	2.35(1.07-5.13)	0.033
Yes	58(39.46)	1.60(0.82-3.11)	0.165
History of previous PCI			
No	106(72.11)	1.37(0.74-2.53)	0.316
Yes	41(27.89)	3.25(1.23-8.58)	0.017
BMI			
<24 kg/m ²	54(36.73)	3.25(1.23-8.57)	0.017
≥24 kg/m ²	93(63.27)	1.37(0.74-2.53)	0.313
Systolic blood pressure			
<140 mmHg	96(65.31)	2.15(1.17-3.97)	0.014
≥140 mmHg	51(34.69)	1.51(0.63-3.60)	0.358
FPG			
<6.1 mmol/L	112(76.19)	1.21(0.63-2.31)	0.565
≥6.1 mmol/L	35(23.81)	3.54(1.61-7.80)	0.002
Dyslipidemia			
No	130(88.44)	2.95(1.32-6.59)	0.008
Yes	17(11.56)	1.33(0.70-2.55)	0.382

In addition to stratification variables, the odds ratio(OR)and its 95% confidence interval(CI)were calculated after adjusting for age, sex, smoking status, body mass index(BMI), history of hypertension, history of diabetes mellitus, family history of coronary artery disease, history of renal insufficiency, history of atrial fibrillation, history of heart failure, history of previous myocardial infarction, history of previous PCI procedure, history of previous CABG procedure, lipid levels, fasting blood glucose, systolic blood pressure, diastolic blood pressure, leukocyte count, platelet count, C-reactive protein, and heart rate.

PCI手术史或高空腹血糖的冠心病患者中,脑卒中既往史与患者NYHA心功能分级之间存在显著相关性。缺血性脑卒中后发生心脏并发症的风险,随着缺血性脑卒中和神经功能缺损的严重程度成比例增加^[14-15]。一项2016年的荟萃分析显示,既往没有心脏病史的急性缺血性脑卒中患者,其在发病后1年内出现心肌梗死的总体风险高达3%。同时,有1/3的急性缺血性脑卒中患者出现了无症状冠状动脉狭窄

(狭窄≥50%)^[16]。此外,在接受静脉溶栓治疗后,急性缺血性脑卒中患者在短时间内发生心肌梗死的病例报告也在逐渐增多^[17]。一项关于1 013例出血性脑卒中患者的相关研究表明^[18],发生出血性脑卒中后有4.1%的患者会出现院内心血管并发症(即严重的室性心律失常和心力衰竭)。并且在既往无心脏病史的情况下,出血性脑卒中后发生院内急性心肌梗死的风险约0.3%^[19-20]。这些数据表明,患者出

现脑卒中后发生心功能不全的风险显著增加。因此,在脑卒中患者的治疗和管理过程中,应加强对心血管疾病的预防和干预。此外,本研究也表明脑卒中既往史与冠心病患者的心力衰竭临床表现之间存在紧密联系。

本研究发现,脑卒中既往史可能会加剧冠心病患者的心功能不全,这可能为临床医生选择冠心病患者的治疗策略提供一些启发。但本研究也具有以下几点局限性。首先,本研究为横断面研究,在脑卒中与冠心病疾病严重程度或临床表现因果关联的推断上存在一定的局限性;其次,数据受单一地区的饮食、环境等因素限制,这可能不代表一般人群;最后,研究对象包括有无房颤病史的冠心病患者、有无心衰的冠心病患者,且也并未排除冠心病合并初发房颤或合并初发心衰的患者,房颤或心衰等重要的协变量可能会对本研究结果产生影响。因此,本研究在统计分析时对这些潜在的重要协变量进行了调整。此外,在本研究中可能存在一些其他潜在的混杂因素未被纳入,这也可能导致本研究结果存在一定的局限性。因此,仍需纳入多中心的人群样本或构建人群队列研究进一步探讨脑卒中既往史与冠心病患者临床表现之间的关联。

综上所述,脑卒中既往史可能存在加剧冠心病相关心功能不全的风险。因此,在对脑卒中患者的治疗及康复期间,应密切监测其心脏功能与状况,并强化相应的管理措施。在临床实践中,这一认识应当得到充分重视与合理运用,以提升患者的生活质量。

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Author's Contributions:

CHEN Qi was responsible for data collection, data organization, drafting, proof reading, and editing; LIU Qiao contributed to data collection and drafting; WANG Jing handled data organization, review, and editing; WANG Junhong was in charge of data organization and review; HAN Zhijun undertook review and editing tasks; ZHANG Lizhu developed the concept and method

design; ZHANG Kaixin and GAO Mingzhu worked on concept and method design, as well as review and editing.

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