·论著·胸部·

术前血压、血糖水平与急性心肌梗死患者PCI术后心肌微灌注、预后的关系研究*

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【摘要】**目的** 探究术前血压、血糖水平对急性心肌梗死(AMI)患者经皮冠状动脉介入(PCI)术后心肌微灌注及预后的影响。**方法** 收我院2021年1月至2023年6月期间接受PCI治疗的120例AMI患者的一般资料，所有患者均行术前血压、血糖测定，根据患者MBG等级分为良好组(n=80)和不良组(n=40)，MBG为3级归为良好组，MBG为0~2级归为不良组，分析术前血压、血糖对AMI患者PCI术后与心肌微灌注、预后的关系及诊断价值。**结果** 临床资料结果显示，Killp分级情况、SBP≥150mmHg、DBP≤60mmHg、FBG≥6.1mmol/L是影响AMI患者PCI术后心肌微灌注不良的影响因素(*P*<0.05)；多因素logistic回归分析结果显示，KillpIII级、SBP≥150mmHg、DBP≤60mmHg、血糖≥6.1mmol/L均为AMI患者PCI术后预后不良的独立危险因素(*P*<0.05)；术前血压、血糖的检测及联合检测AMI患者PCI术后不良预后的AUC均>0.7，其中联合检测的AUC值最高。**结论** 术前血压、血糖水平升高是AMI患者PCI术后心肌微灌注及不良预后的危险因素，两者联合检测对其不良预后具有一定的预测价值。

【关键词】血压；血糖；急性心肌梗死；经皮冠状动脉介入术；心肌微灌注；预后
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Study on the Relationship between Preoperative Blood Pressure and Blood Glucose Level and Myocardial Microperfusion and Prognosis in Patients with Acute Myocardial Infarction after PCI*

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Abstract: ***Objective*** Exploring the effects of preoperative blood pressure and blood glucose levels on myocardial micro perfusion and prognosis in patients with acute myocardial infarction (AMI) after percutaneous coronary intervention (PCI). ***Methods*** Collect general information on 120 AMI patients who received PCI treatment in our hospital from January 2021 to June 2023. All patients underwent preoperative blood pressure and blood glucose measurements, and were divided into a good group (n=80) and an adverse group (n=40) based on their MBG level. MBG level 3 was classified as the good group, and MBG level 0-2 was classified as the adverse group. Analyze the relationship and diagnostic value of preoperative blood pressure and blood glucose on the postoperative myocardial perfusion, prognosis, and outcomes of AMI patients undergoing PCI. ***Results*** The results of clinical data showed that killp grade, SBP ≥ 150 mmHg, DBP ≤ 60mmHg and FBG ≥ 6.1mmol/l were the influencing factors of poor myocardial perfusion in patients with AMI after PCI (*P*<0.05); Multivariate logistic regression analysis showed that killp Ⅲ, SBP ≥ 150 mmHg, DBP ≤ 60 mmHg and blood glucose ≥ 6.1mmol/l were all independent risk factors for poor prognosis in patients with AMI after PCI (*P*<0.05); The AUC of preoperative blood pressure, blood glucose and combined detection of adverse prognosis in AMI patients after PCI were all >0.7, and the value of combined detection was the highest. ***Conclusion*** Preoperative elevated blood pressure and blood glucose levels are risk factors for myocardial perfusion and poor prognosis in AMI patients after PCI. Combined detection of the two has a certain predictive value for the poor prognosis.

Keywords: Blood Pressure; Blood Sugar; Acute Myocardial Infarction; Percutaneous Coronary Intervention; Myocardial Microperfusion; The Prognosis

急性心肌梗死(acute myocardial infarction，AMI)是心脑血管疾病中死亡率较高的疾病之一，主要由于冠状动脉变形、堵塞而引起的心肌缺氧缺血、坏死，具有起病急、病变快、预后效果不好等特点，临床症状包括心悸、烦躁、胸背部及上腹部持续疼痛，严重时可能会出现心力衰竭甚至休克[1-3]。对于AMI的治疗，关键在于尽早、充分且持续地开通梗死相关血管，以实现心肌再灌注，经皮冠状动脉介入(percutaneous coronary intervention，PCI)能有效开通梗死血管，恢复缺血心肌的血供，从而改善患者心功能，是目前治疗AMI的主要方式[4-6]。但PCI术后常发生心肌微灌注、不良心血管事件(adverse cardiovascular events，MACE)等不良预后[7-8]。研究表明，心梗死后伴发的高血糖与其死亡率成正相关[9]，此外，高血压也是心梗发生的独立危险因素之一[10]，但对于术前血压、血糖检测结果对AMI患者PCI术后预后不良的预测价值还鲜有报道，为改善患者预后，此次研究探讨术前血压、血糖水平对AMI患者PCI术后心肌微灌注、预后的影响。现报道如下。

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1 资料与方法

1.1 临床资料 本研究通过医学伦理委员会审核批准。收集我院2021年1月至2023年6月收治的接受PCI治疗的120例AMI患者的临床资料，

纳入标准：符合AMI诊断标准[11]；患者及/或家属签署知情同意书；排除标准：合并有恶性肿瘤；伴心、肝、肾、肺等任一脏器严重功能不全；临床资料不完整或中途退出；对本研究药物过敏患者。

1.2 早期PCI治疗 入院后，均嚼阿司匹林(拜耳医药保健有限公司，国药准字：J20171021，规格：0.1g),首次0.3g/次，后0.1g/次，一次/d。口服氯吡格雷(杭州赛诺菲万特民生制药有限公司，国药准字：J20180029，规格：75mg/片)首次300mg，后75mg/次，1次/d，采用常规PCI治疗，术中经鞘管注入肝素，剂量为100u/kg,根据手术时间加注肝素，每延长1h，加注1000单位。根据患者实际情况给与血管紧张素受体拮抗剂、β-受体阻滞剂等药物治疗。

1.3 分组及心肌灌注情况评定 分组：根据患者MBG等级分为良好组(n=80)和不良组(n=40)，MBG为3级归为良好组，MBG为0~2级归为不良组[12]。评定标准[13]：具体定义为：0级(无灌注)：未见造影剂染色；1级(微量灌注)：可见轻微染色；2级(部分灌注)：中度染色，但水平低于非梗死区；3级(完全灌注)：染色正常，与非梗死区水平一致。

1.4 观察指标及测定方式 心功能测定：采用超声心动图检查左室收缩末内径(left ventricular end systolic diameter，LVESD)、左室舒末内径(left ventricular diastolic diamerer，LVEDD)、左室射血分数(left centricular ejection fraction，LVEF)；术前血压、血糖测定方式：术前血压测定：使用电子血压计于PCI术前测定所有患者的收缩压(systolic blood pressure，SBP)以及舒张压(diastolic blood pressure，DBP)。术前血糖测定：采用葡萄糖氧化酶法测定术前随机空腹血糖(fasting blood glucose，FBG)。

1.5 随访 于术后6个月通过电话联系、门诊复查及不适随诊进行随访，统计患者预后情况。并统计随访6个月内患者预后情况，将术后发生心源性死亡、严重心力衰竭、再次心肌梗死、恶性心律失常等归为预后不良。

1.6 统计学方法 采用SPSS 23.0软件进行统计分析。计量资料以($\bar{x}\pm s$)表示，组间比较采用t检验；计数资料以[n(%)]描述，组间比较采用χ^2检验。采用logistic回归分析AMI患者PCI术后预后的影响因素，并通过受试者工作特征曲线(ROC)评估术前血压、血糖对预后不良的预测价值。以*P*<0.05为差异有统计学意义。

2 结 果

2.1 患者临床资料比较 临床资料显示，年龄为52~75岁，平均年龄为(62.80±5.10)岁，男64例，女56例，疾病史：糖尿病29例、高血压33例、高血脂11例、脑血管疾病12例，吸烟患者49例，心功能水平：LVESD平均为(37.27±5.26)%，LVEDD平均为(56.31±9.71)mm，LVEF平均为(55.16±6.57)mm。其中两组Killp分级情况、术前SBP、DBP和FBG均有意义(*P*<0.05)。见表1。

2.2 随访情况 随访6个月后，发生心源性死亡12例(10.00)、严重心力衰竭6例(5.00%)、再次心肌梗死4例(3.33%)、恶性心律失常3例(2.50%)，预后不良共25例(20.83%)，预后良好共75例(62.50%)。

2.3 术前血压、血糖与AMI患者PCI术后预后不良的关系 结果显示，KillpⅢ级、SBP≥150mmHg、DBP≤60mmHg、血糖≥6.1mmol/L均为AMI患者PCI术后预后不良的独立危险因素(*P*<0.05)。见表2。

2.4 术前血压、血糖对AMI患者PCI术后预后不良的预测价值 术前血压结果预测其预后不良的AUC为0.721，当诊断临界值为68.43%时有最大约登指数，术前血糖结果预测其预后不良的AUC为0.714，当诊断临界值为70.59%时有最大约登指数，联合检测的AUC为0.913，当诊断临界值为78.59%时有最大约登指数。

表2 影响AMI患者PCI术后预后不良的多因素logistic回归分析

因素	β	S.E.	Wald χ^2	*P*	OR	95%CI
KillpIII级	0.874	0.157	5.214	0.028	2.396	1.761~3.260
SBP≥150 mmHg	0.751	0.176	4.321	0.012	2.119	1.501~2.992
DBP≤60 mmHg	0.657	0.154	6.459	0.004	1.929	1.426~2.608
FBG≥6.1mmol/L	0.741	0.258	5.651	0.011	2.098	1.265~3.479

3 讨 论

AMI主要由过度寒冷刺激、吸烟饮酒、疲劳等因素引起的冠状动脉变形、堵塞而引起的心肌缺氧缺血、坏死[14]。近些年，AMI发病率逐渐呈年轻化，且具有较高的死亡率[15]。临床中对AMI的治疗主要以PCI为首选方案，PCI可迅速保护心肌，实现心肌再灌注，但有研究显示约有20%患者会在PCI术后三个月内出现MACE[16]。MACE与PCI术后不良预后直接相关，若未能有效控制相关危险因素，则会进一步增加MACE的发生风险[17-19]。因此，如何有效控制危险因素，改善预后对患者尤为重要。有相关研究显示，PCI术后预后不良的患者多数存在肥胖、高血压、糖尿等病史，无病史患者在术前均出现血糖、血压增高的症状，随着疾病的改善，血糖、血压也逐渐得到恢复[20-22]。为了进一步研究对比术前血压、血糖水平对AMI患者PCI术后心肌微灌注、预后的影响。本研究选取120例行PCI治

表1 患者临床资料比较

项目		良好组(n=80)	不良组(n=40)	t/ x^2	P
年龄(岁)		63.48±6.48	65.48±6.42	1.118	0.084
性别	男[例(%)]	42(52.50)	22(55.00)	6.281	0.006
	女[例(%)]	38(47.50)	18(45.00)		
体重(kg)		65.15±8.54	69.15±8.26	0.564	0.621
病史	糖尿病	19(23.75)	10(25.00)	0.280	0.839
	高血压	21(26.25)	12(30.00)		
	高血脂	7(8.75)	4(10.00)		
	脑血管病	8(10.00)	4(10.00)		
吸烟史		31(38.75)	18(45.00)	0.582	0.521
梗死部位	前壁	36(45.00)	18(45.00)	0.487	0.511
	下壁	25(31.25)	12(30.00)		
Killp分级	Ⅰ级	16(20.00)	6(15.00)	4.251	0.012
	Ⅱ级	36(45.00)	8(20.00)		
	Ⅲ级	28(35.00)	26(65.00)		
冠脉病变支数	单支病变	32(40.00)	18(45.00)	0.548	0.654
	双支病变	27(33.75)	12(30.00)		
	多支病变	21(26.25)	10(25.00)		
心功能水平	LVESD(%)	36.48±5.18	38.26±5.15	1.381	0.170
	LVEDD(mm)	57.21±9.47	56.15±9.45	0.448	0.655
	LVEF(mm)	54.36±6.52	55.12±9.48	0.423	0.673
SBP(mmHg)	≤90	10(12.50)	8(20.00)	-2.586	0.010
	90~149	64(80.00)	12(30.00)		
	≥150	6(7.5)	20(50.00)		
DBP(mmHg)	≤60	10(12.50)	22(55.00)	-2.500	0.012
	61~79	60(75.00)	10(25.00)		
	≥80	10(12.50)	8(20.00)		
FBG(mmol/L)	<3.9	3(3.75)	2(5.00)	-3.526	>0.001
	3.9~6.0	52(65.00)	4(10.00)		
	≥6.1	25(31.25)	28(70.00)		

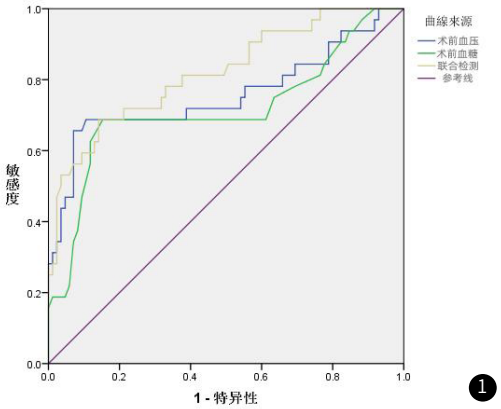

图1 术前血压、血糖对AMI患者PCI术后预后不良的预测价值。

疗的AMI患者，分析术前血压、血糖与其预后的关系。

此次研究其术前血压、血糖资料显示，预后不良组SBP≥150 mmHg、DBP≤60 mmHg、FBG≥6.1mmol/L显然较良好组高，可提示术前血压及血糖是影响AMI患者PCI术后不良的因素，其原因与其机制有关：AMI患者由于冠状动脉产生病变后，其血流储备大大减少，在手术成功将血运重建后，即使在没有明显残余冠状动脉狭窄的情况下，AMI患者心脏仍可能因其他原因导致冠状动脉缺血。AMI患者发病时，机体发生应激反应，体内交感神经细胞兴奋，使血压水平增高，心输出量降低[23-25]。血压与AMI患者PCI术后与心肌微灌注、预后的关系：(1)SBP能反映心脏功能的维持，AMI患者的SBP长期处于高度表达，患者的交感神经过度激活，身体的耗氧量也会明显增加，心室壁张力增加，对患者的心功能产生不利影响，使MACE风险增大，不利于预后[26-27]。(2)DBP反映动脉阻

力，也是影响动脉血流的主要因素，其水平偏低时会增加再灌注不良风险，使心肌缺血现象加重，更影响预后[28-30]。

有研究显示，非糖尿病AMI患者术前血糖≥6.1mmol/L病死率显著较术前血糖正常高[31]。在以往诸多研究当中发现，无论是糖尿病还是非糖尿病患者，在心脏外科手术中均有发生应激血糖增高的风险[32-33]。血糖与AMI患者PCI术后与心肌微灌注、预后的关系：(1)在患者发生AMI时，胰岛素缺乏与升高的游离脂肪酸共同增加心肌耗氧；此外，钙离子稳态失衡会直接损害心功能，膜内外钙失衡，降低了心功能水平，可使其术后增加心力衰竭、心律失常等并发症，影响预后[34-35]。(2)高血糖引发的渗透性利尿，可使左室舒张末压代偿性升高，进而增加心脏负荷[36-37]；(3) 高血糖可增加红细胞中的糖化血红蛋白(glycosylated hemoglobin，GHB)，增强血小板的粘附和聚集，削弱体内抗凝机制的作用，最终导致血液粘度增加与微循环障碍加重，促使病情恶化[38-39]。

有研究显示，术前严重低血糖可增加AMI患者PCI术后病死率[40]，但在本研究中，未显差异，这是由于术前FBG<3.9mmol/L的患者样本量小，其次，本研究采用的是随机空腹血糖，而未采用更可靠的GHB指标，结果可能有偏差，存在局限性，还需进一步研究。

综上所述，术前血压、血糖水平升高会增加AMI患者PCI术后不良预后及心肌微灌注的危险因素，两者的联合检测对其不良预后具有一定的预测意义。

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