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# 老年原发性高血压患者脉搏波传导速度与心脑血管危险因素关系的研究

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**摘要 目的:**探讨老年原发性高血压患者脉搏波传导速度与心脑血管危险因素关系。**方法:**随机选取2012年5月至2012年8月在我院体检的160例新诊老年原发性高血压患者及120例健康个体,所有个体均未接受治疗,采用动脉硬化检测仪测定患者踝臂脉搏波传导速度(baPWV),同时测量身高、腰围、体重、血压、总胆固醇(TC)、甘油三酯(TG)、空腹血糖(FBS)、低密度脂蛋白胆固醇(LDL-C)、高密度脂蛋白胆固醇(HDL-C)、尿酸(UA)、肌酐(Cr)等指标,探讨老年原发性高血压患者高脂血症、吸烟、肥胖、糖尿病等危险因素与baPWV指标变化的关系。**结果:**不同血压分级的老年原发性高血压患者之间踝臂脉搏波传导速度值存在显著差异( $P<0.01$ )。合并冠心病、肥胖、糖尿病、吸烟、高脂血症等危险因素的高血压患者baPWV值显著高于单纯性原发性高血压患者( $P<0.01$ )。多元回归分析表明:吸烟史( $P<0.01$ )、冠心病史( $P<0.01$ )、糖尿病史( $P<0.01$ )、年龄( $P<0.01$ )、腰围( $P<0.01$ )、血压( $P<0.01$ )、HDL-C( $P<0.01$ )、TC( $P<0.01$ )、FBS( $P<0.01$ )、LDL-C( $P<0.01$ )、Cr( $P<0.01$ )是baPWV升高的独立危险因素。**结论:**老年原发性高血压患者存在不同程度的动脉僵硬增高,常见心脑血管风险因素同样影响老年原发性高血压患者僵硬程度。

**关键词:**原发性高血压;老年;心脑血管风险因素;踝臂脉搏波传导速度

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## The Correlation of Pulse Wave Velocity with Cardiovascular Risk Factors in Patients with Essential Hypertension

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**ABSTRACT Objective:** To investigate the association of pulse wave velocity and cardiovascular risk factors in elderly hypertensive patients. **Methods:** From May 2012 to August 2012, 160 newly diagnosed elderly patients with essential hypertension were randomly selected from cardiology outpatient department. Brachial-ankle pulse wave velocity (baPWV) were measured by arteriosclerosis detection, simultaneous measurement of the height, waist circumference, body weight, blood pressure, total cholesterol (TC), triglyceride (TG), fasting blood sugar (FBS), low-density lipoprotein cholesterol(LDL-C), high density lipoprotein lipoprotein cholesterol (HDL-C), uric acid (UA), creatinine (Cr) and other indicators, to explore the relationship between changes with hyperlipidemia, smoking, obesity, diabetes and other risk factors associated with baPWV indicators in elderly hypertensive patients. **Results:** Brachial-ankle pulse wave velocity values were significantly different( $P<0.01$ ) between the different classification of blood pressure in elderly patients with essential hypertension. Coronary heart disease, obesity, diabetes, smoking, hyperlipidemia and other risk factors in hypertensive patients with baPWV value was significantly higher than the Simple patients with essential hypertension( $P<0.01$ ). Multiple regression analysis showed that a history of smoking ( $P<0.01$ ), history of coronary artery disease ( $P<0.01$ ), history of diabetes ( $P<0.01$ ), age ( $P<0.01$ ), waist circumference ( $P<0.01$ ), blood pressure ( $P<0.01$ ), HDL-C ( $P<0.01$ ), TC ( $P<0.01$ ), FBS ( $P<0.01$ ), LDL-C ( $P<0.01$ ), Cr ( $P<0.01$ ) were independent risk factors of increase of baPWV. **Conclusion:** The elderly hypertensive patients had different degrees of increased arterial stiffness, common cardiovascular risk factors also affected the stiffness of elderly patients with essential hypertension.

**Key words:** Essential hypertension; Elderly; Cardiovascular risk factors; BaPWV

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### 前言

原发性高血压是一种全身性的疾病,患者常伴有不同程度的脑、心、视网膜和肾等器官病变,常存在大动脉结构和功能的损害,是高血压患者早期血管改变的病理生理基础。同时,老年

原发性高血压患者常存在不同程度的糖脂代谢紊乱,以及不良的生活方式,这些心脑血管风险因素都可能不同程度地影响老年原发性高血压患者的血管僵硬及顺应性<sup>[1-5]</sup>。本研究旨在探讨老年原发性高血压患者脉搏波传导速度与心脑血管危险因素关系,研究影响僵硬改变和动脉弹性的主要因素。

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### 1 资料与方法

#### 1.1 病例资料

随机选取我院2012年5月至2012年8月间体检的老年

原发性高血压患者 160 例,所有患者符合中国高血压防治指南制订的高血压诊断标准(2005 年),其中高血压 1 级患者 80 例,高血压 2 级患者 50 例,高血压 3 级患者 30 例,以上入选患者皆无高血压无并发症。其中男 95 例,女 65 例,平均年龄 65.6±5.9 岁。健康对照人群 120 例,其中男 74 例,女 46 例,平均年龄 63.9±5.6 岁。

### 1.2 肱踝脉搏波传导速度的测定

肱踝脉搏波传导速度 (baPWV) 测定采用欧姆龙 VP-1000 全自动动脉硬化测定仪(科林公司,日本),组内及组间测量结果的可重复率分别为 0.98 及 0.89,相应的变异系数分别为 8.5% 及 10.7%。

### 1.3 生化检测及数据采集

采用自动生化分析仪(Roche Modular PP 德国)测定患者血糖、血清总胆固醇、甘油三酯、HDL-c、LDL-c、肌酐以及尿酸。腰围测定体重指数(BMI)= 体重(kg)/ 身高(cm)<sup>2</sup>。肥胖或腹型肥胖标准采用中国成人超重和肥胖症预防与控制指南(2003)。糖尿病采用 ADA(2003)标准。

### 1.4 统计学分析

所有数据处理采用 SPSS 13.0 统计软件包进行分析(美国,

芝加哥),计量资料以均数± 标准差(m± s)表示,采用独立样本 t 检验,率的比较采用卡方检验,采用偏相关检测血清 HDL-c 与 baPWV 的相关性,采用多元线性回归模型检测 baPWV 的决定因素,以 P<0.05 为有统计学差异。

## 2 结果

### 2.1 老年原发性高血压患者与健康对照人群之间肱踝脉搏波传导速度的比较

老年高血压患者与健康对照人群 SBP、DBP、baPWV 值比较均存在显著差异 (P<0.01), 其中老年高血压患者 baPWV 值 (1812.35± 398.65 cm/s)显著高于健康对照组(1547.58± 343.59 cm/s) (P<0.01)。

### 2.2 不同血压分级的老年原发性高血压患者之间肱踝脉搏波传导速度值比较

不同血压分级的高血压患者 SBP、DBP、baPWV 值之间存在显著差异(P<0.01),其中 3 级高血压组 baPWV 值(1919.45± 431.72 cm/s)显著高于 2 级高血压组(1792.12± 325.27 cm/s)及 1 级高血压组(1585.63± 284.74 cm/s)(P<0.01),而 2 级高血压组 baPWV 值显著高于 1 级高血压组患者(P<0.01),见表 1。

表 1 不同血压分级的老年原发性高血压患者之间肱踝脉搏波传导速度值比较

Table 1 Comparison of the brachial-ankle pulse wave conduction velocity values in different classification of blood pressure in elderly patients with essential hypertension

	Systolic blood pressure(mmHg)	Diastolic blood pressure(mmHg)	baPWV(cm/s)
Grade 1 hypertension group (n=80)	143.56± 11.17	87.52± 8.13	1585.63± 284.74
Grade 2 hypertension group (n=50)	158.69± 12.47*	96.47± 9.67*	1792.12± 325.27*
Grade 3 hypertension group (n=30)	175.89± 17.96**	106.14± 12.17**	1919.45± 431.72**

Note: \*Compared with grade 1 hypertension, P<0.01; # Compared with grade 2 hypertension, P<0.01.

### 2.3 合并不同数量心脑血管危险因素老年原发性高血压患者之间肱踝脉搏波传导速度值比较

合并不同数量心脑血管危险因素老年原发性高血压患者之间 baPWV 值之间存在显著差异(P<0.01),其中伴有至少 3 个危险因素组 baPWV 值 (2013.78± 524.58 cm/s) 显著高于伴有 1~2 个危险因素组 (1899.85± 428.69 cm/s) 及不伴危险因素组 (1327.64± 247.38 cm/s)患者 baPWV 值(P<0.01),而伴有 1~2 个危险因素组与不伴危险因素组患者间 baPWV 值同样存在显著性差异(P<0.01),见图 1。

### 2.4 老年高血压患者 baPWV 变量的影响因素

在多元逐步回归模型中,baPWV 作为自变量,而年龄、性别、吸烟、肥胖、糖尿病、身高、腰围、体重、血压、总胆固醇(TC)、甘油三酯(TG)、空腹血糖(FBS)、低密度脂蛋白胆固醇(LDL-C)、高密度脂蛋白胆固醇(HDL-C)、尿酸(UA)、肌酐(Cr)作为因变量进行统计分析。多元回归分析表明:吸烟史(P<0.01)、冠心病史(P<0.01)、糖尿病史(P<0.01)、年龄(P<0.01)、腰围(P<0.01)、血压(P<0.01)、HDL-C (P<0.01)、TC (P<0.01)、FBS (P<0.01)、LDL-C (P<0.01)、Cr(P<0.01)是 baPWV 升高的危险因素,见表 2。进一步对危险因素分组分析表明吸烟组、有冠心病史组、糖尿病病史组、低 HDL-c 组、高甘油三酯组其 baPWV 水平分别显著高于非吸烟组、无冠心病组、无糖尿病组、正常 HDL-c 组以及血脂正常组(P<0.01)。

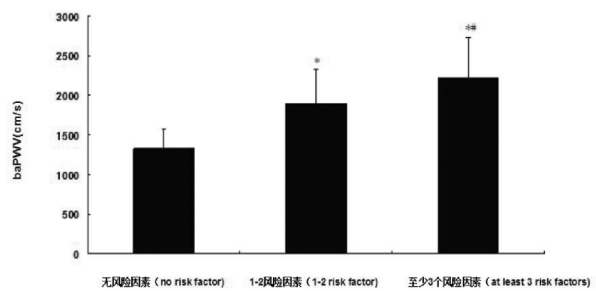


图 1 合并不同数量心脑血管危险因素老年原发性高血压患者之间肱踝脉搏波传导速度值比较

\*\* 与不伴危险因素组比较, P<0.01; # 与伴有 1~2 个危险因素组比较, P<0.01

Fig 1. Comparison of the brachial-ankle pulse wave velocity values of different number of combined cardiovascular and cerebrovascular risk factors in elderly patients with essential hypertension

\*\* Compared with no risk factors group, P<0.01; # and compared with accompanied by 1 to 2 risk factors group, P<0.01

## 3 讨论

近年来,随着人们生活水平提高及生活方式的改变,心脑血管疾病的发病率呈逐年上升趋势,已成为威胁人类健康的主

表 2 老年高血压患者 baPWV 升高的危险因素

Table 2 Risk factors of the increase of baPWV of elderly hypertensive patients

Independent variables	Dependent variable	Standard B	t	P value
baPWV	Smoking	0.324	10.875	p<0.01
	Coronary heart disease	0.098	3.567	p<0.01
	Diabetes mellitus	0.089	3.402	p<0.01
	Age	0.302	10.603	p<0.01
	Waist circumference	0.134	3.781	p<0.01
	Fasting plasma glucose	0.082	3.211	p<0.01
	HDL-C	-0.112	-3.587	p<0.01
	LDL-C	0.092	3.337	p<0.01
	Cr	0.096	3.421	p<0.01
	TC	0.079	2.927	p<0.01

要杀手之一。研究证实,血管结构与功能的异常是心脑血管疾病的发病的基础,包括高血压在内的许多心脑血管危险因素可导致大动脉结构和功能的损害,是引起早期血管改变的重要因素。因此,早期发现及干预心脑血管疾病是预防心脑血管疾病致死致残的重要措施<sup>[6-14]</sup>。

原发性高血压患者的 RAS 系统、交感神经系统活性较正常人群增高,且高血压可促进动脉纤维化的形成。老年原发性高血压患者较易伴随不同程度的糖脂代谢异常,表现为腹型肥胖、高脂血症、糖耐量异常的症状,因此更易发生血管病变。踝脉搏波传导速度(baPWV)能准确反映高血压患者大动脉的弹性和僵硬程度,因而通过早期检测动脉硬化并进行干预治疗是降低高血压等心脑血管疾病发病率和死亡率的重要措施<sup>[20-21]</sup>。目前,baPWV 作为心脑血管疾病无创检测评估动脉弹性的重要手段已在国内外得到广泛应用,脉搏波传导速度(PWV)和踝臂指数(ABI)检测是评价动脉硬化和扩张性的简单方法,具有非侵入性,测量精确和重复性好等多种优势,已逐步发展为临床上常用的评价血管病变的指标<sup>[15-19]</sup>。

本研究主要探讨了老年原发性高血压患者脉搏波传导速度与心脑血管危险因素的关系,研究影响僵硬程度改变和动脉弹性的主要因素。结果发现不同血压分级的老年原发性高血压患者之间踝脉搏波传导速度值存在显著差异,合并冠心病、肥胖、糖尿病、吸烟、高脂血症等危险因素的高血压患者其 baPWV 值显著高于单纯性原发性高血压患者。多元回归分析表明:吸烟史、冠心病史、糖尿病史、年龄(P<0.01)、腰围、血压、HDL-C、TC、FBS、LDL-C、Cr 这些指标是 BaPWV 升高的危险因素。这些结果提示老年原发性高血压患者存在不同程度的的动脉僵硬增高,常见心脑血管危险因素可影响老年原发性高血压患者的动脉僵硬程度。

总之,早期检测老年原发性高血压患者的血管病变对早期发现及合理药物干预及生活方式指导具有十分重要的临床意义,可有效降低心脑血管疾病致死致残的发生率。

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像呈高信号,其ADC值显著低于正常宫颈组织,且其水平与MVD呈显著负相关。

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