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藏族原发性高血压患者血管内皮功能与 糖脂代谢指标和血压变异性的关系 *

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摘要 目的:研究藏族原发性高血压患者血管内皮功能与糖脂代谢指标和血压变异性的关系。**方法:**以2017年2月-2018年2月暨南大学医学院附属广州红十字会医院收治的200例藏族原发性高血压患者为研究对象。将所有患者按照肱动脉血流介导的血管舒张功能(FMD)值分为正常FMD组($FMD \geq 6\%$)48例与异常FMD组($FMD < 6\%$)152例。分别比较两组患者的基本资料、糖脂代谢指标以及血压变异性指标水平,并分析藏族原发性高血压患者FMD与糖脂代谢和血压变异性的相关性。**结果:**异常FMD组年龄、空腹血糖水平高于正常FMD组($P < 0.05$),而两组总胆固醇、甘油三酯、低密度脂蛋白胆固醇(LDL-C)、高密度脂蛋白胆固醇(HDL-C)水平对比差异均无统计学意义($P > 0.05$)。异常FMD组日间收缩压、日间舒张压、夜间收缩压、夜间舒张压、24h收缩压、24h舒张压水平均高于正常FMD组($P < 0.05$)。经Pearson相关性分析可得:藏族原发性高血压患者FMD值与空腹血糖、日间收缩压、日间舒张压、夜间收缩压、夜间舒张压、24h收缩压、24h舒张压均呈负相关关系($P < 0.05$)。**结论:**藏族原发性高血压患者血管内皮功能受损越严重,其空腹血糖、血压就越高,临床工作中可通过联合检查上述指标水平,有助于评估藏族原发性高血压患者血管内皮功能。

关键词:原发性高血压;藏族;糖脂代谢;血压变异性;血管内皮功能

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Relationship between Vascular Endothelial Function and Glycolipid Metabolism Indexes and Blood Pressure Variability in Tibetan Patients with Essential Hypertension*

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ABSTRACT Objective: To study the relationship between vascular endothelial function and glycolipid metabolism indexes and blood pressure variability in Tibetan patients with essential hypertension. **Methods:** A total of 200 Tibetan patients with essential hypertension, who were treated in Guangzhou Red Cross Hospital Affiliated to Jinan University School of medicine from February 2017 to February 2018, were selected as research subjects. All the patients were divided into normal FMD group ($FMD \geq 6\%$) ($n=48$) and abnormal FMD group ($FMD < 6\%$) ($n=152$) according to the blood flow mediated vascular diastolic function (FMD) value of brachial artery. The basic data, the levels of glycolipid metabolism indexes and blood pressure variability indexes of the two groups were compared. The correlation between FMD and glycolipid metabolism and blood pressure variability in Tibetan patients with essential hypertension were analyzed. **Results:** Age and the level of fasting blood glucose in the abnormal FMD group were higher than those in the normal FMD group ($P < 0.05$). There were no significant differences in total cholesterol, triglyceride, low density lipoprotein cholesterol (LDL-C) and high density lipoprotein cholesterol (HDL-C) between the two groups ($P > 0.05$). The levels of daytime systolic pressure, daytime diastolic pressure, night systolic pressure, night diastolic pressure, 24h systolic pressure and 24h diastolic pressure in the abnormal FMD group were all higher than those in the normal FMD group ($P < 0.05$). The results of Pearson correlation analysis showed that the FMD values of Tibetan patients with essential hypertension were negatively correlated with fasting blood glucose, daytime systolic pressure, daytime diastolic pressure, night systolic pressure, night diastolic pressure, 24h systolic pressure and 24h diastolic pressure ($P < 0.05$). **Conclusion:** The more serious damage of vascular endothelial function is in Tibetan patients with essential

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hypertension, the more higher levels of fasting blood glucose and blood pressure are. In clinical work, joint examination of these indicators can help assess endothelial function in Tibetan patients with essential hypertension.

Key words: Essential hypertension; Tibetan; Glycolipid metabolism; Blood pressure variability; Vascular endothelial function

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前言

随着人们生活水平的不断提高以及饮食结构的逐渐改变,相关研究数据表明,高血压发病率正呈逐年升高的趋势,其已成为影响我国中老年人群生命健康安全的主要疾病之一^[1]。临床上将高血压分为原发性高血压以及继发性高血压,其中绝大部分患者均为原发性高血压,该病的发病原因众多,且防病机制尚未完全阐明,多数研究报道显示高血压是由多种因素相互影响、共同作用导致的结果^[2-4]。藏族是我国少数民族之一,具有居住海拔普遍较高、民族聚居等遗传特点,且藏族居民膳食习惯、宗教信仰以及民族风俗均与汉族存在明显差异,这可能是导致藏族的高血压发病率在我国众多民族中位居首位的重要原因^[5-6]。目前,临床上关于原发性高血压的研究较多,但主要是集中在早期诊断、临床治疗以及预后评估等方面,同时针对藏族原发性高血压患者的相关研究并不多见。另有研究报道显示,血管内皮功能障碍属于动脉粥样硬化的早期生理病变,在动脉粥样硬化及其并发症的发生中起着至关重要的作用,且对原发性高血压患者的未来心血管事件发生具有预测价值^[7-9]。鉴于此,本文通过研究藏族原发性高血压患者血管内皮功能与糖脂代谢指标和血压变异性的关系,旨在为藏族原发性高血压的诊断、治疗以及预后评估提供参考依据,现阐述如下。

1 资料与方法

1.1 一般资料

以2017年2月-2018年2月暨南大学医学院附属广州红十字会医院收治的200例藏族原发性高血压患者为研究对象。纳入标准:(1)所有患者均符合《中国高血压防治指南》^[10]中所制定的相关诊断标准;(2)均为藏族;(3)临床病历资料完整;(4)入院前未接受任何相关治疗;(5)所有患者均签署了知情同意书。排除标准:(1)继发性高血压者;(2)合并糖尿病、脑血管意外以及急慢性感染性疾病者;(3)合并肝、肾等脏器功能严重障碍者;(4)妊娠期和哺乳期妇女;(5)存在交流沟通障碍或精

神疾病者;(6)正参与其他研究者。其中男性患者91例,女性患者109例,年龄33-82岁,平均 (56.39 ± 12.83) 岁;病程2-16年,平均 (8.08 ± 3.25) 年;体质量指数(body mass index, BMI) $18-26 \text{ kg/m}^2$,平均 $(22.86 \pm 1.92) \text{ kg/m}^2$ 。我院伦理委员会已批准此次研究。

1.2 研究方法

(1)血管舒张功能(flow-mediated dilation, FMD)值的测定:测量前6h禁止患者吸烟、饮酒、进食。在安静状态下取仰卧位,首先进行肱动脉基础内径的测量,随后将袖带缚于上臂,并进行充气,保证压力>收缩压50 mmHg,阻断肱动脉血流5 min,测定肱动脉舒张后内径。 $\text{FMD} = (\text{肱动脉舒张后内径} - \text{动脉基础内径}) / \text{动脉基础内径} \times 100\%$ 。将所有患者按FMD值分为正常FMD组($\text{FMD} \geq 6\%$)48例与异常FMD组($\text{FMD} < 6\%$)152例。(2)糖脂代谢指标检测:分别采集两组患者清晨空腹静脉血5 mL,以7060型全自动生化分析仪检测空腹血糖、低密度脂蛋白胆固醇(LDL-C)、总胆固醇、甘油三酯、高密度脂蛋白胆固醇(HDL-C)水平。(3)血压变异性检测:采用DS-250型动态血压检测仪(日本NISSEI公司)检测日间收缩压、日间舒张压、夜间收缩压、夜间舒张压、24h收缩压、24h舒张压。

1.3 统计学方法

本研究数据均采用SPSS20.0软件进行检测分析,以(%)表示性别比例等计数资料,予以 χ^2 检验,以 $(\bar{x} \pm s)$ 表示糖脂代谢、血压变异性指标水平等计量资料,予以t检验。FMD值与糖脂代谢、血压变异性指标的相关性予以Pearson相关性分析。检验标准设置为 $\alpha=0.05$ 。

2 结果

2.1 两组患者基本资料情况对比

两组性别、病程、BMI比较差异无统计学意义($P>0.05$),异常FMD组年龄高于正常FMD组,差异有统计学意义($P<0.05$),见表1。

表1 两组患者基本资料情况对比
Table 1 Comparison of the basic data of the two groups

Groups	n	Age(years old)	Sex(male/female)	Course of disease(years)	BMI(kg/m ²)
Normal FMD group	48	53.23± 11.52	21/27	8.13± 3.32	22.13± 1.85
Abnormal FMD group	152	58.48± 13.75	70/82	8.04± 3.37	23.59± 1.74
χ^2/t	-	2.848	0.078	0.162	0.949
P	-	0.005	0.780	0.872	0.339

2.2 两组患者糖脂代谢指标水平对比

异常FMD组空腹血糖水平高于正常FMD组,差异有统计学意义($P<0.05$);而两组总胆固醇、甘油三酯、LDL-C、

HDL-C水平对比差异均无统计学意义($P>0.05$),见表2。

2.3 两组患者血压变异性情况对比

异常FMD组日间收缩压、日间舒张压、夜间收缩压、夜间

舒张压、24h 收缩压、24h 舒张压水平均高于正常 FMD 组,差异 有统计学意义($P<0.05$),见表 3。

表 2 两组患者糖脂代谢指标水平对比($\bar{x}\pm s$, mmol/L)

Table 2 Comparison of levels of glycolipid metabolism indexes between the two groups($\bar{x}\pm s$, mmol/L)

Groups	n	Fasting blood glucose	Total cholesterol	Triglyceride	LDL-C	HDL-C
Normal FMD group	48	4.86± 0.53	4.74± 1.23	1.96± 1.10	2.81± 1.01	1.14± 0.28
Abnormal FMD group	152	5.30± 0.62	4.92± 1.30	1.98± 1.22	2.80± 0.86	1.20± 0.31
t	-	4.430	0.847	0.101	0.067	1.195
P	-	0.000	0.398	0.919	0.946	0.233

表 3 两组患者血压变异性情况对比($\bar{x}\pm s$, mmHg)

Table 3 Comparison of blood pressure variability between the two groups($\bar{x}\pm s$, mmHg)

Indexes	Normal FMD group(n=48)	Abnormal FMD group(n=152)	t	P
Daytime systolic pressure	133.28± 4.21	138.34± 11.48	2.987	0.003
Daytime diastolic pressure	80.92± 5.85	86.30± 7.53	4.534	0.000
Night systolic pressure	117.38± 7.63	133.69± 10.52	9.940	0.000
Night diastolic pressure	80.11± 5.74	82.36± 7.16	1.984	0.049
24h systolic pressure	10.61± 2.22	12.30± 2.59	4.071	0.000
24h diastolic pressure	15.30± 3.37	17.25± 3.29	3.559	0.001

2.4 藏族原发性高血压患者 FMD 值与糖脂代谢、血压变异性指标的相关性分析

经 Pearson 相关性分析可得:藏族原发性高血压患者 FMD 值与空腹血糖、日间收缩压、日间舒张压、夜间收缩压、夜间舒张压、24h 收缩压、24h 舒张压均呈负相关关系($P<0.05$),见表 4。

表 4 藏族原发性高血压患者 FMD 值与糖脂代谢、血压变异性指标的相关性分析

Table 4 Correlation analysis of FMD values with glycolipid metabolism and blood pressure variability indexes in Tibetan patients with essential hypertension

Related indexes	FMD	
	r	P
Fasting blood glucose	-0.331	0.012
Daytime systolic pressure	-0.432	0.000
Daytime diastolic pressure	-0.614	0.000
Night systolic pressure	-0.508	0.000
Night diastolic pressure	-0.376	0.026
24h systolic pressure	-0.462	0.000
24h diastolic pressure	-0.383	0.001

3 讨论

血管与心脏是原发性高血压的重要靶器官,且有相关研究报道显示,血管内皮功能障碍属于高血压最早期的血管损害,主要是由血管内皮舒张因子和血管内皮收缩因子之间的平衡被打破而导致的^[11-13]。血管内皮细胞的功能较为复杂,可通过分泌多种因子发挥直接或间接地发挥调节血管张力、保护血管功

能以及维持血管弹性的作用^[14,15]。同时,血管内皮易受各种因素的侵害,从而引起血管内皮功能障碍,继而可影响动脉粥样硬化的形成,在高血压靶器官损伤以及心血管事件的发生、发展过程中起着至关重要的作用,可作为高血压治疗、预后的新靶点^[16-18]。而血压变异性可以反映机体在一定时间内血压的波动程度,且随着相关研究报道的逐渐深入,越来越多的学者发现血压变异性是心脑血管疾病预后的较强预测因子^[19-21]。

本研究结果发现,异常 FMD 组年龄、空腹血糖水平高于正常 FMD 组($P<0.05$),这在李秀诗等^[22]人的研究报道可加以佐证,提示了随着年龄的不断增加,藏族原发性高血压患者的 FMD 值逐渐降低,即血管内皮功能越来越差。其中主要原因可能与随着年龄的不断增长,机体抵抗力、免疫力以及各项器官、组织功能逐渐下降有关。此外,藏族原发性高血压患者的血管内皮功能与空腹血糖水平存在密切相关,且随着空腹血糖水平的逐渐升高,患者血管内皮功能障碍越明显。已有不少研究学者发现,在糖尿病患者中高血糖、胰岛素抵抗以及氧化应激等多种因素可共同作用于血管,进一步引发全身血管粥样硬化改变,导致大血管和微血管并发症,因此血糖是血管内皮功能障碍的危险因素之一^[23-25],在临床治疗原发性高血压患者过程中,需严格控制患者血糖水平,从而有效减少血管内皮功能损害。本研究结果还显示,异常 FMD 组血压变异性各项指标水平均高于正常 FMD 组,这提示了血压变异性可能在血管内皮功能损害过程中起着至关重要的作用。管内皮功能障碍会导致血管弹性降低,同时增大血管壁所承受的压力,进一步促使血压变异性发生改变^[26]。与此同时,血管内皮功能障碍的发生破坏了内皮素-1/一氧化氮的平衡状态,促使内皮依赖性舒张功能降低甚至消失,从而使得血管弹性和血管壁结构发生改变,继而改变血压变异性^[27]。此外,血管内皮功能障碍患者的肾素-血管紧张素-醛固酮系统处于长期激活状态,且血管以收缩状态为

主,导致日间和夜间血压持续升高^[28,29]。李超民等^[30]人的研究报道也指出,老年原发性高血压患者机体的血管内皮功能也存在较为典型的功能性异常,同时其血压也将产生一定的变异性。本研究进一步经 Pearson 相关性分析显示:藏族原发性高血压患者 FMD 值与空腹血糖、日间收缩压、日间舒张压、夜间收缩压、夜间舒张压、24h 收缩压、24h 舒张压均呈负相关关系 ($P < 0.05$)。这提示了随着上述指标水平的不断增加,藏族原发性高血压患者的血管内皮功能障碍越明显。临床工作中可通过对患者上述指标的检测,从而有效反映其血管内皮功能,进一步为临床治疗方案的制定提供参考依据。

综上所述,临床工作中可通过联合检测空腹血糖水平与血压变异性的情况,从而有效评估藏族原发性高血压患者的血管内皮功能,进一步为有效控制疾病、改善预后提供指导作用。

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