

序进行,无创倾斜方法测定的结果还是可靠的。如果有条件开展有创穿刺桡或肱动脉监测每一心搏血压,试验结果将会更加精确。

REFERENCES

1 Robert J,Justine H,Richard A, et al. Baroreflex sensitivity and heredity in essential hypertension. *Circulation* 1992;85:497

2 Eckberg DL. Carotid baroreflex function in young men with borderline blood pressure elevation. *Circulation* 1979;59:632

3 Goldstein DS, Horwitzd K. Comparison of technique for measuring baroreflex sensitivity in man. *Circulation* 1982;66:432

4 范中杰,吴宁. 急性心肌梗塞患者的压力反射敏感性测定. *中华心血管病杂志* 1998;26:51

5 Ewing DJ,Campbell IW,Murray A,et al. Immediate heart rate responses to stand, simple test for autonomic neuropathy in diabetic. *Br Men J* 1978;1:145

6 Suman V,Norma E,Kishan G,et al. Hemodynamic response to orthostatic stress in the elderly with systolic systemic hypertension. *Am J Cardiol* 1993;71:582

7 Suman V,Norma E,Kishan G,et al. Baroreflex function systemic hypertension. *Am J Cardiol* 1994;73:253

8 罗助荣,陈孟扬,胡锦表. 被动直立倾斜试验测定人体压力反射功能研究. *临床心血管病杂志* 1997;13:98

172-174

高血压病患者胰岛素抵抗与心率变异的关系

蒋赞利 牛小麟 王世臣

(西安医科大学第二临床医学院心内科,西安 710004)

Iusulin Resistance and Heart Rate Variability in hypertension

Jiang Zanli Niu Xiaolin Wang Shichen

(Department of Cardiovascular Internal Medicine, Second Teaching Hospital, Xian Medical University, Xi'an)

ABSTRACT Aim To study the changes of indices of the insulin resistance (IR) and heart rate variability(HRV) in hypertension and the relation between IR and HRV. **Methods** The oral glucose tolerance test,blood insulin and HRV were investigated in thirty seven hypertensive patients and 16 normal control subjects. **Results** 62 percent of hypertensive patients had hyperinsulinemia and insulin resistance. The mean of the standard deviation of all normal RR intervals for all 5 minutes segments(SDNNI) in hypertension with IR was significantly higher than control subjects. However, standard deviation of all normal RR intervals in the entire 24 hours ECG recording(SDNN),standard deviation of average RR intervals for all 5 minutes segments in 24 hours recording(SDANNI),the root mean square successive difference(rMSSD), and the percent of difference between adjacent normal RR interval>50 ms(PNN₅₀) were significantly lower. **Conclusion** Changes of the heart rate variability may be ascribed to sympathetic hyperactivity and parasympathetic withdrawal caused by IR.

KEY WORDS hypertension; insulin resistance; heart rate variability

目的 探讨高血压病患者心率变异指标变化和胰岛素抵抗之间的关系。 **方法** 37例高血压病患者和16例正常人行糖耐量试验和测定胰岛素释放曲线的同时测定心率变异各项指标。 **结果** 高血压病人中62%存在高胰岛素血症和胰岛素抵抗,其24小时RR间期均值的标准差指数(SDNNI)明显高于正常人,而24小量内RR间期的标准差(SDNN)5分钟RR间期均值标准差指数(SDANNI)和相邻心搏RR间期差值的均方根(rMSSD)及相邻心搏RR间期大于50ms的百分比(PNN₅₀)明显低于正常人。 **结论** 高血压病患者的的心率变异和胰岛素抵抗所引起的交感神经增强和副交感神经的活性减弱有关。

关键词 高血压; 胰岛素抵抗; 心率变异

胰岛素抵抗(Insulin resistance,IR)是高血压病一个独立危险因素,并且可能具有病原学意义^[1]。胰岛素抵抗可能以通过肾钠潴留、交感神经活性增强等多种机制参与高血压病的始动形成^[2]。心率变异

(Heart rate variability,HRV)测定是反映体内植物神经系统功能的无创性检查,可定量评估心脏交感、副交感神经张力。本文旨在探讨IR与HRV之间的关系。

MATERIALS AND METHODS

1 对象

1.1 高血压病组 37例(男22例,女15例),均符合WHO高血压标准。年龄42~76岁,平均体重指数 $25.3 \pm 3.2 \text{ kg/m}^2$ 。I期14例,II期21例,III期2例。全部病例均排除了症状性高血压,高血压合并冠心病或糖尿病。实验前停药降压药1~2周。

1.2 正常对照组 16例(男10例,女6例)。年龄46~67岁,平均体重指数 $22.4 \pm 2.9 \text{ kg/m}^2$ 。血压正常,无其它系统疾病。

2 Holter监测与HRV分析 采血当天接受动态心电图检查系统采样,佩带磁带式记录盒24小时。将记录磁带回放,在微机上用专用HRV分析软件处理,自动检出24小时全部窦性心律,进行数理统计,取得5种HRV时域指标。SDNN:24小时内RR间期的标准差。SDANNI:5分钟RR间期均值的标准差指数。SDNNI:标准差指数。rMSSD:相邻心搏RR间期差值的均方根。PNN₅₀:相邻心搏RR间期大于50ms的百分比。

3 统计 全部资料输入后用SAS统计软件包作两组t检验, $P < 0.05$ 有统计学意义。

RESULTS

1 正常组、高血压病组、高血压并IR组的血糖、胰岛素、胰岛素曲线下面积及胰岛素与血糖比值 Tab 1

Tab 1 Comparison of SG, IS and AUC in three group

	Control	Hypertension	
	(n=16)	Non-IR(n=15)	IR(n=22)
SG(mmol/L)			
0h	5.1±0.5	4.9±0.6	6.4±0.4
1h	8.0±0.6	8.3±0.4	12.8±0.6
2h	5.1±0.4	5.5±0.6	8.8±0.5
3h	3.8±0.3	4.2±0.4	6.3±0.4
AUC _{SG}	17.5±1.2	20.1±1.1	24.9±1.3
IS(mU/L)			
0h	5.4±2.2	8.7±1.8	13.4±2.0*
1h	45.3±11.5	65.2±12.4	98.6±14.3*
2h	28.6±8.7	40.8±6.7	68.7±10.5*
3h	5.8±0.8	11.2±1.2	32.3±6.5*
AUC _{IS}	72.5±13.2	86.5±14.3	184.2±18.8*△
IS/SG			
0h	1.1±0.2	1.7±0.3	2.1±0.4*
1h	5.6±0.7	8.1±1.3	7.7±1.8*
2h	5.6±0.5	7.4±0.9	7.8±1.1*
3h	1.5±0.3	2.6±0.5	5.4±0.6*△
AUC _{IS} /AUC _{SG}	4.1±0.4	4.3±1.2	7.1±0.5*△

*: $P < 0.05$ vs Control, △: $P < 0.05$ IR vs non-IR

IR: insulin resistance; SG: serum glucose; IS: insulin; AUC: area under curve($\text{mmol} \cdot \text{h}^{-1} \cdot \text{L}^{-1}$ in SG; $\text{mU} \cdot \text{h}^{-1} \cdot \text{L}^{-1}$ in IS)

结果显示高血压病组37例中22例(62%)存在高胰岛素血症,即糖耐量试验时表现血胰岛素升高较SG升高为明显,提示胰岛素抵抗。高血压IR组的IS/SG和AUC_{IS}/AUC_{SG}亦明显升高。

2 三组HRV各指标的比较见Tab 2

Tab 2 Comparison of the HRV indices in three groups

	Control	Hypertension	
	(n=16)	Non-IR(n=15)	IR(n=22)
SDNN(ms)	135.2±23.5	124.3±22.8	108.8±29.5*
SDANNI(ms)	132.4±25.8	125.8±24.5	105.5±30.6*
SDNNI(ms)	24.3±5.4	29.2±24.5	38.2±7.8*
rMSSD(ms)	28.9±6.8	23.2±8.5	20.1±5.4*
PNN ₅₀ (%)	5.8±7.2	4.6±6.2	3.1±4.5*

*: $P < 0.05$ vs control

SDNN: standard deviation of all normal RR intervals in the entire 24 hours ECG recording; SDANNI: standard deviation of average normal RR intervals for all 5 minutes segment in 24 hours recording; SDNNI: mean of the standard deviation of all normal RR intervals for all 5 minutes segments; rMSSD: root mean square successive difference; PNN₅₀: percent of difference between adjacent normal RR interval > 50 ms

结果显示,高血压IR组SDNNI明显升高,而SDNN、SDANNI、rMSSD和PNN₅₀显著降低。非IR高血压组则和正常组无明显差别。

DISCUSSION

目前国内外大多数学者认为胰岛素抵抗是高血压病的一个独立危险因素。本文对高血压患者测定葡萄糖耐量和胰岛素释放曲线,研究存在胰岛素抵抗的高血压患者和心率变异各指标之间的关系。

心率变异可反映机体植物性神经系统功能状态,它可分为时域和频域分析法两种;两者均反映心率变异的基本特征,实质是等效的^[3]。本文采用时域指标,其中SDNNI主要反映交感神经活性,而rMSSD和PNN₅₀反映副交感神经活性,SDNN和SDANNI反映植物神经整体功能^[3]。结果显示高血压IR组主要反映交感神经活性的SDNNI明显升高,而反映副交感神经活性的rMSSD和PNN₅₀明显降低。而反映植物神经整体功能的SDNN和SDANNI亦降低,说明植物神经整体功能削弱。最近国外用频域分析法结果低频成份增加,高频明显减少为特征的变化^[4],和本文结果基本一致。

胰岛素抵抗增强交感神经活性在高血压形成机制中起一定作用^[5]。心率变异的测定反映了胰岛素抵抗高血压患者的植物性神经系统的紊乱,促进了血压

调节障碍,导致高血压病的发生和发展。

REFERENCES

1 Swislocki A. Insulin resistance and hypertension. *Am J Med Sci* 1990;300:104
 2 Sundeep M. Insulin resistance in systemic hypertension; pharmacotherapeutic implications. *J Clin Pharmacol* 1995;35:943
 3 Thomas J. Correlation among time and frequency domain measures

of heart period variability two weeks after acute myocardial infarction *Am J Cardiol* 1992;69:891

4 Guzzetti S, Piccaluga E, Casati R, et al. Sympathetic predominance in essential hypertension; A study employing spectral analysis of heart rate variability *J Hypertens* 1988;6:711
 5 DeFronzo RA. Insulin resistance: A multifaceted syndrome responsible for NIDDM, obesity, hypertension, dyslipidemia, and atherosclerotic cardiovascular disease. *Diabetes Care* 1991;14:173

174-176

核黄素对心绞痛治疗作用的临床研究

金明 左保华 周志泳 杨会杰
(皖南医学院心血管功能研究所, 芜湖 241001)

The Therapeutic Efficacy of Riboflavin on Angina Pectoris

Jin Ming, Zuo Baohua, Zhou Zhiyong, Yang Huijie
(Institute of Cardiovascular Function Research, Wannan Medical Collage, WuHu)

ABSTRACT Aim The therapeutic efficacy of riboflavin (RBF) on angina was evaluated. **Methods** 78 cases of angina were divided into B group (n=28, RBF 75 mg · d⁻¹ × 30, po). Group I (n=22, isosorbide dinitrate 15 mg · d⁻¹ × 30, po) and C group (n=28, placebo for 30 days). EKG, platelet aggregation in blood and serum malondialdehyde (MDA) content were examined before and after drug. The clinical manifestations of angina were recorded before and after treatment two weeks or four weeks. **Results** The total effective rate of EKG and therapeutic effect of angina was significantly higher in B group than that in C group (P<0.01, P<0.01, respectively.) But no significant difference was found between B and I group. **Conclusion** Riboflavin is an effective drug for angina and it's mechanism may be related to antiplatelet aggregation and inhibiting lipid peroxidation in patient with angina.

KEY WORDS riboflavin; angina; isosorbide dinitrate

目的 观察核黄素对心绞痛的临床疗效。 **方法** 78例劳力性心绞痛患者随机分成B组(n=28,核黄素75 mg · d⁻¹, po), I组(n=22,硝酸异山梨(醇)酯15 mg · d⁻¹, po)和C组(n=28,安慰剂, po), 各组均连续服药4W。用药前后检测静息心电图(EKG)、血小板聚集性(PAG)和血清丙二醛(MDA)含量,并于用药前、用药第2W、用药第4W末记录心绞痛症状。结果核黄素对EKG和心绞痛症状的疗效与硝酸异山梨(醇)酯相比无明显差异,但显著高于C组(P<0.01, P<0.01)。 **结论** 核黄素能有效治疗心绞痛,其机制可能与抑制血小板聚集和抗脂质过氧化作用有关。

关键词 核黄素; 心绞痛; 硝酸异山梨(醇)酯 治疗

近年来研究发现摄入大量维生素可降低脑卒中、急性心肌梗塞和猝死等心血管意外的发生率,抑制动脉粥样硬化和冠心病的发生、发展^[1]。有报道冠心病的发生率与B族维生素的摄入量密切相关^[2]。本实验室在先前实验中发现核黄素(RF)能显著改善心肌缺血和缩小梗塞范围^[3]。但核黄素(RF)能否治疗心绞痛,迄今未见报道。为此作者进行了临床观察,并初步

探讨其可能的作用机制。

OBJECTIVES AND METHODS

1 对象选择和给药方法

按1979年WHO通过的“缺血性心脏病的命名及诊断标准”^[4],而确诊的94~96年门诊冠心病患者78例,心功能为I~II级(纽约心功能分级标准)。按就诊先后随机分成三组:①B组(核黄素组,核黄素75 mg · d⁻¹, po, 浙江天美制药有限公司)28例。其中