扩张型心肌病患者恶性室性心律失常与心率变异性关系分析

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摘要 目的:了解扩张型心肌病患者恶性心律失常(MVA)与心率变异性(heart rate variability,HRV)的关系,探讨扩心病患者体内自主神经变化的临床意义。**方法**:选择扩心病患者48例作为研究对象,同时按照年龄配对,取48例正常者作为对照组,对其行24小时动态心电图检查,依据其是否出现恶性心律失常分为恶性室性心律失常(MVA+)组及单纯扩张型心肌病(MVA-)组,分析组间HRV的差异。**结果**:与对照组比较,单纯扩张型心肌病(MVA-)组HRV时域指标(SDNN、SDANN、RMSSD)均有降低($P<0.05$)L与(MVA-)组相比,恶性室性心律失常(MVA+)组HRV相关指标进一步降低($P<0.05$)。**结论**:自主神经功能异常是扩张型心肌病患者恶性心律失常的重要危险因子,可能可以用HRV预测其发生恶性心律失常危险性。

关键词:扩张型心肌病;心率变异性;自主神经功能;恶性室性心律失常

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Analysis of the Relation between HRV and Malignant Ventricular Arrhythmia in Patient with Dilated Cardiomyopathy

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ABSTRACT Objective: To analyze the relation between Heart Rate Variability (HRV) and malignant ventricular arrhythmia(MVA) in patient with dilated cardiomyopathy (DCM), and to provide clinic basis for predicting the risk of death. Methods: We divide the 48 patients with dilated cardiomyopathy into 2 groups according to MVA, we also collect 48 normal people as control. They are MVA(+) group, MVA(-) group and normal control group. We analyze the difference of HRV indexes such as SDNN, SDANN and RMSSD among the 3 groups. Results: The indexes of SDNN, SDANN and RMSSD in MVA (+) group are lower than those in MVA (-) group, and the indexes of HRV in MVA (-) group is lower than normal group using ANOVA. Conclusions: MVA is closely related to the decrease of HRV. HRV might be used to predict the incidence of MVA and sudden death in patient with DCM.

Key words: Dilated cardiomyopathy(DCM); Heart rate variability(HRV); Autonomic nerve function; Malignant ventricular arrhythmia(MVA)

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心率变异性(HRV)**是一种能够定量反映自主神经活动及其调节功能的检测方法,具有敏感度高、可重复性等优点,对评价许多神经内分泌疾病和心血管疾病过程中自主神经的变化具有非常重要的价值**[1-4],**已成为近年来研究心电信号处理领域的一个热点。许多研究发现,扩张型心肌病患者其**HRV**明显低于正常人群**[5,6],**本文进一步研究扩张型心肌病恶性心律失常与**HRV**关系。**

1 资料与方法

1.1 研究对象

自2008**年**2**月至**2011**年**8**月共收集我院住院扩张心肌病患者共**48**人,其中,男**30**人,女**18**人,平均年龄**58.2±5.4**岁。另外依据年龄、性别匹配,选取正常无扩张心肌病者**48**人作为正常对照组。**

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1.2 研究方法

扩张型心肌病患者在入院时行一般体格检查后,立即安排24**小时动态心电图检查,并同步行**NT-proBNP、**血常规、肝肾功能、电解质及心脏彩超等检查。依据**24**小时动态心电图结果非为恶性室性心律失常**(MVA+)**组及单纯扩张型心肌病(MVA-)组,分析**HRV**与恶性心律失常关系。**

1.3 扩张型心肌病诊断标准

扩张型心肌病诊断标准(1995年中华医学会**):①**临床表现心脏扩大、心室收缩功能减退伴或不伴充血性心力衰竭。②心脏扩大,X线心胸比例大于0.5,超声心动图示全心长大,尤以左心室扩大为显,左室舒张期末内径≥27cm/m^2,心脏呈球形。③心室收缩功能减低超声心动图检测室壁运动弥漫性减弱,射血分数小于正常值。④必须排除其他特异性(继发性)心肌病如缺血性心肌病、围产期心肌病等及地方性心肌病(克山病)。**

1.4 HRV诊断标准

采用中华心血管病杂志编委会心率变异性对策专题组推荐的24 h**时域分析指标,各指标正常值范围**:SDNN(**全部窦性心搏间期的标准差**):141±39 ms(<100ms**为中度降低**,<50m

s为明显降低); SDANN (24 h每 5 min窦性心搏间期均值的标准差):127± 35 ms; rM SSD(正常连续窦性心搏间期差值的均方根值): 27± 12 ms[7]。

恶性室性心律失常诊断标准：依据 LOWN 室性早搏严重程度分级在 3-5 级者判断为恶性室性心律失常[8]。

1.5 统计学方法

所有计数资料采用所有数据均在 SPSS13.0 中进行统计分析。计量资料以均数± 标准差 ($\bar{x}$ ± s) 表示。组间比较采用配对 t 检验，率的比较采用 X^2 检验，相对危险度检验采用 RR 分析及 logistic 回归分析，所有检验均为 P 小于 0.05 具有统计学意义。

2 结果

2.1 扩心病患者依据有无 MVA 分组后一般特征比较

依据扩张型心肌病患者是否出现恶性心律失常分为恶性室性心律失常(MVA＋)组及单纯扩张型心肌病(MVA－)组，组间一般特征指标比较见表 1。由表 1 可见，年龄、肌酐、尿酸、NT-proBNP、左室舒张末容积(LVEF)及心室晚电位阳性(VLP)率皆为 MVA(＋)组高于 MVA(－)组 ;左室射血分数则相反，为 MVA(－)组高于 MVA(＋)组，上述指标的组间差异皆有统计学意义。而性别比、收缩压、舒张压、心率之间的组间差异没有统计学意义，尚不能认为这些指标在两组间有所不同。

表 1 依据有无恶性室性心律失常分组人群特征分析

Table 1 Demographic and clinical characteristics of participants according to MVA

Index	Group (n=48)	
	MVA(＋) (n=17)	MVA(－) (n=31)
Age (years)	66.4± 10.3	62.1± 8.5#
Male/female	12/5	18/13
SBP (mmHg)	87.40± 7.46	90.80± 13.799
DBP (mmHg)	43.89± 12.479	46.47± 7.379
HR (bpm)	72	75
Crea (μmol/L)	88.41± 22.468	80.565± 12.648#
Uric acid (μmol/L)	412.670± 102.457	337.045± 82.238#
NT-proBNP (pg/ml)	12082.040± 2100.937	60047.84± 2691.356*
LVEF	29.6± 5.92	34.1± 3.89#
LVEDV	72.6± 5.86	66.3± 5.32#
VLP(＋)%	35.29%	6.45%#

Note: * P＜0.01, # P＜0.05. MVA: malignant ventricular arrhythmia. SBP: systolic blood pressure. DBP: diastolic blood pressure. HR: heart rate. Crea: creatinine. NT-proBNP: N-terminal pro-brain natriuretic peptide. LVEF: left ventricular ejection fraction. LVEDV: left ventricular end-diastolic volume. VLP: ventricular late potential.

2.2 恶性室性心律失常 (MVA＋) 组、单纯扩张型心肌病(MVA－)组及正常对照组间的 HRV 比较

使用方差分析比较恶性室性心律失常(MVA＋)组、单纯扩张型心肌病(MVA－)组及正常对照组间的 HRV 情况，其结果如表 2 所示。由表 2 可见，HRV 各指标皆为 (MVA＋)组(MVA－)组＜对照组，各指标两两组间比较差异有统计学意义 (P＜0.05) 。

Table 2 ANOVA of HRV among the 3 groups

Group		SDNN (ms)	SDANN(ms)	RMSSD(ms)
DCM	MVA(＋)	41.82± 40.25	38.24± 39.73	12.3± 10.6△☆
	MVA(－)	82.53± 42.79	76.74± 43.46	17.5± 10.2△*
Normal		138.92± 44.84	130.38± 41.92	32.2± 11.8☆*

Note: DCM: Dilated Cardiomyopathy. MVA: malignant ventricular arrhythmia. SDNN: standard deviation of normal to normal R-R (NN)intervals. SDANN: Standard deviation of 5-minute average NN intervals. RMSSD: Square root of the mean of the squares of successive NN interval differences. *: P＜0.05 in MVA(+) group compared with normal and MVA(-) group. ☆: P＜0.05 in MVA(-) group compared with normal and MVA(+) group. △: P＜0.05 in normal group compared with MVA(+) and MVA(-) group.

3 讨论

HRV 分析作为评价心脏自主神经活性、均衡性及其相关的病理状态的无创检测方法[9-11]，其应用价值已在 AMI 预后评估和糖尿病自主神经病变、心力衰竭、高血压、心肌病、心脏移植、阻塞性睡眠呼吸暂停综合征等多种心血管疾病和非心血管疾病中展现出广泛的应用前景[7,12,13]。大量前瞻性临床研究证实，AMI 后 HRV 时域和频域指标均降低，特别是高频功率、RMSSD、pNN50 等反映迷走神经活性的指标降低更明显，提示迷走神经活性减低和交感神经占优势。现已公认 HRV 降低是一个预测 AMI 后恶性心律失常和死亡的强有力指标，其预测价值独立于其他 AMI 后危险分级指标[14,16]。就慢性充血性心衰(CHF)而言，近年来几项研究显示 HRV 分析可预测 CHF 患者不同原因的死亡，SDNN 降低预测总病死率增加，而控制呼吸情况下短时程高频功率降低则预示着猝死危险性增加[17]。另外，HRV 是判断糖尿病病人是否伴有自主神经系统损害最准确、最敏感的指标[18,19]，其价值已大大超过既往使用的 Valsalva 试验、直立试验及深呼吸试验等。

既往有研究报道，扩张型心肌病患者 HRV 明显降低[20-22]，我们的研究结果亦支持这一结论。另外，我们的研究更进一步发现，扩张型心肌病患者中尤以发生恶性心律失常(MVA)亚组 HRV 相关指标下降明显，提示 HRV 与 DCM 的 MVA 相关。而恶性心律失常是扩张型心肌病的重要死因，这就意味着 HRV 下降可能与扩张型心肌病不良预后密切相关。我们知道，HRV 反映了窦性心率不齐的程度，它的产生主要是由于神经体液因素对心血管系统精细调节的结果，反映神经体液因素与窦房结相互作用的平衡关系，体现神经调节变化程度。扩张型心肌病患者 HRV 下降的主要原因有以下几个方面：一个可能是扩心病后期心肌因广泛纤维化发生导致心肌收缩功能明显下降、心肌收缩的阶段性延迟缓慢，心脏射血分数下降，为使心输出增加，此时心脏交感神经系统会明显代偿激活，因此 HRV 明显下降[20,21]；另一方面，由炎症因子及炎症细胞介导的心脏局部及全身系统肾素 - 血管紧张素 - 醛固酮系统激活，同样导致 HRV 的下降[22]；第三，一些血管活性肽如 BNP、前列腺素(PGI, PGE)、TNF 等亦会在此期明显激活并最终导致 HRV 的下降[23]。而在此期，扩张型心肌病患者心肌细胞受炎症细胞及炎症因子的作用发生显著的肥厚、扩大及坏死，心肌间质纤维化增加、瘢痕形成，会进一步导致心肌肌束之间形成绝缘的屏障，使各肌束间电传导不均一，心室激动传导延缓，且传导方向会发生变化，局部形成折返通道并促进碎裂电位的形成最终导致导致恶性室性心律失常的发生[9,10]。因此，在扩张型心肌病患者中，HRV 的下降与恶性室性心律失常密切相关。

综上述，HRV 作为反映心脏自主神经活动的一个独立指标，其下降程度与 DCM 患者恶性室性心律失常及不良预后密切相关。因此，对于已确诊 DCM 患者常规进行 HRV 检测，对了解病变的严重程度、评估预后是很有必要。

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疗,同时可明显改善患者的预后,而其具体作用机制仍有待于进一步的研究证实。

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