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超声三维斑点技术联合 SYNTAX 评分对冠心病病情的判断价值分析 *

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摘要 目的:探讨与分析超声三维斑点技术联合 SYNTAX 评分对冠心病病情的判断价值。**方法:**2022 年 2 月到 2023 年 1 月选择在医院诊治的冠心病患者 350 例作为研究对象,所有患者都给予超声三维斑点检查,同时所有患者都给予 SYNTAX 评分。随访记录患者的主要不良心血管事件(MACE)发生情况并进行相关性分析。**结果:**在 350 例患者中,随访到 2023 年 2 月 1 日,平均随访时间为 9.14 ± 1.13 个月,发生 MACE 45 例(MACE 组),占比 12.9%,其中中心源性死亡 6 例、冠脉综合征 14 例、血运重建 13 例、恶性心律失常 7 例、心力衰竭 5 例。MACE 组的年龄、体重指数、性别、总胆固醇(TG)、高密度脂蛋白(HDL-C)、低密度脂蛋白(LDL-C)、甘油三酯(TC)血糖与非 MACE 组对比无显著差异($P > 0.05$)。MACE 组的超声三维斑点参数-右室收缩峰值应变率(SRs)高于非 MACE 组($P < 0.05$),右室舒张晚期峰值应变率(SRa)、舒张早期峰值应变率(SRc)与非 MACE 组对比有显著降低($P < 0.05$)。MACE 组的 SYNTAX 评分明显高于非 MACE 组($P < 0.05$),两组的 SYNTAX 评分分级人群占比也有显著差异($P < 0.05$)。在 350 例患者中,Spearsman 分析显示 SYNTAX 评分、SRs、SRc、SRa 都与 MACE 的发生呈现正相关性($P < 0.05$)。logistic 回归分析法显示 SYNTAX 评分、SRs、SRc、SRa 都为导致 MACE 发生的重要因素($P < 0.05$)。**结论:**冠心病患者治疗后 MACE 的发生率依然比较高,多伴随有 SYNTAX 评分增高,超声三维斑点技术检查也存在一定的差异性,超声三维斑点技术联合 SYNTAX 评分能有效反映冠心病患者的病情。

关键词:超声三维斑点技术;SYNTAX 评分;冠心病

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Analysis of the Value of Three-dimensional Speckle Ultrasound Combined with SYNTAX Score in the Diagnosis of Coronary Heart Disease*

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ABSTRACT Objective: To explore and analysis the values of three-dimensional ultrasound speckle technique combined with SYNTAX score in the diagnosis of coronary heart disease. **Methods:** From February 2022 to January 2023, 350 cases of patients with coronary heart disease diagnosed and treated in a certain hospital were selected as the study subjects. All patients were given three-dimensional ultrasound spot examination, and all patients were given SYNTAX score. The incidence of major adverse cardiovascular event (MACE) of the patients were followed up and recorded for correlation analysis. **Results:** In the 350 patients, the average follow-up time were 9.14 ± 1.13 months until February 1, 2023. There were 45 cases of MACE (MACE group), accounting for 12.9 %, included 6 cases of cardiac death, 14 cases of coronary syndrome, 13 cases of revascularization, 7 cases of malignant arrhythmia, and 5 cases of heart failure. There were no significant difference in age, body mass index, sex, total cholesterol (TG), high-density lipoprotein (HDL-C), low density lipoprotein (LDL-C), triglyceride (TC) blood glucose compared between MACE group and non-MACE group ($P > 0.05$). The three-dimensional ultrasound speckle parameter-right ventricular systolic peak strain rate (SRs) in the MACE group were higher than that in the non-MACE group ($P < 0.05$), and the right ventricular late diastolic peak strain rate (SRa) and early diastolic peak strain rate (SRc) were significantly lower than those in the non-MACE group ($P < 0.05$). The SYNTAX scores of the MACE group were significantly higher than that of the non-MACE group ($P < 0.05$), and there were also significant difference in the proportion of people in the SYNTAX score grading compared between the two groups ($P < 0.05$). In the 350 patients, Spearman analysis showed that SYNTAX score, SRs, SRc and SRa were positively correlated with the occurrence of MACE ($P < 0.05$). Logistic regression analysis showed that SYNTAX score, SRs, SRc and SRa were important factors led to MACE ($P < 0.05$). **Conclusion:** The incidence of MACE in patients with coronary heart disease after treatment is still relatively high, which is often accompanied by the increase of SYNTAX score. There are certain differences in the examination of three-dimensional ultrasound speckle technology. The combination of three-dimensional ultrasound speckle technology and SYNTAX score can effectively reflect the condition of patients with coronary heart

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disease.

Key words: Three-dimensional ultrasound speckle technology; SYNTAX score; Coronary heart disease

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前言

冠状动脉粥样硬化性心脏病简称冠心病,近些年因生活方式的改变等原因使得冠心病的发病人数逐年增加。冠心病患者治疗后依然有很多出现主要不良心血管事件(Major adverse cardiovascular event, MACE),影响患者的预后^[1-3]。因此冠心病患者入院后明确患者的病情与影响不良预后的因素为当前研究的重点^[4]。颈动脉粥样硬化是冠心病发生的基础,动脉粥样硬化的影像学检查方法包括动脉造影、超声等,当前冠状动脉造影是金标准,但有一定的创伤^[5,6]。超声三维斑点技术是一种在应变及应变率显像的基础上发展而来的超声定量分析技术,可通过判断患者的心肌应变率来评价患者的心功能^[7]。SYNTAX II评分(SYNTAX score II, SS-II)包含2个冠状动脉解剖学参数与6个临床参数,比单纯地SS评分更能更加有效判定冠心病患者的病情与预测预后^[8,9]。本文具体探讨与分析了超声三维斑点技术联合SYNTAX评分对冠心病病情的判断价值。能够有效地为下一步治疗方案提供依据。

1 资料与方法

1.1 研究对象

研究得到了医院伦理委员会的批准,2022年2月到2023年1月选择在医院诊治的冠心病患者350例作为研究对象。

纳入标准:所有患者在检查前未给予任何治疗;符合冠心病的诊断标准,冠状动脉造影至少有一个主要分冠状动脉狭窄 $\geq 50.0\%$;知情同意。

排除标准:合并各种原因所致的严重感染患者;合并免疫系统疾病患者;合并有原发性心脏病、先天性心脏血管畸形、主动脉夹层等疾病患者;合并有高危传染性性疾病者。

1.2 超声三维斑点检查

采用 Philips EPIQ 7C 彩色多普勒超声诊断仪,配有 S5-1 相控阵探头和 X5-1 矩阵探头,频率 1.0~5.0 MHz。患者在静息状态下采用左侧卧位,将心电图同步连接,记录4个心动周期。常规超声分别观察与测量右室舒张末横径、肺动脉主干内径、

右室面积变化率、右心室射血分数等指标。再应用 X5-1 探头,启动全容积显像模式,采集连续4个稳定心动周期三维全容积动态图像;利用 Tomtec 软件进行分析,选取清晰图像,进行图像分析,测量记录右室舒张晚期峰值应变率(SRa)、收缩峰值应变率(SRs)、舒张早期峰值应变率(SRc)等指标。

1.3 SYNTAX 评分判定

计算 SYNTAX 评分,分为高危人群(≥ 33 分)、中危人群(23分-32分)、低危人群(0分-22分)。

1.4 观察指标

所有患者在治疗后第1天开始算,直到随访到2023年2月1日,观察与记录 MACE 发生情况,记录方式包括微信、电话、门诊与住院等,包括心源性死亡、冠脉综合征、血运重建、恶性心律失常、心力衰竭等。同时记录与调查所有患者的一般资料。超声检查当天空腹抽取静脉血,化验检测空腹血糖、总胆固醇(TG)、高密度脂蛋白(HDL-C)、低密度脂蛋白(LDL-C)、甘油三酯(TC)等指标。

1.5 统计方法

通过使用软件 SPSS22.00 来处理所得数据,开展正态性检验来分析统计指标,采用均数 $\pm$ 标准差来描述计量数据比如 SYNTAX 评分,计数数据比如 MACE 发生率采用%表示,对比方法为卡方 χ^2 分析、t 检验等,以 logistic 回归分析法与 Spearmen 来分析相关性,当 $P < 0.05$,即数据对比具有明显差异。

2 结果

2.1 MACE 发生情况

在350例患者中,随访到2023年2月1日,平均随访时间为 9.14 ± 1.13 个月,发生 MACE 45 例(MACE 组),占比 12.9%,其中心源性死亡6例、冠脉综合征14例、血运重建13例、恶性心律失常7例、心力衰竭5例。

2.2 一般资料对比

MACE 组的年龄、体重指数、性别、TC、HDL-C、LDL-C、血糖、TG 与非 MACE 组对比无显著差异($P > 0.05$)。见表1。

表1 两组一般资料对比

Table 1 Comparison of the two groups of general data

Groups	n	Age (year)	Body mass index (kg/m ²)	Gender (male / female)	Blood Glucose (mmol/L)	TG (mmol/L)	TC (mmol/L)	HDL-C (mmol/L)	LDL-C (mmol/L)
MACE group	45	52.87 $\pm$ 5.23	21.76 $\pm$ 2.41	23/22	5.14 $\pm$ 0.22	2.09 $\pm$ 0.31	4.26 $\pm$ 0.27	1.03 $\pm$ 0.12	2.58 $\pm$ 0.22
Non-MACE group	305	52.10 $\pm$ 6.92	21.19 $\pm$ 3.18	153/152	5.16 $\pm$ 0.27	2.08 $\pm$ 0.35	4.21 $\pm$ 0.25	1.04 $\pm$ 0.13	2.65 $\pm$ 0.31
t/ χ^2		0.914	0.873	0.014	0.178	0.133	0.278	0.145	0.563
P		0.122	0.187	0.906	0.843	0.882	0.743	0.876	0.434

2.3 超声三维斑点参数对比

MACE 组的超声三维斑点参数 SRs 高于非 MACE 组

($P < 0.05$), SRc、SRa 与非 MACE 组对比有显著降低($P < 0.05$)。见表2。

表 2 两组超声三维斑点参数对比(s^{-1} , 均数 $\pm$ 标准差)

Table 2 Comparison of 3 D spot parameters of two groups (s^{-1} , mean $\pm$ standard deviation)

Groups	n	SRs	SRc	SRa
MACE group	45	-1.03 $\pm$ 0.25	0.96 $\pm$ 0.25	0.79 $\pm$ 0.23
Non-MACE group	305	-1.38 $\pm$ 0.25	1.54 $\pm$ 0.22	1.11 $\pm$ 0.22
<i>t</i>		16.035	25.560	12.494
<i>P</i>		0.000	0.000	0.000

2.4 SYNTAX 评分对比 两组的 SYNTAX 评分分级人群占比也有显著差异($P<0.05$)。MACE 组的 SYNTAX 评分明显高于非 MACE 组($P<0.05$)，见表 3。

表 3 两组 SYNTAX 评分对比

Table 3 SYNTAX scores between the two groups

Groups	n	SYNTAX Score (score)	High risk group (n)	Medium-risk population (n)	Low-risk people (n)
MACE group	45	31.11 $\pm$ 1.68	30(66.7%)	14(31.1%)	11(24.4%)
Non-MACE group	305	21.58 $\pm$ 2.10	21(6.9%)	40(13.1%)	244(80.0%)
t/χ^2		19.575		103.127	
<i>P</i>		0.000		0.000	

2.5 相关性分析 SRs、SRc、SRa 都与 MACE 的发生呈现正相关性($P<0.05$)。见在 350 例患者中,Spearsman 分析显示 SYNTAX 评分、表 4。

表 4 超声三维斑点技术联合 SYNTAX 评分与冠心病病情的相关性(n=350)

Table 4 Correlation between SYNTAX score and CAD (n=350)

Groups	SYNTAX grade	SRs	SRc	SRa
<i>r</i>	0.672	0.711	-0.567	-0.622
<i>P</i>	0.000	0.000	0.000	0.000

2.6 相关性分析 SYNTAX 评分、SRs、SRc、SRa 都为导致 MACE 发生的重要因素($P<0.05$)。见表 5。
在 350 例患者中,以 MACE 的发生作为因变量,以 SYNTAX 评分、SRs、SRc、SRa 作为自变量,logistic 回归分析法显示

表 5 超声三维斑点技术联合 SYNTAX 评分对冠心病病情的判断价值(n=350)

Table 5 Value of SYNTAX score for coronary heart disease (n=350)

Indexs	β	SE	<i>t</i>	<i>P</i>	95%CI	OR
SYNTAX	1.265	0.2343	15.456	0.000	1.483-4.144	1.875
SRs	1.241	0.433	13.187	0.000	1.483-8.154	3.481
SRc	0.267	0.028	12.933	0.000	0.139-0.984	0.341
SRa	0.598	0.124	15.783	0.000	0.324-0.916	0.572

3 讨论

冠心病是一种复杂性疾病,动脉粥样硬化可在一定程度上反映并预测疾病严重程度,但是多需要进行造影检查,对患者有一定的创伤,很难进行普查^[10-13]。动脉造影是冠状动脉、颈动脉病变诊断的"金标准",但其是有创检查^[14]。CT 很难显示无钙化的中等程度病变。MRI 检查费用相对比较昂贵,操作要求也较高^[15,16]。超声三维斑点技术通过追踪超声图上不同小像素

斑点的运动轨迹,然后计算运动轨迹曲线,测量相应区段的应变率,从而反映冠心病状况^[17,18]。本研究显示 MACE 组的超声三维斑点参数 SRs 高于非 MACE 组 ($P<0.05$),SRc、SRa 与非 MACE 组对比有显著降低($P<0.05$)。分析可知,超声三维斑点技术可以较准确评估不同负荷状态下的右心室功能,具有无角度依赖、客观性好等优点,在评估冠心病患者的右心室功能有其一定的优势^[19,20]。

动脉内膜是颈动脉粥样硬化的形成、发展过程中最早累及

的。颈动脉狭窄主要是因为颈动脉粥样斑块导致的,部分狭窄性病变可能会完全闭塞^[21,22]。SYNTAX 评分涉及的指标包括年龄、肌酐清除率、性别、保护左主干病变、慢性阻塞性肺疾病、左室射血分数等,是一项非常有价值的评价心功能预后评价的工具,SYNTAX 评分越高,提示患者发现预后不良事件发生率增高^[23]。还有研究表明,SYNTAX 评分与患者的左室功能存在独立相关性,也可有效反映冠状动脉血管病变的复杂性^[24,25]。本研究显示 MACE 组的 SYNTAX 评分明显高于非 MACE 组($P<0.05$),两组的 SYNTAX 评分分级人群占比也有显著差异($P<0.05$)。当前有研究显示,SYNTAX 评分为了优化常规评分指标对冠心病患者的预后评价而发展起来的,可有效协助医师评估患者病情^[26,27]。

冠状动脉病变程度与颈动脉病变具有相关性,颈动脉斑块参与冠心病形成及发展,斑块的将会造成血管狭窄,致使临床症状持续加重、功能持续恶化^[28,29]。本研究 Spearsman 分析显示 SYNTAX 评分、SRs、SRc、SRa 都与冠心病患者治疗后 MACE 的发生呈现正相关性($P<0.05$);logistic 回归分析法显示 SYNTAX 评分、SRs、SRc、SRa 都为导致 MACE 发生的重要因素($P<0.05$)。冠心病动脉硬化的病理改变可累及动脉内膜,超声三维斑点技术能够可反映心血管系统功能,可在未出现血管斑块时预测冠心病进展^[30]。

总之,冠心病患者治疗后 MACE 的发生率依然比较高,多伴随有 SYNTAX 评分增高,超声三维斑点技术检查也存在一定的差异性,超声三维斑点技术联合 SYNTAX 评分能有效反映冠心病患者的病情。

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