

冠心病患者血清 Mac-2 结合蛋白水平与低密度脂蛋白的相关性研究

高婉琴, 李小丹 (西安大兴医院心内一科, 西安 710016)

摘要: 目的 探讨冠心病(coronary heart disease, CHD)患者血清 Mac-2 结合蛋白(mac-2 binding protein, M2BP)水平与低密度脂蛋白(low-density lipoprotein, LDL)的相关性。方法 选取西安大兴医院因首次胸痛发作并经冠状动脉造影(coronary arteriography, CAG)确诊的 107 例 CHD 患者为观察组, 其中稳定型心绞痛(stable angina pectoris, SAP)患者 32 例, 不稳定型心绞痛(unstable angina pectoris, UAP)患者 22 例, ST 段抬高型心肌梗死(ST segment elevation myocardial infarction, STEMI)患者 24 例和非 ST 段抬高型心肌梗死(non ST segment elevation myocardial infarction, NSTEMI)患者 29 例。另选同期该院 40 例健康体检者为对照组。采用酶联免疫吸附法(enzyme-linked immunosorbent assay, ELISA)检测血清中 M2BP 水平。采用 Pearson 直线相关性分析法分析 CHD 患者血清 M2BP 水平与 Gensini 评分及血清学参数的关系。结果 两组的 Gensini 评分、心肌肌钙蛋白 I(cardiac troponin I, cTnI)、肌酸激酶 MB(creatine kinase MB, CK-MB)、M2BP 和 LDL 水平差异具有统计学意义($\chi^2=9.959, 4.893, 11.070, 35.020, 14.514$, 均 $P < 0.05$)。两组的高密度脂蛋白(high-density lipoprotein, HDL)水平差异无统计学意义($\chi^2=0.036, P > 0.05$)。Pearson 直线相关性分析结果显示血清 M2BP 水平与 LDL 呈正相关关系($r=0.212, P=0.028$), 其与 Gensini 评分、cTnI 和 CK-MB 均无明确相关性($r=0.162, 0.168, 0.173$, 均 $P > 0.05$)。结论 M2BP 对改善 CHD 患者的生活质量和预后具有积极意义。

关键词: 冠心病; Mac-2 结合蛋白; 狭窄程度评分; 低密度脂蛋白

中图分类号: R541.4; R446.112 **文献标识码:** A **文章编号:** 1671-7414 (2021) 01-054-04

doi:10.3969/j.issn.1671-7414.2021.01.014

Correlation between Serum Mac-2 Binding Protein and Low-density Lipoprotein in Patients with Different Types of Coronary Heart Disease

GAO Wan-qin, LI Xiao-dan (the First Department of Cardiology, Xi'an Daxing Hospital, Xi'an 710016, China)

Abstract: Objective To study the correlations between serum Mac-2 binding protein (M2BP) and low-density lipoprotein (LDL) in patients with coronary heart disease (CHD). **Methods** A total of 107 CHD patients diagnosed by coronary arteriography (CAG) in Xi'an Daxing Hospital were selected as the observation group. There were 32 patients with stable angina pectoris (SAP) and 22 patients with unstable angina pectoris (UAP). 24 patients with ST elevation myocardial infarction (STEMI) and 29 patients with non ST segment elevation myocardial infarction (NSTEMI), enzyme-linked immunosorbent assay (ELISA) was used to determine the level of M2BP in serum of CHD patients. Pearson linear correlation assay was used to analyze the relationship between serum M2BP level and Gensini score and serological parameters in CHD patients. **Results** There were statistically significant differences in Gensini score, cardiac troponin I(cTnI), creatine kinase MB(CK-MB), M2BP and LDL levels between the two groups ($\chi^2=9.959, 4.893, 11.070, 35.020, 14.514$, all $P < 0.05$). There was no significant difference in the levels of high-density lipoprotein (HDL) between the two groups ($\chi^2=0.036, P > 0.05$). Pearson straight-line correlation analysis showed that serum M2BP level was positively correlated with LDL ($r=0.212, P=0.028$), but had no clear correlation with Gensini score, cTnI and CK-MB ($r=0.162, 0.168, 0.173$, all $P > 0.05$). **Conclusion** M2BP has positive significance for improving the quality of life and prognosis of CHD patients.

Keywords: coronary heart disease; Mac-2 binding protein; gensini score; low-density lipoprotein

冠状动脉粥样硬化性心脏病(coronary atherosclerotic heart disease, CHD)简称为冠心病,其是由于冠状动脉粥样硬化导致的管腔狭窄、堵塞,从而引起心肌缺血、缺氧甚至坏死的心脏病。随着人们对 CHD 认知的不断加深,生物标志物对于 CHD 的早期诊断、危险分层、预后评估及治疗策略的选

择具有重要作用,已成为该研究领域的热点方向之一。Mac-2 结合蛋白(mac-2 binding protein, M2BP)属于巨噬细胞清道夫受体超家族,其是一种富含半胱氨酸的分泌型糖蛋白^[1]。已有研究表明 M2BP 与支气管哮喘和肝纤维化等疾病的发生发展密切相关^[2-3],但关于其与 CHD 的研究较少。

作者简介: 高婉琴(1977-),女,本科,主治医师,研究方向:冠心病、高血压临床治疗与诊断, E-mail: xigaowanq@163.com。

通讯作者: 李小丹(1977-),男,本科,主治医师,研究方向:冠心病、高血压临床治疗与诊断, E-mail: 1751204244@qq.com。

在CHD发病危险因素研究方面,有报道指出低密度脂蛋白(low-density lipoprotein, LDL)占有重要作用。机体内LDL的水平与冠心病发病率和严重程度呈明显正相关关系^[4]。本研究拟探究CHD患者血清中M2BP水平与LDL的相关性,为CHD防治提供新思路。现具体报道如下。

1 材料与方法

1.1 研究对象 选取我院收治的2019年1~12月因首次胸痛发作并经冠状动脉造影(coronary arteriography, CAG)确诊的107例CHD患者为观察组,其中男性65例,女性42例;平均年龄为 57.97 ± 11.77 岁。另选择同期我院体检健康的40例志愿者为对照组,其中男、女性各20例,平均年龄为 56.10 ± 15.65 岁。

根据冠心病的不同类型,观察组患者分为稳定型心绞痛(stable angina pectoris, SAP)患者32例,不稳定型心绞痛(unstable angina pectoris, UAP)患者22例,ST段抬高型心肌梗死(ST segment elevation myocardial infarction, STEMI)患者24例和非ST段抬高型心肌梗死(non ST segment elevation myocardial infarction, NSTEMI)患者29例。两组的年龄、性别、体质指数(body mass index, BMI),有无高血压和糖尿病病史、是否血脂异常和吸烟一般资料差异均无统计学意义(均 $P > 0.05$)。本研究经我院伦理委员会审核批准,受试者自愿参加且均签署知情同意书。

纳入标准:①年龄 ≥ 18 岁,胸痛发作到入院时间 < 12 h者;②临床资料完整者。排除标准:①并发大动脉炎、梅毒感染、有头颈部放射治疗史者;②并发心肌炎、心脏瓣膜病者;③并发严重肝肾疾病、恶性肿瘤者;④妊娠期女性。

诊断标准:①SAP诊断符合2018年中华医学会心血管病学分会介入心脏病学组制定的《稳定性

冠心病诊断与治疗指南》^[8];②UAP, STEMI和NSTEMI诊断符合2015年中国医师协会急诊医师分会等制定的《急性冠脉综合征急诊快速诊疗指南》^[9]。

1.2 仪器与试剂 M2BP的酶联免疫吸附法(enzyme-linked immunosorbent assay, ELISA)试剂盒购自美国R&D公司,选用芬兰雷勃公司MB-530型酶标仪。

1.3 方法 CAG检查方法:按标准流程进行CAG检查,常规局麻下Judkins穿刺桡动脉进行CAG检查,根据CAG结果进行冠脉狭窄程度(Gensini)评分。

血清M2BP水平的检测:采集受试者清晨空腹外周静脉血3ml,3000 r/min离心5 min后取上清液置于 -20°C 冰箱中保存备用。采用ELISA法测定血清M2BP浓度,测定步骤严格按照说明书进行操作。

1.4 统计学分析 采用SPSS 19.0统计学软件处理数据,对于符合正态分布和方差齐性检验的计量资料结果以均数 \pm 标准差($\bar{x} \pm s$)表示,多组间均数比较采用方差分析,组间两两比较采用SNK- q 检验,两组间均数比较采用 t 检验;对于不符合正态分布或方差齐性检验的计量资料结果采用四分位数表示,两组样本比较采用Mann-Whitney检验或Kruskal-Wallis检验。计数资料结果以构成百分比表示,组间比较采用 χ^2 检验。相关性分析采用Pearson直线相关分析法。 $P < 0.05$ 为差异具有统计学意义。

2 结果

2.1 两组一般资料的比较 见表1。两组的Gensini评分、心肌肌钙蛋白I(cardiac troponin I, cTnI)、肌酸激酶MB(creatine kinase MB, CK-MB)、M2BP水平和LDL水平比较差异具有统计学意义(均 $P < 0.05$)。两组的高密度脂蛋白(high-density lipoprotein, HDL)水平差异无统计学意义($P > 0.05$)。

表1 各组一般资料的比较 [$M(P_{25}, P_{75})$, $\bar{x} \pm s$]

项目	观察组($n=107$)	对照组($n=40$)	χ^2	P
Gensini评分(分)	38.00(28.50,52.00)	7.00(5.00,9.00)	9.959	0.002
cTnI (ng/ml)	2.48(2.10,2.87)	0.10(0.07,0.13)	4.893	0.032
CK-MB (U/L)	29.84(22.33,38.90)	8.13(7.62,8.34)	11.070	0.001
M2BP (ng/L)	13.97 ± 2.60	9.48 ± 2.48	35.020	< 0.001
LDL (mmol/L)	3.37 ± 1.23	2.94 ± 0.96	14.514	< 0.001
HDL (mmol/L)	1.14 ± 0.16	1.16 ± 0.42	0.036	0.850

2.2 CHD患者血清M2BP水平与Gensini评分及血清学参数的关系 见表2。结合2.1的结果,探究CHD患者血清中M2BP水平与Gensini评分、cTnI, CK-MB和LDL水平的相关性。Pearson直线相关性分析结果显示血清M2BP水平与LDL呈正

相关关系($r=0.212$, $P=0.028$),其与Gensini评分、cTnI和CK-MB均无明确相关性($r=0.162$, 0.168 , 0.173 , $P=0.095$, 0.084 , 0.074)。

3 讨论

CHD在心脏病的诸多类型中是较多发的一种

临床类型, 其在中老年群体中的发病率较高, 随着我国人口老龄化的发展进程, CHD 的发病率逐年上涨。目前生物标志物已成为了 CHD 研究领域的热点。M2BP 作为一种分泌性蛋白, 在人体各组织和体液中广泛存在。已有大量研究报道证实 M2BP 与支气管哮喘、肝纤维化、慢性胰腺炎等多种疾病的发生发展密切相关^[10], 但是有关其与 CHD 的研究报道较少, 且缺乏系统性。黄倚文等^[11]指出 LDL-C 是 CHD 发病的重要危险因素, LDL 是血浆中的一种载脂蛋白, 是运输内源性胆固醇到肝外组织的重要载体。当机体清除 LDL 的能力降低时, 会引发动脉内膜粥样斑块的形成。有研究指出^[12] 机体 LDL 的水平与 CHD 的发病率和严重程度呈明显正相关关系, 其被认为是动脉粥样硬化的主要致病因子, 其也被用以评价个体患病概率的重要危险因素^[13-14]。

本研究通过探究 CHD 患者血清中 M2BP 水平与 LDL 的相关性, 旨在为 CHD 的防治提供合理参考。结果显示相较于对照组, 观察组患者的 Gensini 评分, cTnI, CK-MB, M2BP 和 LDL 水平显著升高。Pearson 直线相关性分析结果显示血清 M2BP 水平与 LDL 呈正相关关系。在临床上, 应积极控制患者 M2BP 的水平, 进而降低 LDL 水平, 降低 CHD 的发病率, M2BP 对改善 CHD 患者的生活质量和预后具有积极意义。

参考文献:

- [1] AKAHOSHI Y, NAKASONE H, KAWAMURA K, et al. Increased Mac-2 binding protein glycan isomer in patients at risk for late nonrelapse mortality after HSCT [J]. *Blood Adv*, 2019, 3(21):3287-3296.
- [2] CHEN C C, HSU H T, CHEN Y L, et al. Diagnostic accuracy of acoustic radiation force impulse (ARFI) and wisteria floribunda agglutinin-positive Mac-2-binding protein (WFA⁺-M2BP) in patients with chronic liver disease [J]. *Med Sci Monit*, 2019, 25:7169-7174.
- [3] CHEUNG K S, SETO W K, WONG D K H, et al. Wisteria floribunda agglutinin-positive human Mac-2 binding protein predicts liver cancer development in chronic hepatitis B patients under antiviral treatment [J]. *Oncotarget*, 2017, 8(29):47507-47517.
- [4] 陈绍轩, 谭罗坤, 莫洁芳, 等. 小而密低密度脂蛋白胆固醇、同型半胱氨酸及 D-二聚体测定在冠心病诊断中的临床意义 [J]. *中国当代医药*, 2019, 26(12):147-149.
- [5] CHEN Shaoxuan, TAN Luokun, MO Jiefang, et al. Clinical significance of small dense low density lipoprotein cholesterol, homocysteine and D-Dimer in the diagnosis of coronary heart disease [J]. *China Modern Medicine*, 2019, 26(12):147-149.
- [6] 左鹏飞, 李亚峰, 顿国亮. Mac-2 结合蛋白与经超声造影诊断的人颈动脉粥样硬化斑块不稳定性与临床表现的相关性分析 [J]. *临床和实验医学杂志*, 2019, 18(16):1743-1747.
- [7] ZUO Pengfei, LI Yafeng, DUN Guoliang. Correlation between Mac-2 binding protein and the instability and clinical manifestations of human carotid atherosclerotic plaque diagnosed by contrast-enhanced ultrasonography [J]. *Journal of Clinical and Experimental Medicine*, 2019, 18(16):1743-1747.
- [8] GLEISSNER C A, ERBEL C, LINDEN F, et al. Galectin-3 binding protein plasma levels are associated with long-term mortality in coronary artery disease independent of plaque morphology [J]. *Atherosclerosis*, 2016, 251:94-100.
- [9] GLEISSNER C A, ERBEL C, LINDEN F, et al. Galectin-3 binding protein, coronary artery disease and cardiovascular mortality: Insights from the LURIC study [J]. *Atherosclerosis*, 2017, 260:121-129.
- [10] 中华医学会心血管病学分会介入心脏病学组, 中华医学会心血管病学分会动脉粥样硬化与冠心病学组, 中国医师协会心血管内科医师分会血栓防治专业委员会, 等. 稳定性冠心病诊断与治疗指南 [J]. *中华心血管病杂志*, 2018, 46(9):680-694.
- [11] Section of Interventional Cardiology of Chinese Society of Cardiology, Section of Atherosclerosis and Coronary Artery Disease of Chinese Society of Cardiology, Specialty Committee on Prevention and Treatment of Thrombosis of Chinese College of Cardiovascular Physicians. Guideline on the diagnosis and treatment of stable coronary artery disease [J]. *Chinese Journal of Cardiology*, 2018, 46(9):680-694.
- [12] 中国医师协会急诊医师分会, 中华医学会心血管病学分会, 中华医学会检验医学分会. 急性冠脉综合征急诊快速诊疗指南 [J]. *中华急诊医学杂志*, 2016, 25(4):397-404.
- [13] Emergency Medical Branch of Chinese Medical Doctor Association, Cardiovascular Epidemiology Branch of Chinese Medical Association, Laboratory Medicine Branch of Chinese Medical Association. Emergency rapid diagnosis and treatment of guidelines acute coronary syndrome [J]. *Chinese Journal of Emergency Medicine*, 2016, 25(4):397-404.
- [14] FUJIYAMA T, ITO T, UEDA K, et al. Serum levels of Wisteria floribunda agglutinin - positive Mac - 2 binding protein reflect the severity of chronic pancreatitis [J]. *J Dig Dis*, 2017, 18(5): 302-308.
- [15] 黄倚文, 杨益, 蔡淑仪. 不同血清低密度脂蛋白胆固醇在冠心病患者中的表达水平及其与冠心病的关系 [J]. *黑龙江医学*, 2020, 44(5):638-641.
- [16] HUANG Yiwen, YANG Yi, CAI Shuyi. Expression of low-density lipoprotein in patients with coronary heart disease and its relationship with coronary heart disease [J]. *Heilongjiang Medical Journal*, 2020, 44(5):638-641.
- [17] 徐嘉, 徐岩, 张建华, 等. 血清载脂蛋白 B 联合非高密度脂蛋白胆固醇对冠心病的预测价值 [J]. *安徽医科大学学报*, 2016, 51(2):259-262.
- [18] XU Jia, XU Yan, ZHANG Jianhua, et al. The value of serum apolipoprotein B combined with non-high density lipoprotein cholesterol in predicting coronary

- heart disease[J]. *Acta Universitatis Medicinalis Anhui*, 2016, 51(2): 259-262.
- [13] 罗金, 蓝柳萍. 血液RDW, Hcy和NEFA水平联合检测在冠心病诊断中的应用[J]. *现代检验医学杂志*, 2020, 35(3): 62-65, 80.
LUO Jin, LAN Liuping. Application of combined detection of blood RDW, Hcy and NEFA levels in the diagnosis of coronary heart disease[J]. *Journal of Modern Laboratory Medicine*, 2020, 35(3): 62-65, 80.
- [14] 徐焰, 彭道荣, 陈灿磊, 等. 血浆脑钠肽水平对冠心病诊断价值的初步探讨[J]. *现代检验医学杂志*, 2006, 21(3): 58-60.
XU Yan, PENG Daorong, CHEN Canlei, et al. Preliminary approach of diagnostic value of plasma brain natriuretic peptide(BNP) levels in coronary artery disease[J]. *Journal of Modern Laboratory Medicine*, 2006, 21(3): 58-60.
- 收稿日期: 2020-06-29
修回日期: 2020-08-04
-
- (上接第46页) and *Obstetrics*, 2017, 296(4): 645-651.
- [4] ZHANG Xiaoyan, WANG Wei, HE Falin, et al. Proficiency testing of maternal serum prenatal screening in second trimester in China, 2015[J]. *Biochimica Medica*, 2017, 27(1): 114-121.
- [5] MANOTAYA S, ZITZLER J, LI Xiaotian, et al. Effect of ethnicity on first trimester biomarkers for combined trisomy 21 screening: Results from a multicenter study in six Asian countries[J]. *Prenatal Diagnosis*, 2015, 35(8): 735-740.
- [6] LERTHIRANWONG T, WANAPIRAK C, SIR-ICHOTIYAKUL S, et al. Strong impact of ethnicity on effectiveness of the first trimester maternal serum screen of fetal Down syndrome[J]. *The Journal of Maternal-fetal & Neonatal Medicine*, 2018, 31(21): 2847-2851.
- [7] HE Falin, WANG Wei, ZHONG Kun, et al. The status of quality control investigation and analysis for maternal serum marker of prenatal screening laboratories in China[J]. *Clinical Laboratory*, 2017, 63(1): 183-188.
- [8] LONG Yao, LIU Yanqiu, MA Pengpeng, et al. Establishment of medians for maternal serum markers in Down's syndrome screening during the second trimester of pregnancy in north-central region of Jiangxi Province[J]. *Journal of Central South University(Medical Sciences)*, 2017, 42(7): 831-835.
- [9] LI Yahong, ZHANG Xiaojuan, HONG Dongyang, et al. Significance of data analysis in the quality control of prenatal screening for Down syndrome[J]. *Biomedical Reports*, 2018, 8(5): 447-453.
- [10] 燕凤, 燕飞, 姚念玲, 等. 孕妇外周血无创DNA检测技术在产前诊断中的应用[J]. *现代检验医学杂志*, 2019, 34(1): 17-21.
YAN Feng, YAN Fei, YAO Nianling, et al. Application of non-invasive DNA detection technique in maternal peripheral blood for prenatal diagnosis[J]. *Journal of Modern Laboratory Medicine*, 2019, 34(1): 17-21.
- [11] QUIBEL T, ROZENBERG P. What are the real purpose and scope of screening for aneuploidy[J]. *Gynecologie, Obstetrique, Fertilité & Senologie*, 2018, 46(2): 124-129.
- [12] QI Qingwei, LU Sijia, ZHOU Xiya, et al. Copy number variation sequencing-based prenatal diagnosis using cell-free fetal DNA in amniotic fluid[J]. *Prenatal Diagnosis*, 2016, 36(6): 576-583.
- [13] LINDQUIST A, POULTON A, HALLIDAY J, et al. Prenatal diagnostic testing and atypical chromosome abnormalities following combined first-trimester screening: implications for contingent models of non-invasive prenatal testing[J]. *Ultrasound in Obstetrics & Gynecology*, 2018, 51(4): 487-492.
- [14] XU Zunpeng, LI Bei, LIAO Can, et al. Results of prenatal screening for fetal chromosome abnormality during the first trimester pregnancy in Guangzhou[J]. *Chinese Journal of Medical Genetics*, 2014, 31(5): 632-635.
- [15] 梁培松, 王结珍, 陈康, 等. 孕早期年龄, BMI和PAPPA水平综合评价对GDM的预测价值[J]. *现代检验医学杂志*, 2020, 35(1): 133-135.
LIANG Peisong, WANG Jiezheng, CHEN Kang, et al. Predictive value of comprehensive evaluation of early pregnant age, BMI and PAPPA levels to the GDM[J]. *Journal of Modern Laboratory Medicine*, 2020, 35(1): 133-135.
- [16] GOMES M S, CARLOS-ALVES M, TROCADO V, et al. Prediction of adverse pregnancy outcomes by extreme values of first trimester screening markers[J]. *Obstetric Medicine*, 2017, 10(3): 132-137.
- [17] ALMOHAMADY A M G A F, SHERIF M, RASLANA N A, et al. Could first-trimester assessment of placental functions predict preeclampsia and intrauterine growth restriction? A prospective cohort study[J]. *The Journal of Maternal - Fetal & Neonatal Medicine*, 2016, 29(3): 413-417.
- [18] BOUZID A, AYACHI A, DHAOUH H, et al. Relevance of first trimester serum markers to predict pregnancy complications: A tunisian preliminary study[J]. *Gynecologie Obstetrique & Fertilité*, 2016, 44(2): 96-100.
- [19] KHAMBALIA A Z, ROBERTS C L, MORRIS J, et al. Maternal body weight and first trimester screening for chromosomal anomalies[J]. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 2014, 54(5): 490-492.
- [20] HASEGAWA J, WADA S, KASAMATSU A, et al. Distribution of PAPP-A and total hCG between 11 and 13 weeks of gestation in Japanese pregnant women[J]. *J Matern Fetal Neonatal Med*, 2020, 33(12): 2017-2022.
- 收稿日期: 2020-08-15
修回日期: 2020-09-12