

甘油三酯葡萄糖指数与早发冠心病的相关性分析

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摘要 目的: 探讨甘油三酯葡萄糖指数(TyG指数)与早发冠心病的相关性。方法: 选取2018年1月—2021年12月延边朝医医院心内科住院的年龄 ≤ 50 岁冠心病患者63例作为年龄 ≤ 50 岁组, 2018年1—12月年龄 ≤ 30 岁健康体检者56例作为健康对照组, 2021年8—10月住院年龄 ≥ 75 岁老年冠心病患者62例作为年龄 ≥ 75 岁组。比较三组一般资料及生化指标, 分析TyG指数与低密度脂蛋白胆固醇(LDL-C)、高密度脂蛋白胆固醇(HDL-C)、甘油三酯(TG)、胆固醇(TC)、血糖的相关性, 分析早发冠心病的影响因素。结果: 年龄 ≤ 50 岁组TyG指数、TC、TG、吸烟占比高于健康对照组、年龄 ≥ 75 岁组, 差异有统计学意义($P < 0.05$)。Logistic回归分析显示, LDL-C、高血压、TyG指数是早发冠心病的独立危险因素($P < 0.05$), TyG指数诊断早发冠心病受试者工作特征曲线下面积为0.813, 敏感性63.5%, 特异性83.9%, 最佳诊断截断值为8.895。结论: 高TyG指数是早发冠心病的独立危险因素, 可为早发冠心病的诊断提供参考。

关键词 甘油三酯葡萄糖指数; 冠心病; 年龄

Correlation Analysis Between Triglyceride Glucose Index and Early-Onset Coronary Heart Disease

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Abstract Objective: To investigate the correlation between triglyceride glucose index (TyG index) and early-onset coronary heart disease. Methods: From January 2018 to December 2021, 63 patients with coronary heart disease who aged ≤ 50 years old and were hospitalized in the Department of Cardiology of Yanbian Chaoyi Hospital were selected as the age ≤ 50 years old group, 56 people for physical examination from January 2018 to December 2018 who aged ≤ 30 years old were selected as the healthy control group, and 62 elderly patients with coronary heart disease who aged ≥ 75 years old and were hospitalized from August 2021 to October 2021 were selected as the age ≥ 75 years old group. The general data and biochemical indicators in three groups were compared. The correlation between TyG index and low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), triglycerides (TG), cholesterol (TC) and blood glucose was analyzed. The influencing factors of early-onset coronary heart disease were analyzed. Results: The TyG index, TC, TG and smoking proportion in the age ≤ 50 years old group were higher than those in the healthy control group and the age ≥ 75 years old group, and the difference was statistically significant ($P < 0.05$). Logistic regression analysis showed that LDL-C, hypertension and TyG index were independent risk factors for early-onset coronary heart disease ($P < 0.05$). The area under the receiver operating characteristic curve of TyG index for the diagnosis of early-onset coronary heart disease was 0.813, the sensitivity was 63.5%, the specificity was 83.9%, and the best diagnostic cut-off value was 8.895. Conclusion: High TyG index is an independent risk factor for early-onset coronary heart disease, which can provide a reference for the diagnosis of early-onset coronary heart disease.

Key words Triglyceride glucose index; Coronary heart disease; Age

冠心病是冠状动脉硬化使管腔狭窄或阻塞导致心肌缺血、缺氧而引起的心脏病, 发病年龄日趋年轻化。识别和控制冠心病的危险因素对预防冠心病的发生具有重要意义。血脂、血糖检测方便, 可操作性强。本文就甘油三酯葡萄糖指数(TyG指数)与早发冠心病的相关性进行分析, 报告如下。

资料与方法

选取2018年1月—2021年12月延边朝医医院心

内科住院的年龄 ≤ 50 岁冠心病患者63例作为年龄 ≤ 50 岁组, 选取2018年1—12月健康体检者56例作为健康对照组, 选取2021年8—10月心内科住院年龄 ≥ 75 岁老年冠心病患者62例作为年龄 ≥ 75 岁组。

纳入标准: ①患者符合冠心病的诊断标准, 有典型冠心病特点; ②心电图缺血性ST-T改变; ③冠脉CT提示冠脉病变 $\geq 50\%$ 。

排除标准: ①临床资料不完整者; ②肥厚性心肌病、心脏瓣膜病、急性心肌梗死或有心肌梗死病

史者；③近3个月使用他汀类、贝特类等降脂药物者。

方法及观察指标：①分析患者一般资料，包括性别、吸烟情况、饮酒情况、高血压病史、糖尿病病史。②生化指标的检测：a.住院患者由值班护士采集入院第2天晨起空腹外周肘静脉血4 mL，送检我院检验科；b.体检者空腹于我院化验室完成采血，均由全自动生化检验仪器完成检测，生化指标包括甘油三酯(TG)、胆固醇(TC)、低密度脂蛋白胆固醇(LDL-C)、高密度脂蛋白胆固醇(HDL-C)、TyG指数、尿酸。TyG指数=ln[空腹TG(mg/dL)×空腹血糖(mg/dL)/2]^[1]；分析TyG指数与LDL-C、HDL-C、TG、TC、血糖的相关性；分析早发冠心病的影响因素。

统计学方法：数据应用SPSS 23.0统计学软件分析；符合正态分布及方差齐性的计量资料以 $\bar{x}\pm s$ 表示，两组间比较采用 t 检验，三组间比较用单因素方差分析；非正态分布的计量资料用 $M(P_{25}, P_{75})$ 表示，采用 H 检验；计数资料以 $n(\%)$ 表示，采用 χ^2 检验；二元Logistic回归分析TyG指数对冠心病的预测价值，绘制TyG指数和LDL-C诊断早发冠心病的受试者工作特征(ROC)曲线，采用ROC曲线下面积(AUC)评价TyG指数对早发冠心病的预测价值，根据约登指数最大值确定敏感性、特异性及最佳截断值； $P<0.05$ 为差异有统计学意义。

结 果

三组一般资料及生化指标比较：健康对照组和年龄 ≥ 75 岁组TyG指数、TC、LDL-C、TG、血糖、尿酸水平比较，差异无统计学意义($P>0.05$)；年龄 ≥ 75 岁

组吸烟、饮酒、男性占比低于健康对照组，高血压占比高于对照组，差异有统计学意义($P<0.05$)；年龄 ≤ 50 岁组TyG指数、TC、TG、吸烟占比高于健康对照组、年龄 ≥ 75 岁组，差异有统计学意义($P<0.05$)；年龄 ≤ 50 岁组、年龄 ≥ 75 岁组HDL-C均低于健康对照组，差异有统计学意义($P<0.05$)。见表1。

TyG指数与LDL-C、HDL-C、TG、TC、血糖的相关性：TyG指数与LDL-C、TG、TC、血糖呈正相关，HDL-C与TyG指数呈负相关，差异有统计学意义($P<0.001$)。见表2。

表2 TyG指数与LDL-C、HDL-C、TG、TC、血糖的相关性

指标	r	P
HDL-C	-0.323*	<0.001
LDL-C	0.294*	<0.001
TG	0.826*	<0.001
血糖	0.489*	<0.001
TC	0.465*	<0.001

注：*在0.01级别(双尾)，相关性显著

早发冠心病的Logistic多因素回归分析：二元Logistic回归分析早发冠心病的危险因素，结果显示TyG指数、高血压、LDL-C是早发冠心病的独立危险因素($P<0.05$)。见表3。

表3 早发冠心病的Logistic多因素回归分析

因素	OR	95%CI	P
TyG	4.254	1.872~9.668	0.001
高血压	2.948	1.157~7.513	0.024
LDL-C	0.151	0.300~0.745	0.020

TyG指数的ROC曲线：绘制TyG指数和LDL-C对诊断早发冠心病的预测ROC曲线，TyG指数的

表1 三组一般资料及生化指标比较

指标	健康对照组($n=56$)	年龄 ≤ 50 岁组($n=63$)	年龄 ≥ 75 岁组($n=62$)	$F/Z/\chi^2$	P
TyG指数($\bar{x}\pm s$)	8.34 $\pm$ 0.61	9.18 $\pm$ 0.71*	8.49 $\pm$ 0.51#	32.32	<0.001
TC[$M(P_{25}, P_{75})$, mmol/L]	4.22(3.54, 5.01)	5.03(4.10, 5.74)*	4.04(3.41, 4.90)#	11.39	0.003
LDL-C[$M(P_{25}, P_{75})$, mmol/L]	2.12(1.63, 2.75)	2.74(1.89, 3.27)*	2.29(1.64, 3.04)	7.24	0.027
TG[$M(P_{25}, P_{75})$, mmol/L]	0.99(0.64, 1.47)	1.69(1.20, 3.09)*	1.02(0.78, 1.62)#	40.24	<0.001
HDL-C[$M(P_{25}, P_{75})$, mmol/L]	1.35(1.11, 1.56)	1.00(0.84, 1.42)*	0.99(0.81, 1.21)*	35.17	<0.001
血糖[$M(P_{25}, P_{75})$, mmol/L]	5.50(5.20, 5.70)	5.60(5.20, 7.20)	5.40(4.80, 6.40)	5.93	0.050
尿酸[$M(P_{25}, P_{75})$, mmol/L]	346.00(290.00, 451.00)	377.00(308.00, 459.00)	345.00(289.00, 433.00)	1.26	0.533
吸烟[$n(\%)$]	13(23.2)	32(50.8)*	2(3.2)*#	37.10	<0.001
饮酒[$n(\%)$]	13(23.2)	14(22.2)	2(3.2)*#	11.50	0.003
高血压[$n(\%)$]	12(21.4)	37(58.7)*	38(61.3)*	23.13	<0.001
糖尿病[$n(\%)$]	6(10.7)	11(17.5)	11(17.7)	1.40	0.496
男性[$n(\%)$]	37(66.1)	47(74.6)	27(43.5)*#	13.48	0.001

注：与健康对照组比较，* $P<0.05$ ；与年龄 ≤ 50 岁组比较，# $P<0.05$

AUC为0.813, 约登指数为0.474, 最佳诊断截断值是8.895。TyG指数诊断早发冠心病的敏感性为63.5%, 特异性为83.9%。见图1。

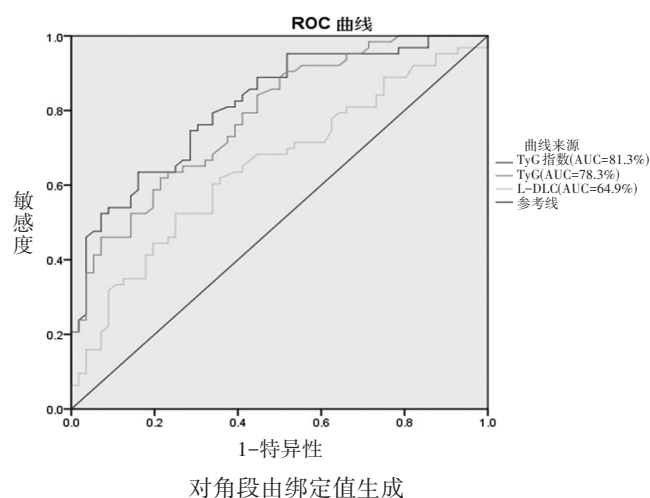


图1 TyG指数和LDL-C诊断早发年龄冠心病的ROC曲线

讨论

多项队列研究显示, 血清TG水平升高是青年冠心病发病的重要危险因素, 这可能与TG升高降低了HDL-C保护性有关^[2-4]。高TG与胰岛素抵抗(IR)所致的血脂异常及脂质三联征(高TG、低HDL-C和高LDL-C)密切相关^[5]。IR是代谢紊乱和全身炎症反应标志物与冠心病直接相关^[6]。从空腹血糖和TG水平推导出来的TyG指数被认为是诊断胰岛素抵抗的可靠指标^[7]。本文中早发冠心病患者TyG指数高于健康对照组和年龄 ≥ 75 岁组。高TyG指数与冠心病的心源性死亡风险增加相关 $OR=2.3(95\%CI: 1.247 \sim 4.241)^{[8-10]}$ 。高TyG指数与冠心病的心源性死亡风险增加相关 $OR=2.3(95\%CI: 1.247, 4.241)$, TyG指数是发生心血管疾病(CVD)的独立危险因素, 可以预测CVD的患病风险^[11]。Won等^[12]对12 326例无症状韩国成年人进行3.3年的研究也得出了类似的结果。Akbar等^[13]进行荟萃分析, 包含13 684例受试者, 结果显示TyG指数最高值组是最低值组主要心血管不良终点事件发生率(全因死亡、心肌梗死、不稳定性心绞痛、靶血管的复合血运重建、脑血管意外和心力衰竭)的2倍。

本文发现TyG指数是早发冠心病的独立危险因素, 可为早发冠心病的诊断提供参考。本研究病例数较少, 且未对不良心血管终点事件进行进一步探究, 结果可能出现偏差。

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