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妊娠糖尿病患者血清 HbA1c 与 CRP 水平的相关性分析 *

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摘要 目的:为明确妊娠期糖尿病(gestational diabetes mellitus, GDM)患者血清糖化血红蛋白(glycosylated hemoglobin, HbA1c)与 C 反应蛋白(C-reactive protein, CRP)的关系,本研究检测了 GDM 患者血糖、血清 HbA1c 与 CRP 水平,并对 HbA1c 与 CRP 的相关性进行了分析。**方法:**以 68 例 2015 年 4 月至 2017 年 4 月于我院诊治的 GDM 孕妇为研究对象,所有患者均符合《妇产科学》中关于 GDM 的诊断标准,另选取 68 例正常孕妇为对照组。采用葡萄糖氧化酶法检测血糖水平(空腹血糖及餐后 2 h 血糖水平),采用免疫凝集法检测和比较两组血清糖化血红蛋白(HbA1c)水平,采用免疫透射比浊法检测血清 C 反应蛋白(CRP)水平,并分析 HbA1c 与 CRP 的相关性。**结果:**GDM 组患者空腹血糖(fasting plasma glucose, FPG)、2 h 血糖(plasma glucose, PG)、血清 HbA1c 和 CRP 水平均显著高于正常组($P < 0.05$),GDM 患者血清 HbA1c 和 CRP 水平呈显著正相关关系($r = 0.654, P < 0.05$)。**结论:**GDM 患者血清 HbA1c 和 CRP 水平相较于正常孕妇有显著提高,且二者呈显著的正相关关系,二者联合检测可能作为 GDM 早期诊断的筛查的重要参考指标。

关键词:妊娠糖尿病;血糖;糖化血红蛋白;C 反应蛋白;相关性

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The Correlation Analysis of Serum HbA1c and CRP in Patients with Gestational*

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ABSTRACT Objective: To determine the relationship between serum glycosylated hemoglobin (HbA1c) and C-reactive protein (CRP) in patients with gestational diabetes mellitus (GDM). In this study, blood glucose levels, serum HbA1c and CRP were measured in patients with GDM and the correlation between HbA1c and CRP was studied. **Methods:** A total of 68 pregnant women with gestational diabetes mellitus diagnosed and treated in our hospital from April 2015 to April 2017 were selected as research objects. All patients were in line with "Obstetrics and Gynecology" in the diagnostic criteria for GDM, and the other 68 normal pregnant women as the control group. There was no significant difference between the two groups in the general information of the study subjects, and the inclusion and exclusion criteria were met. Glucose oxidase method was used to test the blood glucose level (fasting blood glucose and postprandial 2h blood glucose level). Immunoagglutination method was used to detect serum HbA1c, Immunoturbidimetry was used to detect the C-reactive protein (CRP). The differences between the two groups were compared, and the correlation between HbA1c and CRP was studied. All data were analyzed by SPSS 20.0, t-test and correlation analysis were used to analyze the data. The difference was statistically significant at $P < 0.05$. **Results:** The levels of fasting plasma glucose (FPG) and 2 h plasma glucose (PG) in GDM pregnant women and normal pregnant women were significantly higher than those in normal controls ($P < 0.05$). In this study, serum levels of HbA1c and CRP were measured in patients with GDM and normal controls. The levels of HbA1c and CRP in patients with GDM were significantly higher than those in normal controls ($P < 0.05$). Correlation analysis of serum HbA1c level and CRP level in pregnant women with GDM showed that there was a significant positive correlation between HbA1c and CRP levels in GDM patients ($r = 0.654, P < 0.05$). **Conclusions:** The serum HbA1c and CRP levels were significantly upregulated in GDM patients. There was a significant positive correlation between serum

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HbA1c and CRP levels in GDM patients. Combined detection of serum HbA1c and CRP levels could be used as an important indicator of early diagnosis of GDM.

Key words: Gestational diabetes; Blood glucose; Glycosylated hemoglobin; C-reactive protein; Correlation

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前言

妊娠期糖尿病(Gestational diabetes mellitus, GDM)为产科常见疾病之一,妊娠前糖代谢正常或有潜在糖耐量减退,妊娠期才出现或确诊的以糖耐量减低为特征的糖代谢异常疾病^[1,2]。由于现代人生活方式及饮食习惯等的改变,GDM的发病率呈逐年上升趋势,GDM孕妇的早产和剖宫产概率明显高于正常孕妇^[3,4]。有研究表明在妊娠早、中期,随孕周的增加,胎儿对营养物质需求量增加,通过胎盘从母体获取葡萄糖是胎儿能量的主要来源^[5,6],孕妇血浆葡萄糖水平随妊娠进展而降低;雌激素和孕激素增加母体对葡萄糖的利用,到妊娠中、晚期,孕妇体内抗胰岛素样物质增加等使孕妇对胰岛素的敏感性随孕周增加而下降。为维持正常糖代谢水平,胰岛素需求量必须相应增加;对于胰岛素分泌受限的孕妇,妊娠期不能代偿这一生理变化而使血糖升高,使原有糖尿病加重或出现GDM^[7-9]。

GDM无典型症状,临床上常在24-28孕周通过检测FPG及1、2、3 h PG等来诊断GDM,但血糖水平指标存在较大的瞬时性和波动性,此检测方法极易出现漏诊和误诊^[10,11],故临床上常结合其他检测指标,例如糖化血红蛋白(HbA1c)、C反应蛋白(CRP)等^[12-14],但关于HbA1c与CRP的相关性报道较少,为明确GDM患者血清HbA1c与CRP的关系,本研究对GDM患者血糖水平、血清HbA1c与CRP进行检测,并对HbA1c与CRP的相关性进行研究,结果如下。

1 材料与方法

1.1 一般资料

以68例自2015年4月至2017年4月于我院诊治的妊娠糖尿病孕妇为研究对象,另选取68例正常孕妇为对照组。GDM组中孕妇年龄范围为21~31岁,平均年龄为(26.1±4.8)

岁,孕周20~38周,平均孕周为(29.1±7.3)周。正常组孕妇年龄范围为22~33岁,平均年龄为(25.7±5.1)岁,孕周21~37周,平均孕周为(28.4±5.1)周。两组一般资料比较无统计学差异($P>0.05$),具有可比性。

1.2 纳入与排除标准

纳入标准:①符合《妇产科学》中关于GDM的诊断标准^[15];②无潜在炎症相关因素:泌尿系统感染、呼吸系统感染等;③近期无外伤史;④近期末使用过糖皮质激素。排除标准:①孕前已为糖尿病患者;②有先兆子痫或子痫史;③患有严重肝、肾等功能障碍及恶性肿瘤者。

1.3 研究指标

血糖水平:所有患者分别于空腹时、餐后2 h时抽取肘静脉血4 mL,采用全自动生化分析仪根据葡萄糖氧化酶法检测研究对象空腹血糖(FPG)及餐后2 h血糖(2 h PG)水平。血清HbA1c水平:采用免疫凝集法对研究对象的血清HbA1c进行检测。血清CRP水平:根据免疫透射比浊法对研究对象的血清CRP水平进行检测。

诊断标准:空腹血糖 >5.1 mmol/L为异常,餐后2 h血糖 >10.1 mmol/L为异常,HbA1c $>6\%$ 为异常,CRP >6 mg/L为异常。

1.4 统计学分析

以SPSS 20.0分析数据,计量资料以 $\bar{x} \pm s$ 表示,采用t检验;对CRP和HbA1c进行pearson相关分析,以 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 两组患者血糖水平的比较

如表1所示,GDM组患者FPG和2 h PG均显著高于正常组($P<0.05$)。

表1 两组患者血糖水平比较($\bar{x} \pm s$)

Table 1 Comparison of the blood glucose levels between two groups ($\bar{x} \pm s$)

Group	Cases	FPG (mmol/L)	2 h PG (mmol/L)
GDM group	68	6.91±0.81*	10.25±2.1*
Normal group	68	4.41±0.62	6.51±0.85

Note: compared with normal group, * $P<0.05$.

2.2 两组患者血清糖化血红蛋白、CRP水平的比较

如表2所示,GDM组患者HbA1c和CRP水平均显著高

于正常组($P<0.05$)。

表2 两组患者血清HbA1c和CRP水平比较($\bar{x} \pm s$)

Table 2 Comparison of the serum CRP and HbA1c between two groups ($\bar{x} \pm s$)

Group	Cases	HbA1c (%)	CRP (mg/L)
GDM group	68	9.35±0.98*	7.12±1.03*
Normal group	68	5.23±0.41	3.87±0.21

Note: compared with normal group, * $P<0.05$.

2.3 GDM 患者血清 HbA1c 和 CRP 水平的相关性分析

对 GDM 组孕妇的血清 HbA1c 水平和 CRP 水平进行 pearson 相关分析,结果显示 GDM 患者 HbA1c 和 CRP 水平呈显著正相关关系($r=0.654$, $P<0.05$)。

3 讨论

妊娠期间的糖尿病有两种情况,一种为妊娠前已确诊患糖尿病,称“糖尿病合并妊娠”,另一种为妊娠前糖代谢正常或有潜在糖耐量减退、妊娠期才出现或确诊的糖尿病,又称为“妊娠期糖尿病(GDM)”^[16]。糖尿病孕妇中 80%以上为 GDM,我国发生率为 1%~5%,近年有明显增高趋势^[17]。妇女妊娠期间饮食增加、活动量减少,使得体质量也随之增加,导致妊娠期成为糖尿病的高发时期^[18]。妊娠糖尿病易导致流产、胎儿肺发育不全、胎儿呼吸窘迫综合征等危害,GDM 患者糖代谢多数于产后能恢复正常,但将来患 II 型糖尿病机会增加,糖尿病孕妇的临床经过复杂,母子都有风险,应该给予重视^[19]。妊娠期妇女的定期检查、早发现早治疗是减少母婴并发症、保障母婴安全的重要措施。因此,优良的筛查方法及对检验数据的有效且深度的分析显得尤为重要^[20,21]。本研究对 GDM 孕妇和正常孕妇 FPG 和 2 h PG 水平进行检测,显示 GDM 组患者 FPG 和 2 h PG 均显著高于正常组。

25 % 的妊娠糖尿病患者产后转变为持久糖耐量异常,极大的增加了日后患糖尿病风险,其中大多数患者发展为 II 型糖尿病^[22,23]。其早期诊断及治疗对有效控制血糖有很好的积极作用。HbA1 由 HbA1a、HbA1b、HbA1c 组成^[24,26],其中 HbA1 的 70 %~90 % 为 HbA1c,由于 HbA1c 的合成只与血糖有关,因此其血清水平能反应患者体内血糖水平,是对糖尿病治疗及预后诊断的重要依据^[27]。HbA1c 由葡萄糖和血红蛋白 A 通过不可逆非酶促反应结合生成,能在一段时间内反映孕妇的血糖水平^[28],且变异率小、指标稳定、受其他因素影响较小^[29],且不需要空腹采血,方法较简便。本研究结果显示,GDM 组患者血清 HbA1c 显著高于正常组,一般情况下血清 HbA1c 浓度能保持相对稳定,其水平与血糖浓度呈正比,故血清 HbA1c 可以表示糖尿病状态。本研究结果显示,GDM 组患者血清 CRP 水平显著高于正常组,与 Bowers 等^[30]研究显示的糖尿病患者血清 CRP 的含量明显增高结果一致,说明 CRP 能在一定程度上对 GDM 孕妇未来 2 型糖尿病风险进行预测。本研究对 GDM 组孕妇的血清 HbA1c 水平和 CRP 水平做相关性分析,结果显示 GDM 患者 HbA1c 和 CRP 水平呈显著正相关关系,加之上述 GDM 组患者血清 HbA1c 和 CRP 水平显著提高,使 GDM 的诊断更加合理和准确,有利于 GDM 的早期诊断和筛查,具有较高的临床价值。

综上所述,GDM 患者血清 HbA1c 和 CRP 水平相较于正常孕妇有显著提高,且二者呈显著的正相关关系,二者联合检测可能作为 GDM 早期诊断的筛查的重要参考指标。

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