牙周治疗干预对 2 型糖尿病伴牙周炎患者糖脂质代谢的影响

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［摘 要］**目的**：分析 2 型糖尿病伴牙周炎患者牙周治疗干预对糖脂质代谢及炎症因子的影响。**方法**：2 型糖尿病伴牙周炎患者 42 例为研究对象，检测牙周治疗前后空腹血糖（FPG）、糖化血红蛋白（HbA1c）、甘油三酯（TG）、高密度脂蛋白（HDL-C）、低密度脂蛋白（LDL-C）等糖脂质代谢指标，同时检测肿瘤坏死因子-α（TNF-α）、白介素-6（IL-6）、C-反应蛋白（CRP）、脂联素（APN）、瘦素（LEP）等血清炎症因子水平，并分析炎症因子间的相关性。**结果**：2 型糖尿病伴牙周炎患者治疗后，FPG、HbA1c 及 TG 显著降低，与治疗前比较差异有统计学意义（$P < 0.001$）；TNF-α、IL-6、CRP 及 LEP 显著降低，与治疗前比较差异有统计学意义（$P < 0.001$）；APN 明显升高，与治疗前比较差异有统计学意义（$t = 4.245$，$P < 0.001$）；血清 APN 与 LEP 及 TNF-α 水平呈现显著负相关（$P < 0.05$）。**结论**：控制牙周炎可改善 2 型糖尿病伴牙周炎患者的糖脂质代谢紊乱。

［关键词］糖尿病，非胰岛素依赖型；牙周炎；代谢；炎症；肿瘤坏死因子；C 反应蛋白质；瘦素
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Effects of Periodontitis Treatment Intervention on Glucose and Lipid Metabolism of Periodontitis Patients with Type 2 Diabetes

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［**Abstract**］**Objective**: To investigate the clinical effect of periodontitis treatment on glucose and lipid metabolism and inflammatory factors in periodontitis patients with Type 2 diabetes. **Method**: A total of 42 patients of type 2 diabetes with periodontitis were analyzed. Glucose and lipid metabolism index levels such as FPG, HbA1c, TG, HDL-C and LDL-C were tested before and after periodontitis treatment. Meanwhile, serum inflammatory factors such as TNF-α, IL-6, CRP, APN and LEP were also tested. The correlation analysis of serum inflammatory factors was performed. **Results**: After treatment, patients got lower levels of FPG, HbA1cand TG when compared with those before treatment, differences were statistical significant ($P < 0.001$); Meanwhile, TNF-α, IL-6, CRP and LEP were obviously lower than those before treatment, differences were statistical significant ($P < 0.001$); Level of APN were higher than before treatment, the difference was statistically significant ($t = 4.245$, $P < 0.001$). The level of serum APN had significant negative correlation with TNF-α and LEP ($P < 0.05$). **Conclusion**: Periodontitis treatment can improve metabolic disorders in patients with type 2 diabetes.

［**Key words**］diabetes mellitus, non-insulin-dependent; periodontitis; metabolism; inflammation; tumer necrosts factor; C reactive protein; leptin

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2 型糖尿病(type 2 diabetes)的发病机制尚不完全清楚,目前认为与高脂、高糖饮食及西方化的生活方式有关[1]。牙周炎(periodontitis)是牙周支持组织(牙龈、牙周膜、牙槽骨和牙骨质)的慢性感染性疾病,可导致牙周支持组织的炎性破坏[2]。有研究表明,牙周炎与糖尿病关系密切[3-4],本文通过分析 2 型糖尿病伴牙周炎患者牙周治疗干预后糖脂质代谢及炎症因子的改变,了解牙周炎的治疗对 2 型糖尿病患者炎症及糖脂质代谢紊乱的改善作用。

1 资料与方法

1.1 对象

2011 年 1 月 ~2013 年 12 月门诊 2 型糖尿病伴牙周炎患者 42 例,2 型糖尿病的诊断符合美国糖尿病协会诊断标准(2010)[5],排除合并严重糖尿病并发症如糖尿病足、眼部损害等,无合并其它自身免疫性疾病或代谢紊乱性疾病。牙周炎的诊断标准:牙探诊深度(PD)>5 mm 或附着体(AL)丧失 >4 mm,受累牙数目≥20 颗[6]。所有患者入组前 3 个月未接受过牙周治疗,入组前及入组观察期间未使用激素或抗炎药物。男性 19 例,女性 23 例;平均(53.21 ±8.86)岁,体质指数平均(23.58 ±2.12)kg/m^2,病程平均(7.28 ±3.19)年。

1.2 方法

牙周治疗视患者具体牙周损害程度而定,首先全面清洁口腔,龈上和龈下洁治,然后行根面平整术,如有必要拔除无法保留的牙齿。治疗前、后 3 d 给予抗生素(奥硝唑 1.0 g/d,阿莫西林 1.0 g/d)静脉输注。

1.3 观察指标

治疗 3 个月时评价治疗效果。(**1**)评价牙周治疗效果:牙探诊深度(PD)、附着体(AL)、牙菌斑指数(PLI);(**2**)糖脂质代谢指标:空腹血糖(FPG)、糖化血红蛋白(HbA**1**c)、甘油三酯(TG)、高密度脂蛋白(HDL-C)、低密度脂蛋白(LDL-C);(**3**)血清炎症因子(酶联免疫吸附法,试剂购于 R&D 公司):肿瘤坏死因子-α(TNF-α)、白介素-6(IL-6)、C-反应蛋白(CRP)、脂联素(Adiponectin,APN)、瘦素(Leptin,LEP)。

1.4 统计学方法

数据采用 SPSS 19.0 软件进行统计分析,计量资料以均数 ± 标准差($\bar{x} \pm s$)表示,组间比较采用 t 检验。相关性分析采用 *Pearson* 检验。$P<0.05$ 为差异有统计学意义。

2 结果

2.1 治疗效果

所有患者经牙周治疗后,PD、AL 及 PLI 均显著降低,与治疗前比较差异有统计学意义($P<0.001$)。见表 1。

表 1 2 型糖尿病并牙周炎患者牙周治疗前后 PD、AL 及 PLI(mm)

Tab. 1 PD, AL and PLI (mm) before and after periodontitis treatment in periodontitis patients with Type 2 diabetes

牙周指标	治疗前	治疗后	t	P
PD	4.21 ±0.45	3.12 ±0.23	13.980	<0.001
AL	5.10 ±0.43	4.12 ±0.31	11.980	<0.001
PLI	2.52 ±0.18	1.53 ±0.10	31.160	<0.001

2.2 FPG、HbA1c、TG、HDL-C、LDL-C

2 型糖尿病并牙周炎患者牙周治疗后 FPG、HbA1c 及 TG 显著降低,与治疗前比较差异有统计学意义($P<0.001$);治疗后 LDL-C 呈下降趋势,但与治疗前比较差异无统计学意义($t=1.626$,$P=0.108$);治疗后 HDL-C 具有升高趋势,与治疗前比较差异无统计学意义($t=0.963$,$P=0.338$)。见表 2。

表 2 2 型糖尿病并牙周炎患者牙周治疗前后糖脂质代谢情况

Tab. 2 The changes of glucose and Lipid metabolism in periodontitis patients with Type 2 diabetes before and after treatment

糖脂质代谢指标	治疗前	治疗后	t	P
FPG(mmol/L)	10.13 ±1.08	9.17 ±0.96	4.306	<0.001
HbA1c(%)	9.27 ±1.12	8.23 ±0.89	4.711	<0.001
TG(mmol/L)	2.19 ±0.21	1.92 ±0.18	6.326	<0.001
LDL-C(mmol/L)	3.41 ±0.24	3.33 ±0.21	1.626	0.108
HDL-C(mmol/L)	1.21 ±0.18	1.25 ±0.20	0.963	0.338

2.3 TNF-α、IL-6、CRP、APN、LEP

2 型糖尿病并牙周炎患者牙周治疗后 TNF-α、IL-6、CRP 及 LEP 均显著下降,与治疗前比较差异有统计学意义($P<0.001$);治疗后 APN 有升高趋势,与治疗前比较差异有统计学意义($t=4.245$,$P<0.001$)。见表 3。

表 3　2 型糖尿病并牙周炎患者牙周治疗前后血清炎症因子水平

Tab. 3　The changes of serum inflammatory factors before and after treatment in periodontitis patients with Type 2 diabetes

血清炎症因子	治疗前	治疗后	t	P
TNF-α(ng/L)	12.49 ± 3.13	8.11 ± 2.34	7.263	< 0.001
IL-6(ng/L)	11.86 ± 2.15	9.27 ± 2.11	5.572	< 0.001
CRP(mg/L)	7.28 ± 2.12	5.14 ± 1.98	4.781	< 0.001
APN(mg/L)	8.12 ± 1.76	9.87 ± 2.01	4.245	< 0.001
LEP(μg/L)	13.26 ± 4.78	8.97 ± 3.18	4.843	< 0.001

2.4　血清炎症因子相关性分析

分析 2 型糖尿病并牙周炎患者治疗前后血清炎症因子的相关性，血清 APN 水平与 LEP 水平呈现显著负相关（$r = -0.476$，$P = 0.001$），血清 APN 水平与血清 TNF-α 水平呈现显著负相关（$r = -0.424$，$P = 0.005$）。见图 1。

3　讨论

近 10 年来，糖尿病各种并发症的发病率明显上升[7-9]，其中心血管病变、视网膜病变及肾病等致残性并发症严重威胁患者的生命健康，已经逐渐成为一个全球性的问题[10]。牙周炎是一种慢性感染性疾病，糖尿病是牙周炎的易患因素，牙周炎的持续存在又增加糖尿病患者的病情。积极有效控制血糖可以显著降低患牙周炎的风险[11]，牙周炎的治疗干预可减轻糖尿病患者糖脂代谢紊乱状况，降低重症并发症的发病率[12-13]。本研究证实有效治疗牙周炎可以明显降低 2 型糖尿病合并牙周炎患者的 FPG、HbA1c 及 TG 水平。

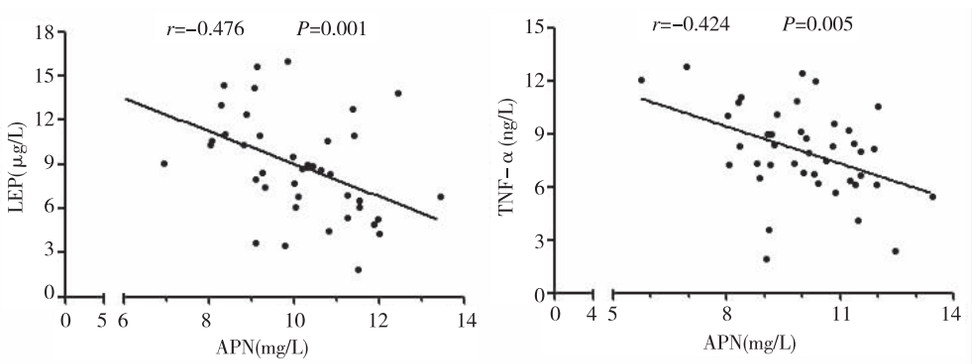


图 1　2 型糖尿病并牙周炎患者血清炎症因子相关性分析

Fig. 1　The correlation analysis of serum inflammatory factors in periodontitis patients with Type 2 diabetes

牙周炎病灶迁延不愈会导致机体持续释放 TNF-α、IL-6 等炎症因子[14]，致使机体呈现系统性慢性炎症状态，而慢性炎症状态会增加胰岛素抵抗、降低胰岛素敏感性，加重糖尿病患者糖脂质代谢紊乱[15]。APN 是一种具有抗炎作用的脂肪因子，可提高胰岛素敏感性，LEP 是一种具有促炎作用的脂肪因子，本研究发现牙周炎治疗干预后血清 TNF-α、IL-6、CRP 及 LEP 等显著降低，而血清 APN 明显升高，且 APN 与 TNF-α、LEP 呈现显著负相关，说明慢性炎症状态可能会抑制抗炎因子 APN 的表达或增加其消耗。

综上，本研究显示积极控制牙周炎能抑制机体慢性系统性炎症反应水平，从而改善 2 型糖尿病患者的糖脂质代谢紊乱状况。

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