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持续皮下胰岛素注射对 2 型糖尿病合并肺部感染患者的疗效分析 *

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摘要 目的:分析持续皮下注射胰岛素对 2 型糖尿病(T2DM)合并肺部感染患者的临床疗效。**方法:**将我院 2010 年 6 月至 2013 年 6 月收治的 86 例 2 型糖尿病合并肺部感染患者随机分为 2 组,分别采用胰岛素泵持续皮下注射(治疗组)和多次皮下注射胰岛素(对照组),观察患者血糖指标、血糖达标时间、低血糖发生率及肺部感染治愈率情况。**结果:**治疗后,两组患者的血糖均得到控制,治疗组的血糖指标变化、血糖达标时间及住院时间均优于对照组,差异均有统计学意义(均 $P < 0.05$)。治疗组的低血糖发生率明显低于对照组,而肺部感染治愈率显著高于对照组,差异均有统计学意义(均 $P < 0.05$)。**结论:**胰岛素泵持续皮下胰岛素注射在治疗 2 型糖尿病合并肺部感染患者中使用,血糖达标迅速,降低低血糖发生率,缩短住院时间,提高感染治愈率,临床效果好。

关键词:2 型糖尿病;肺部感染;胰岛素

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The Curative Effect Analysis of Continuous Subcutaneous Insulin Infusion in Type 2 Diabetes Patients Accompanied with Pulmonary Infection*

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ABSTRACT Objective: To analyze the clinical effect of continuous subcutaneous insulin infusion treatment of type 2 diabetes with pulmonary infection. **Methods:** 86 cases of type 2 diabetes complicated with pulmonary infection from June 2010 to June 2013 in our hospital were randomly divided into two groups, namely treatment group and control group. The treatment group were treated by continuous subcutaneous insulin infusion, and the control group were given hypodermic injection repeatedly. The patients' blood glucose index, time to reach normal level of blood glucose, the incidence of hypoglycemia and the clinical effect were analyzed. **Results:** Both of the two groups reached the target level of blood glucose after treatment, but the mean time of blood sugar controlling and the duration of hospital stays was shorter in the treatment group than in the control group, the difference was statistically significant (all $P < 0.05$). The incidence of hypoglycemia and the curative ratio of pulmonary infection in the treatment group was significantly lower than in the control group, and the difference was statistically significant (all $P < 0.05$). **Conclusion:** Continuous subcutaneous insulin infusion treatment is effective in patients of type 2 diabetes with pulmonary infection, it can effectively reduce the incidence of hypoglycemia, shorten the hospital stays and increase the curative ratio of pulmonary infection, thus is worth clinical promotion.

Key words: Type 2 diabetes; Pulmonary infection; Insulin

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前言

2 型糖尿病(Type 2 diabetes mellitus, T2DM)在发生发展过程中,常伴有肺部感染、血管并发症、神经性病变、肾脏衰竭等多种并发症^[1-3],其中以肺部感染为主,常引起血糖波动,加重糖尿病人的代谢紊乱^[4],如治疗不当易产生高渗性昏迷或酮症酸中毒,如合并其他慢性并发症,病死率较高^[5]。因此,2 型糖尿病合并肺部感染患者,合理控制血糖极为关键。临床上多使用皮下多点胰岛素注射和持续皮下胰岛素注射进行糖尿病强化治

疗,因此,本文总结了 2010 年 6 月至 2013 年 6 月我院收治的 86 例老年 2 型糖尿病合并肺部感染患者的临床资料,分析两种治疗方法对 2 型糖尿病合并肺部感染患者血糖控制、安全性及肺部感染治愈率,现报道如下:

1 资料与方法

1.1 一般资料

收集 2010 年 6 月至 2013 年 6 月我院收治的 86 例老年 2 型糖尿病合并肺部感染患者,其中男性 55 例,女性 31 例,年龄 60-85 岁。按照患者自愿原则将其分为两组,其中胰岛素泵持续皮下胰岛素注射组(治疗组)44 例,男性 32 例,女性 12 例,平均年龄(64.8±9.6)岁,糖尿病平均病程 6.5 年,肺部感染病程

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(8.7±3.5)d。常规诺和灵皮下注射组(对照组)42例,男性27例,女性15例,平均年龄(63.7±8.4)岁,糖尿病平均病程6.7年,肺部感染病程(9.1±3.4)d。治疗前两组患者的年龄、性别、肺部感染病情经比较无统计学差异($P>0.05$),具有可比性。

1.2 诊断标准

糖尿病诊断标准按照美国糖尿病协会标准^[6]:空腹血糖(Fasting blood-glucose,FBG)≥7.0 mmol/L或餐后2 h血糖(2 hour postprandial blood glucose,2 h PBG)≥11.1 mmol/L。

肺部感染诊断标准^[7]:近期出现咳嗽、咳痰、脓性痰、发热、头痛等症状,听诊肺部有实质性病变和湿罗音,白细胞(WBC) $>10 \times 10^9/L$ 或WBC $<4 \times 10^9/L$,部分患者出现中性粒细胞核左移,X线胸透检查为片状、斑片状阴影或间质性改变,伴或不伴有胸腔积液,痰培养分离出致病菌。

1.3 治疗方法

所有病例确诊为T2DM合并肺部感染后,签署知情同意后均及时使用胰岛素治疗。治疗组采用胰岛素泵(美国敦力,Minied 712E)连续腹部皮下注射,对照组采用每日三餐前和晚间十点诺和灵(苏州制药,300IU/支)多次皮下注射。对两组患者的呼吸系统视情况给予改善小气道功能、化痰、平喘等对症支持治疗,根据患者痰培养结果进行抗生素治疗。治疗后全部采用生化全自动分析仪(日本,Olympus)监测餐前及餐后2小时手指末梢血糖,根据血糖情况调整胰岛素剂量,至血糖达理想范围(FBG <7.0 mmol/L,2 h FBG <10.0 mmol/L)。治疗过程中

对两组患者的血糖水平、血糖达标时间、住院时间以及低血糖发生率进行记录。

1.4 临床观察与疗效评价

比较两组患者血糖达标时间,血糖指标变化和低血糖发生率。治疗后空腹血糖4.4-7 mmol/L,餐后2小时 <10 mmol/L,睡前 <8 mmol/L为血糖正常。血糖 <3.5 mmol/L为低血糖。观察发热、咳嗽、咳痰等症状改善情况及肺部听诊,X线胸片评价疗效。治愈标准为临床症状消失,体温正常,肺部啰音消失,X线胸片显示病灶完全消失;显效为临床症状明显好转,体温正常,肺部啰音减少,X线胸片显示病灶大部分吸收;无效为临床症状及X线胸片无改善甚至恶化。有效率为治愈率和显效率之和。

1.5 统计学方法

采用SPSS15.0统计软件进行分析,计量资料以均数±标准差表示,组间比较采用t检验,计数资料采用 χ^2 检验, $P<0.05$ 为差异有统计学意义。

2 结果

2.1 两组治疗前后血糖变化比较

治疗前两组FBG和2 h PBG差异无统计学意义($P>0.05$);两组治疗后FBG和2 h PBG均显著下降($P<0.05$),但是治疗组血糖恢复到正常水平的时间要明显短于对照组(见表1)。

表1 两组治疗前后血糖指标比较($\bar{x} \pm s$)

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

组别 Groups	例数(n) Case(n)	治疗前(mmol/L) Before treatment(mmol/L)		治疗后(mmol/L) After treatment(mmol/L)	
		FBG	2h PBG	FBG	2h PBG
治疗组 Treatment group	44	10.25±2.01	13.14±6.85	6.23±0.65*	7.12±2.46*
对照组 Control group	42	10.48±2.35	13.76±7.13	6.96±0.97*	8.45±2.67*

注:与治疗前相比,两组治疗后血糖均下降显著($P<0.05$)。

Note: After treatment,the blood sugar had significantly decreased in two groups compared with before treatment($P<0.05$).

2.2 两组治疗安全性比较

治疗组血糖达标时间为(4.35±2.51)d,低血糖发生4例,低血糖率为9.09%,平均住院时间(9.20±2.75)d。对照组血糖达标时间为(7.28±3.64)d,低血糖发生11例,低血糖率为

26.19%,平均住院时间(11.30±3.46)d。经统计学比较,两组在血糖达标时间、低血糖发生率和平均住院时间差异均显著($P<0.05$),(见表2)。

表2 两组血糖达标时间、低血糖发生率、住院时间比较($\bar{x} \pm s$)

Table 2 Comparison of time to reach normal level of blood sugar, the incidence of hypoglycemia and hospitalization time between two groups ($\bar{x} \pm s$)

组别 Group	例数(n) Cases(n)	血糖达标时间(d)	低血糖发生率(%)	平均住院时间(d)
		Time to reach normal level of blood sugar (d)	The incidence of hypoglycemia(%)	The mean time of hospitalization (d)
治疗组 Treatment group	44	4.35±2.51	4(9.09%)	9.20±2.75
对照组 Control group	42	7.28±3.64	11(26.19%)	10.30±3.46
t/ χ^2		4.363	3.257	3.123
P		0.001	0.048	0.003

2.3 两组临床疗效比较

治疗组 44 例患者中,30 例治愈,后大多采用口服降糖药治疗,均能保持空腹血糖平衡;13 例显效好转,肺部感染得到控制;1 例酮酸症中毒患者经降糖、补液扩容、纠正酸碱平衡治

疗和抗生素治疗后,因诱发多脏器功能衰竭死亡。对照组 42 例患者中,16 例经常规胰岛素注射治疗后痊愈,20 例显效好转,6 例无效(见表 3)。

表 3 两组临床疗效比较 [n(%)]
Table 3 Comparison of the clinical efficacy between the two groups[n(%)]

组别 Groups	病例(n) Cases(n)	临床疗效 Clinical efficacy			总有效 Overall response
		治愈 Cure	显效 Excellent	无效 Fail	
治疗组 Treatment group	44	30(68.18)	13(29.55)	1(2.27)	43(97.73)
对照组 Control group	42	16(38.10)	20(47.62)	6(14.28)	36(85.72)
X ²		—			4.147
P		—			0.042

3 讨论

糖尿病是危害人类的严重疾病之一,近年来糖尿病发病呈上升趋势。糖尿病和感染相互影响,糖尿病患者患各种感染的几率是普通人的 4-8 倍^[8],呼吸系统感染是感染的主要部位,其中以肺部感染为最^[9]。由于 2 型糖尿病患者合并肺部感染不具有典型性,患者一般因出现肺部感染症状而入院,病死率可达 14.2%^[9]。2 型糖尿病合并肺部感染患者血糖浓度升高后,可导致白细胞的活性和数量降低,影响 IL-12 诱导 CD4⁺T 细胞分化成 TH1,抑制抗体的生成,从而影响患者免疫功能,使得肺部感染也会严重^[10]。Hai J 等临床试验发现,肺部感染病原菌以肺炎克雷伯菌、铜绿假单胞菌、肺炎链球菌金黄色葡萄球菌等为主,其中高血糖、低氧血症是导致 2 型糖尿病患者易合并肺部感染的主要原因^[11]。因此,治疗糖尿病合并肺部感染的患者,最首要的目的是控制血糖后对症治疗。虽然胰岛素具有心血管反应,易引起低血糖症,但在其他药物不能维持正常血糖范围时,胰岛素是治疗 2 型糖尿病最为有效和安全的治疗方法^[12,13]。

Song Y 研究发现^[14],糖尿病人胰岛素治疗的有效性与胰岛素治疗方法有关。每天采用胰岛素注射胰岛素过程中有 35.26% 的糖尿病患者在注射部位形成了脂肪增生,58.68% 的患者出现出血和挫伤,增加癌症发生风险^[14,15],但在治疗 2 型糖尿病合并肺部感染方面,注射胰岛素更能快速有效控制血糖,使患者血糖达标^[16,17],尤其是需要胰岛素长期治疗的 2 型糖尿病患者^[18]。因此,为探讨 2 型糖尿病合并肺部感染的有效治疗方法,以我院 2010 年 6 月至 2013 年 6 月间收治的 86 例 2 型糖尿病合并肺部感染患者为研究对象,比较不同胰岛素治疗方法在控制血糖指标和安全性。本研究中采用的两种治疗方法均为当前临床常用方法,治疗过程中密切监测患者血糖指标,根据检查结果进行剂量调整,直到患者血糖达到正常水平,并评价治疗的有效率和安全性。本研究发现,经过一段时间治疗后,持续皮下胰岛素注射和餐前多次皮下注射均可使患者血糖恢复到正常水平,与治疗前相比差异均有统计学意义。同时,持续皮下胰岛素注射组在血糖达标时间、平均住院时间和低血糖发

生率方面也明显优于多次皮下注射组,治疗总有效率可达 97.7%,明显高于对照组 92.9%。因此,2 型糖尿病合并肺部感染患者积极控制血糖是关键^[17],由于胰岛素持续皮下注射可对患者血糖实时监控,按照患者需求给药,患者吸收平稳准确,减少血糖波动,能更加准确、快速、平稳的控制患者血糖^[19,20],缩短治疗时间,降低低血糖发生率,提高治愈率治疗效果显著。

综上所述,2 型糖尿病合并肺部感染患者在临床上采用胰岛素泵持续皮下注射能在最短时间内使患者血糖恢复到正常水平,有效控制肺部感染,降低其他并发症危险,值得临床推广应用。

参考文献(References)

- [1] Rathmann W, Schloot NC, Kostev K, et al. Macro- and microvascular outcomes in patients with type 2 diabetes treated with rapid-acting insulin analogues or human regular insulin:a retrospective database analysis[J]. Exp Clin Endocrinol Diabetes, 2014, 122(2): 92-99
- [2] 杜精晴,马跃东.2 型糖尿病患者脉搏波传导速度的变化[J].辽宁医学院学报,2013,34(6): 7-10,后插 1-后插 2
- [3] Cho YN, Lee KO, Jeong J, et al. The role of insulin resistance in diabetic neuropathy in koreans with type 2 diabetes mellitus:a 6-year follow-up study[J]. Yonsei Med J, 2014, 55(3): 700-708
- [4] Toda G, Fujishiro M, Yamada T, et al. Lung abscess without sepsis in a patient with diabetes with refractory episodes of spontaneous hypoglycemia:a case report and review of the literature [J]. J Med Case Rep, 2014, 8(1): 51
- [5] Li Gui-xiang, Liu Hong-fen. Clinical analysis of 76 cases of patients with Type 2 diabetes mellitus and pulmonary infections[J]. Journal of Practical Diabetology, 2013, 4(2): 37-38
- [6] American Diabetes Association.Standards of medical care in diabetes - 2013[M]. Diabetes Care, 2013, 36(Suppl 1): S11-S66
- [7] Respiratory Society, Chinese Medical Association [J]. Chin J Tuberc Respir Dis, 2006, 29: 651-655
- [8] 马付坚,黄承乐,黎荣能,等.糖化血红蛋白 $\geq 6.2\%$ 作为诊断阈值对糖尿病筛查的价值[J].广西医学,2013,(12): 1642-1645

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- Inflammation, 2012, 35(3): 1069-1077
- [23] Nakayama H, Kitayama J, Muto T, et al. Characterization of intracellular cytokine profile of CD4 (+) T cells in peripheral blood and tumor-draining lymph nodes of patients with gastrointestinal cancer[J]. Japanese Journal of Clinical Oncology, 2000, 30(7): 301-305
- [24] Borg C, Ray-Coquard I, Philip I, et al. CD4 lymphopenia as a risk factor for febrile neutropenia and early death after cytotoxic chemotherapy in adult patients with cancer [J]. Cancer, 2004, 101(11): 2675-2680
- [25] Hwang GI, Yoo CH, Sohn BH, et al. Predictive value of preoperative serum CEA, CA19-9 and CA125 levels for peritoneal metastasis in patients with gastric carcinoma[J]. Cancer Research Treatment, 2004, 36(3): 178-181
- [26] Lai IR, Lee WJ, Huang MT, et al. Comparison of serum CA72-4, CEA, TPA, CA19-9 and CA125 levels in gastric cancer patients and correlation with recurrence [J]. Hepatogastroenterology, 2002, 49(46): 1157-1160
- [27] Fernández-Fernández L, Tejero E, Tieso A, et al. Receiver operating characteristic (ROC) curve analysis of the tumor markers CEA, CA 19-9 and CA 72-4 in gastric cancer [J]. International Surgery, 1996, 81(4): 400-402
- [28] Ychou M, Duffour J, Kramar A, et al. Clinical significance and prognostic value of CA72-4 compared with CEA and CA19-9 in patients with gastric cancer[J]. Disease Markers, 2000, 16(3-4): 105-110
- [29] Li Y, Yang Y, Lu M, et al. Predictive value of serum CEA, CA19-9 and CA72.4 in early diagnosis of recurrence after radical resection of gastric cancer[J]. Hepatogastroenterology, 2011, 58(112): 2166-2170
- [30] Kodama I, Koufuji K, Kawabata S, et al. The clinical efficacy of CA 72-4 as serum marker for gastric cancer in comparison with CA19-9 and CEA[J]. International Surgery, 1995, 80(1): 45-48
- [31] Ikeguchi M, Katano K, Saitou H, et al. Pre-operative serum levels of CA72-4 in patients with gastric adenocarcinoma [J]. Hepatogastroenterology, 1997, 44(15): 866-871
- [32] Ucar E, Semerci E, Ustun H, et al. Prognostic value of preoperative CEA, CA 19-9, CA 72-4, and AFP levels in gastric cancer [J]. Advances in Therapy, 2008, 25(10): 1075-1084
- [33] Zheng CX, Zhan WH, Zhao JZ, et al. The prognostic value of preoperative serum levels of CEA, CA19-9 and CA72-4 in patients with colorectal cancer [J]. World Journal of Gastroenterology, 2001, 7(3): 431-434
- [34] Knutson KL, Disis ML. Tumor antigen-specific T helper cells in cancer immunity and immunotherapy [J]. Cancer Immunology Immunotherapy, 2005, 54(8): 721-728
- [35] Vivier E, Ugolini S, Blaise D, et al. Targeting natural killer cells and natural killer T cells in cancer[J]. Nature Reviews Immunology, 2012, 12(4): 239-252
- [36] Whiteside TL. What are regulatory T cells (Treg) regulating in cancer and why?[J]. Seminars in Cancer Biology, 2012, 22(4): 327-234
- [37] Koido S, Hara E, Torii A, et al. Induction of antigen-specific CD4- and CD8-mediated T-cell responses by fusions of autologous dendritic cells and metastatic colorectal cancer cells [J]. International Journal of Cancer, 2005, 117(4): 587-595

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- [9] Chen Xue-hui, Hai Jie, Peng Hua. Clinical characteristics of senile patients with type 2 diabetes mellitus complicated by pulmonary infections [J]. Chinese Journal of Nosocomiology, 2013, 23(13): 3106-3108
- [10] Wu HP, Kuo SF, Wu SY, et al. High interleukin-12 production from stimulated peripheral blood mononuclear cells of type 2 diabetes patients[J]. Cytokine, 2010, 51(3): 298-304
- [11] Hai Jie. Clinical analysis of 68 cases of senile patients with Type 2 diabetes and pulmonary infections [J]. Chinese Journal of Nosocomiology, 2012, 22(8): 1575-1577
- [12] Maria Rotella C, Pala L, Mannucci E. Role of Insulin in the Type 2 Diabetes Therapy: Past, Present and Future[J]. Int J Endocrinol Metab, 2013, 11(3): 137-144
- [13] Winkler G. Timely commencement of insulin in type 2 diabetes: benefits and risks[J]. Orv Hetil, 2014, 155(7): 255-261
- [14] Song Y, Li Y, Wang PJ, et al. Contrast-enhanced ultrasonography of skeletal muscles for type 2 diabetes mellitus patients with microvascular complications [J]. Int J Clin Exp Med, 2014, 7(3): 573-579
- [15] Holden SE, Currie CJ. Dogenous hyperinsulinaemia and exogenous insulin: a common theme between atherosclerosis, increased cancer risk and other morbidities[J]. Atherosclerosis, 2012, 222(1): 26-28
- [16] Mei Jian. Insulin pumps and Novolin 30R in treatment of diabetes mellitus complicated with pulmonary infections: a comparative study of clinical effect [J]. Chinese Journal of Nosocomiology, 2013, 23(6): 1298-1300
- [17] Ratanawongsa N, Crosson JC, Schillinger D, et al. Getting under the skin of clinical inertia in insulin initiation: the Translating Research Into Action for Diabetes (TRIAD) Insulin Starts Project[J]. Diabetes Educ, 2012, 38: 94-100
- [18] Rodríguez A, Tofe S, Reviriego J. Clinical course after five years of insulin therapy in patients with type 2 diabetes in Spain: Results of the EDIN study[J]. Endocrinol Nutr, 2014, 27: 1575-0922
- [19] Ong WM, Chua SS, Ng CJ. Barriers and facilitators to self-monitoring of blood glucose in people with type 2 diabetes using insulin: a qualitative study[J]. Patient Preference Adherence, 2014, 8: 237-246
- [20] 钟莉, 黎珂. 胰岛素泵与多次皮下注射强化治疗 II 型糖尿病的疗效对比分析[J]. 西部医学, 2012, 24(9): 1735-1737
- Zhong Li, Li Ke. Continuous subcutaneous insulin infusion for treatment of type II diabetes mellitus [J]. Medical Journal of West China, 2012, 24(9): 1735-1737