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胰岛素不同给药方式对妊娠期糖尿病患者围手术期血糖控制的效果研究*

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摘要 目的:研究胰岛素不同给药方式对妊娠期糖尿病患者围手术期血糖控制的效果与安全性。**方法:**选择 2013 年 11 月~2016 年 11 月于我院接受治疗的 92 例妊娠期糖尿病患者,所有患者按随机数字表法分为对照组和研究组,每组 46 例。对照组围手术期予以皮下注射胰岛素治疗,研究组围手术期予以胰岛素泵治疗。比较两组空腹血糖(FBG),餐后 2 h 血糖(2hPBG),血糖达标情况,抗生素使用情况,切口愈合情况、住院时间及并发症的发生情况。**结果:**治疗后 12 h、24 h 及 36 h,两组 FBG、2hPBG 水平均较治疗前显著下降,且研究组以上指标均低于对照组($P<0.05$)。研究组血糖达标、抗生素使用、切口愈合及住院时间均明显短于对照组($P<0.05$)。两组均有低血糖、切口感染发生,研究组并发症发生率低于对照组($P<0.05$)。**结论:**胰岛素泵输注胰岛素对妊娠期糖尿病患者围手术期血糖的控制效果明显优于皮下注射胰岛素,且其安全性更高。

关键词:妊娠期糖尿病;胰岛素泵;皮下注射胰岛素;围手术;血糖控制;安全性

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Research on the Insulin in Different Modes of Administration on the Perioperative Blood Glucose Control of Gestational Diabetes*

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ABSTRACT Objective: To research the effect and safety of different insulin administration methods on the perioperative blood glucose control in patients with gestational diabetes mellitus. **Methods:** 92 cases of patients with gestational diabetes who were treated from November 2013 to November 2016 in our hospital were selected and divided into the control group and the research group according to the random number table, with 46 patients in each group. The control group was treated with subcutaneous injection of insulin during perioperative period, and the research group was treated with insulin pump during perioperative period. Then the fasting blood glucose (FBG), 2 h postprandial blood glucose (2hPBG), blood glucose compliance, antibiotic use, incision healing, length of hospital stay, and incidence of complications were compared between the two groups. **Results:** At 12 h, 24 h and 36 h after treatment, the levels of FBG and 2hPBG in both groups were significantly lower than those before treatment, and the above indicators in the research group were lower than those in the control group ($P<0.05$). The blood glucose, antibiotic use, incision healing and hospitalization time in the research group were significantly shorter than those in the control group ($P<0.05$). The incidence of hypoglycemia and incision infection in the research group was lower than that in the control group ($P<0.05$). **Conclusion:** Insulin pump infusion is significantly better than that of subcutaneous insulin injection on the perioperative blood glucose control in patients with gestational diabetes, with higher safety.

Key words: Gestational diabetes; Insulin pump; Insulin subcutaneously; Perioperative; Blood glucose control; Security

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前言

妊娠期糖尿病为妊娠期间的一种特有疾病,糖尿病家族史、肥胖、年龄等是其主要诱因,由于其容易引起酮症酸中毒、羊水过多、早产、新生儿呼吸窘迫、巨大儿等并发症,因此临床分娩多选用剖宫产方式^[1-3]。但围手术期因麻醉、疼痛等刺激能

够进一步加重糖代谢紊乱,引起血糖上升,增加血糖控制难度^[4,5]。高血糖为糖代谢紊乱的主要特征,胰岛素作用或者分泌不足是引起高血糖的主要原因,胰岛素因无法透过胎盘屏障成为辅助性用药的首选。有研究显示^[6,7]胰岛素能够有效控制妊娠期糖尿病孕妇的血糖水平,改善母婴预后。既往妊娠期糖尿病患者多选择静脉滴注或者皮下注射胰岛素以控制血糖,但其难以有效

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维持调控血糖水平^[8,9]。胰岛素泵为血糖控制的新型治疗手段,能够通过模拟机体胰岛素的输注系统,从而能够灵活的维持血糖平稳性^[10,11]。本研究旨在探讨胰岛素不同给药方式对妊娠期糖尿病患者围手术期血糖控制的效果及安全性,结果报道如下。

1 资料与方法

1.1 一般资料

选择 2013 年 11 月~2016 年 11 月于我院接受治疗的 92 例妊娠期糖尿病患者,符合妊娠期糖尿病相关诊断标准^[12];孕

前无糖尿病史,空腹血糖(FBG)在 5.8 mmol/L 以上,糖筛查试验中 50 g 葡萄糖粉服用后 1h 血糖水平在 7.8 mmol/L 以上;剖宫产指征明确;年龄 24~38 岁;孕周 37~40 周;体质指数 23~28 kg/m²;平均动脉压 80~100 mmHg。排除标准:产科其他疾病;降糖药物过敏史;心、肝、肺主要脏器明显异常;自身免疫系统障碍。92 例妊娠期糖尿病患者按随机数字表法分为对照组和研究组,每组 46 例。两组一般资料比较无统计学差异($P>0.05$),见表 1。本研究已征得我院伦理会批准,并且签署家属知情同意书。

表 1 两组一般临床资料比较

Table 1 Comparison of the basic and clinical information between two groups

Item	Control group(n=46)	Research group(n=46)
Age(year)	32.39± 0.77	32.65± 0.79
Gestational week(week)	39.46± 0.16	39.40± 0.18
Body mass index(kg/m ²)	26.07± 0.58	25.97± 0.76
Mean arterial pressure(mmHg)	94.07± 0.95	94.30± 0.79
Number births(primary/maternal)	25/21	20/26

1.2 治疗方法

对照组予以皮下注射胰岛素治疗,术前 3 餐前及晚上十点予以诺和灵 N(规格:300 IU/3 mL,批号:20120817,生产厂家:广西健丰药业有限公司)皮下注射,将血糖控制在 FBG 低于 5.6 mmol/L,餐后 2 h 血糖(2hPBG)低于 7.2 mmol/L,术后 24 h 禁食期间输入诺和灵 R(规格:300 IU/3 mL,批号:20120419,生产厂家:重庆泰平药业有限公司),恢复饮食后调整为最初治疗方式,待患者切口拆线出院。研究组予以胰岛素泵治疗,胰岛素为诺和灵 R,术前按照每日 8 点血糖谱拟定餐时大剂量及基础率,将血糖控制在 FBG 低于 5.6 mmol/L,2hPBG 低于 7.2 mmol/L。手术当天嘱患者禁食,并停止予以餐时大剂量,并参照上述方式调节基础率,术后恢复进食时恢复餐前追加量。患者术后由禁食过度至流食,再恢复至正常饮食,并同对照组进行胰岛素强化治疗,待患者切口拆线出院。

1.3 观察指标

用药期间采用血糖监测仪测定两组患者手指末梢血糖,并比较术前 3 天及术后 12 h、24 h 及 36 h 时 FBG 及 2hPBG。血糖在 3.9 mmol/L 以下者为低血糖。并统计两组血糖达标、抗生

1.4 统计学分析

数据处理选用 SPSS18.0 软件包进行统计分析,计量资料用($\bar{x} \pm s$)表示,组间比较选用独立样本 t 检验,不同时间点采用重复测量方差分析,计数资料用[(例)%]表示,组间比较用 χ^2 检验,以 $P<0.05$ 表示差异有统计学意义。

2 结果

2.1 两组治疗前后血糖水平的比较

治疗前,两组血糖水平比较无统计学差异($P>0.05$);治疗后 12 h、24 h 及 36 h,两组血糖均较治疗前显著下降,且研究组下降更明显,组间差异有统计学意义($P<0.05$),见表 2。

表 2 两组治疗前后血糖水平的比较($\bar{x} \pm s$)

Table 2 Comparison of blood glucose level between two groups before and after the treatment($\bar{x} \pm s$)

Item	Time	Control group(n=46)	Research group(n=46)
FBG(mmol/L)	Before treatment	11.38± 1.78	11.71± 1.23
	At 12 h After treatment	6.78± 0.95 ^b	6.11± 0.59 ^{ab}
	At 24 h After treatment	6.03± 0.81	5.69± 0.69 ^{ab}
	At 36 h After treatment	5.60± 0.64	5.14± 0.60 ^{ab}
2hPG(mmol/L)	Before treatment	17.12± 2.25	17.38± 2.14
	At 12 h After treatment	8.60± 0.95 ^b	7.57± 0.80 ^{ab}
	At 24 h After treatment	7.93± 0.83 ^b	7.03± 0.84 ^{ab}
	At 36 h After treatment	7.26± 0.95 ^b	6.75± 0.75 ^{ab}

Note: Compared with control group ^a $P<0.05$; Compared with before treatment ^b $P<0.05$.

2.2 两组临床指标的比较

研究组血糖达标、抗生素使用、切口愈合及住院时间均短

于对照组,组间差异有统计学意义($P<0.05$),见表3。

表3 两组临床指标的比较($\bar{x} \pm s$)

Table 3 Comparison of the clinical index between two groups($\bar{x} \pm s$)

Item	Control group(n=46)	Research group(n=46)
Blood glucose compliance(d)	4.09± 0.63	3.15± 0.47 ^a
Antibiotic use(d)	5.13± 0.62	3.15± 0.56 ^a
Incision healing(d)	8.28± 1.03	7.00± 0.87 ^a
Hospital stay time(d)	14.10± 1.83	12.02± 1.48 ^a

Note: Compared with control group, ^a $P<0.05$.

2.3 两组不良反应发生情况的比较

对照组5例低血糖,6例切口感染,研究组1例低血糖,2例切口感染,对照组并发症发生率为23.91%,显著高于研究组(6.52%),组间差异有统计学意义($P<0.05$)。

3 讨论

妊娠期糖尿病是产科常见疾病,由于妊娠期间雌激素、孕激素、催乳素等分泌增多,导致细胞对胰岛素的敏感性减弱,进而造成胰岛素的分泌不足,最终出现糖代谢异常,增加围产期合并症,影响产妇身心健康^[13-15]。剖宫产是妊娠期糖尿病患者的主要分娩方式,但由于疼痛、手术恐惧等因素能够引起机体为明显应激状态,增加糖皮质类固醇及肾上腺素的释放,造成应激性高血糖,诱导系列急性并发症,加大麻醉及手术风险^[16,17]。同时血糖上升能够减弱吞噬细胞能力,导致暂时性的免疫抑制,促进细菌增生,增加术后感染的危险性,快速、有效、平稳的控制血糖于妊娠期2型糖尿病患者围手术期有着重要价值^[18,19]。

胰岛素是一种来自于胰岛β细胞的蛋白激素,利于肝糖原的合成及葡萄糖氧化,抑制糖原糖异生及分解,避免蛋白质及脂肪出现分解,为机体重要的降糖素^[20,21]。补充外源性胰岛素可拮抗胰岛素相对不足所致的血糖上升,妊娠期糖尿病围手术患者多应用胰岛素强化治疗,多次皮下注射胰岛素虽可导致血糖下降,然而餐前剂量较多时容易增加两餐之间低血糖的发生率,胰岛素剂量较低又难以控制餐后出现的高血糖,无法完全消除“黎明现象”,不能有效控制机体血糖的波动,有一定局限性^[22,23]。

正常空腹情况下,机体胰岛β细胞能够分泌一定量的胰岛素,从而调控FBG,进餐时其可分泌与食物对应的胰岛素,避免餐后血糖大量增加^[24,25]。胰岛素泵旨在模拟机体生理性分泌胰岛素方式,持续24h的输注基础胰岛素,维持血糖稳定,并参照患者的不同需求,拟定每小时的基础率,灵活调整胰岛素输注量,实施个体化差异,缓解低血糖及黎明效应^[26,27]。FBG是糖尿病检测的常用指标,可反映机体基础性胰岛素的分泌功能,然而其水平波动性较大;2hPBG能够进一步反映机体血糖控制状态,进一步说明妊娠期糖尿病患者血糖处于较高水平^[28,29]。本研究中,两组治疗后不同时间点的FBG、2hPBG均下降,但胰岛素泵组下降更为明显,说明其更能有效控制血糖水平,为围手术期创造良好条件,以增强手术成功率。同时,胰岛素泵组血糖达标、抗生素使用、切口愈合及住院时间均优于皮下注射胰岛

素组,且并发症发生率更低,提示其能促进患者恢复,安全性更高,在妊娠期糖尿病围手术期应用上有明显优势^[30,31]。

综上所述,胰岛素泵在妊娠期糖尿病患者围手术的血糖控制效果优于皮下注射胰岛素,能够降低并发症发生率,促进患者恢复。但本研究纳入样本量较少,观察指标不够全面,结果有待更多大样本、多中心试验进一步明确。

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