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不同麻醉方式对老年糖尿病患者全膝置换术后糖代谢的影响*

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摘要 目的:探讨不同麻醉方式对老年糖尿病患者全膝置换术(total knee arthroplasty, TKA)后糖代谢的影响。**方法:**2018年2月到2020年3月选择在本院进行择期TKA的老年糖尿病合并膝关节骨性关节炎患者88例,随机原则分为研究组与对照组,各44例。对照组给予常规静吸复合全身麻醉,研究组在对照组麻醉的基础上给予复合股神经阻滞,检测两组术后空腹血糖值,并记录两组膝关节功能改善情况。**结果:**研究组术后1 d、3 d与7 d静息状态下和活动状态下的疼痛视觉模拟评分法(Visual Analogue Scale/Score, VAS)评分都显著低于对照组($P<0.05$)。研究组术后1 d、3 d与7 d的空腹血糖值都显著低于对照组($P<0.05$)。研究组术后1 d、3 d与7 d的患肢膝关节活动度都显著高于对照组($P<0.05$)。**结论:**股神经阻滞联合全麻在老年糖尿病患者TKA中的应用能缓解术后疼痛,降低术后血糖水平,并且促进提高膝关节活动度有益预后。

关键词:股神经阻滞;老年人;糖尿病患者;全膝置换术;糖代谢

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Effects of Different Anesthesia Methods on Glucose Metabolism in Elderly Diabetic Patients after Total Knee Replacement*

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ABSTRACT Objective: To explore the effects of different anesthesia methods on the glucose metabolism after total knee arthroplasty (TKA) in elderly diabetic patients. **Methods:** From February 2018 to March 2020, 88 cases of elderly patients with diabetes and knee osteoarthritis who underwent elective TKA in our hospital were selected as the research object. The patients were divided into research group and control group of 44 cases in each groups accorded to the principle of random envelope drawing. The control group were given routine intravenous inhalation combined with general anesthesia, and the research group were given compound femoral nerve block on the basis of the control group anesthesia. The postoperative fasting blood glucose values of the two groups were detected, and the improvement of knee joint function in the two groups were recorded. **Results:** The visual analogue scale/score (VAS) scores of pain in resting and active states on the 1 st, 3 d and 7 d postoperatively in the study group were significantly lower than those in the control group ($P<0.05$). The fasting blood glucose values of the research group at 1 d, 3 d and 7 d postoperative days were significantly lower than those of the control group ($P<0.05$). The knee joint mobility of the affected limb at 1 d, 3 d and 7 d postoperative days in the research group were significantly higher than that in the control group ($P<0.05$). **Conclusion:** The application of femoral nerve block combined with general anesthesia in TKA of elderly diabetic patients can relieve postoperative pain, reduce postoperative blood glucose levels, and promote the improvement of knee joint mobility and beneficial prognosis.

Key words: Femoral nerve block; Elderly; Diabetic; Total knee replacement; Glucose metabolism

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前言

随着老年人口的增加,老年糖尿病合并膝关节骨性关节炎(osteoarthritis, OA)的发病率逐年升高。全膝置换术(total knee arthroplasty, TKA)为该病的主要治疗方法,可以减轻患者患膝疼痛,提高预后^[1,2]。但TKA术后会出现剧烈的疼痛,可造成术

后感染等^[3]。TKA是通过阻滞感受器的传入,抑制周围神经致敏,降低中枢兴奋性^[4,5]。目前镇痛方法包括股神经阻滞、硬膜外镇痛、静脉自控镇痛等,其中股神经阻滞通过阻滞股神经,可以显著减轻患者的术后疼痛,降低术后的应激反应^[6,7]。特别是当前神经穿刺技术的发展,为其提供了技术保障^[8,9]。现代研究表明,很多老年糖尿病患者在进行围手术期伴有明显的应激反应,

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可恶化胰岛素信号传导障碍,形成胰岛素抵抗,使得靶器官对胰岛素反应性与敏感性降低,葡萄糖的代谢及摄取能力降低,造成术后糖代谢紊乱,容易形成血糖持续升高,不利于患者术后康复^[10,11]。本文具体探讨了不同麻醉方式对老年糖尿病患者 TKA 后糖代谢的影响,希望为临床上合理麻醉提供参考。

1 资料与方法

1.1 研究对象

2018 年 2 月到 2020 年 3 月选择在本院进行择期 TKA 的

老年糖尿病合并膝关节骨性关节炎患者 88 例,纳入标准:美国麻醉医师协会(ASA)分级为 I - II 级;单侧手术;符合糖尿病合并膝关节骨性关节炎的诊断标准;都由同一组医生进行手术操作;医院伦理委员会批准了此次研究;患者全程同意本研究;年龄 60~75 岁,具有手术指征;临床资料完整。排除标准:因手术效果不理想行 2 次手术者;精神疾病患者;有酗酒史或者药物依赖史;血功能障碍、神经功能缺陷者;术前肝肾功能不全患者。

根据随机原则分为研究组与对照组,各 44 例,两组的一般资料对比无差异($P>0.05$),有可比性,见表 1。

表 1 两组一般资料对比

Table 1 Comparison of two sets of general information

Groups	n	Location of operation (left/right)	Operation time (min)	Anaesthesia time (min)	Gender (M/F)	Average age (years)	Fasting Blood (mmol/L)	BMI (kg/m ²)
Study group	44	23/21	89.33± 11.59	113.89± 27.18	18/26	68.58± 6.27	6.77± 0.14	22.17± 2.55
Control group	44	22/22	89.01± 12.04	114.00± 31.87	20/24	68.62± 6.22	6.58± 0.22	22.10± 3.14

1.2 方法

对照组:给予常规静吸复合全身麻醉。研究组:在对照组麻醉的基础上给予复合股神经阻滞。入室后监测生命体征,患肢全麻插管后上止血带。静脉注射芬太尼 3~5 $\mu\text{g/kg}$ 、咪达唑仑 0.04 mg/kg 、丙泊酚 1~2 mg/kg 、维库溴铵 0.1 mg/kg ,术中麻醉维持吸入体积分数 0.025~0.035 七氟烷。手术均取髌骨前正中切口,从股四头肌肌腱和髌骨内侧进入,人工假体置换完成后置入骨水泥固定人工膝关节。在复合神经阻滞中,患者取仰卧位,患肢外旋外展。在超声引导下定位股神经,以平面内技术进针,穿透髂筋膜回抽无血后注入 0.2%罗哌卡因 20 mL。术后如疼痛剧烈给予氟比洛芬酯 50 mg 静滴。

1.3 观察指标

(1)在术后 1 d、3 d 与 7 d 采用疼痛视觉模拟评分法(Visual Analogue Scale/Score, VAS)评定患者静息状态下和活动状态下的疼痛状况,0~10 分范围,分数越高,疼痛越严重。(2)在术后 1 d、

3 d 与 7 d 在早晨 6:00 左右测手指血糖,用 75%的酒精消毒左手无名指指腹,待干后,用全自动采血笔以足够深度刺入,用棉球抹去第一滴血,再自然流出足量血液,用欧姆龙快速血糖仪及配套试纸严格按照仪器说明书进行测定血糖。(3)记录两组术后 1 d、3 d 与 7 d 的患肢膝关节活动度。

1.4 统计学分析

在数据统计过程中,通过 SPSS 22.00 软件完成,选择 $\bar{x} \pm s$ 来表示计量资料(对比为 t 检验),计数数据选择%的方式来表示(对比为卡方 χ^2 检验),检验水准为 $\alpha=0.05$ 。

2 结果

2.1 疼痛评分对比

研究组术后 1 d、3 d 与 7 d 静息状态和活动状态下的疼痛 VAS 评分都显著低于对照组($P<0.05$),见表 2。

表 2 两组术后 VAS 评分对比(分, $\bar{x} \pm s$)

Table 2 Comparison of pain VAS scores between the two groups (scores, $\bar{x} \pm s$)

Groups	n		1 d postoperatively	3 d postoperatively	7 d postoperatively
Study group	44	Resting state	3.02± 1.03*	1.22± 0.56*	0.89± 0.41*
		Active state	5.62± 1.25*	4.31± 1.32*	1.79± 0.32*
Control group	44	Resting state	4.78± 1.39	2.29± 0.49	1.67± 0.65
		Active state	6.24± 1.21	5.15± 1.14	2.83± 0.42

Note: * $P<0.05$ compared with the control group.

2.2 血糖含量对比

研究组术后 1 d、3 d 与 7 d 的空腹血糖值都显著低于对照组($P<0.05$),见表 3。

2.3 患肢膝关节活动度对比

研究组术后 1 d、3 d 与 7 d 的患肢膝关节活动度都显著高于对照组($P<0.05$),见表 4。

3 讨论

TKA 治疗膝关节骨性关节炎,有消除疼痛、纠正畸形的优势^[12,13]。但有研究表明 TKA 可造成术后的疼痛,影响患者术后膝功能^[14,15]。股神经阻滞能直接阻断疼痛的传导,从而减少中枢对疼痛的反应,稳定机体的自主神经功能^[16,17]。本研究的研究组术后 1、3、7 d 的静息状态和活动状态的 VAS 评分都显著低于对照组。谭玉峰^[18]等学者的研究也发现股神经阻滞复合全身麻醉患者术后 2、4、8 h 的 VAS 评分均低于全身麻醉患者,说明股神经阻滞复合全身麻醉在老年患者膝关节置换术中应用效

果较好,患者术后清醒更快,疼痛感更轻。本研究结果表明应用等神经定位技术,股神经阻滞作用靶点明确,可有效阻断 TKA 术后的疼痛传导通路^[19-21]。

表 3 两组血糖含量对比(mmol/L, $\bar{x} \pm s$)Table 3 Comparison of blood glucose content between the two groups (mmol/L, $\bar{x} \pm s$)

Groups	n	1 d postoperatively	3 d postoperatively	7 d postoperatively
Study group	44	7.22 $\pm$ 0.33*	6.44 $\pm$ 0.46*	6.10 $\pm$ 0.32*
Control group	44	8.89 $\pm$ 0.14	7.39 $\pm$ 0.15	6.84 $\pm$ 0.82

表 4 两组患肢膝关节活动度对比($^{\circ}$, $\bar{x} \pm s$)Table 4 Comparison of knee joint mobility of affected limbs ($^{\circ}$, $\bar{x} \pm s$)

Groups	n	1 d postoperatively	3 d postoperatively	7 d postoperatively
Study group	44	93.02 $\pm$ 3.29*	99.87 $\pm$ 11.49*	106.79 $\pm$ 14.20*
Control group	44	90.10 $\pm$ 6.24	92.72 $\pm$ 8.44	100.76 $\pm$ 15.73

随着医疗科学技术的提高,TKA 的成功率越来越高,显著延长了患者的生存时间,也提高了患者的生存质量^[2]。但是很多糖尿病患者伴随有剧烈的术后应激反应,可导致血糖剧烈波动^[23]。有研究显示炎症反应、免疫异常、氧化应激、基因易感性、感染等也是导致患者血糖升高的重要危险因素,从而影响患者的康复^[24]。特别是表明手术应激可对机体产生了负面的影响,降低细胞免疫功能,从而诱导炎症因子的大量释放^[25,26]。而血糖异常波动与认知功能障碍的发生有关,良好的血糖控制可能逆转术后患者的认知功能障碍;胰岛素抵抗还能够导致组织、器官等功能下降,促进心脑血管动脉硬化^[27,28]。本研究显示研究组术后 1 d、3 d 与 7 d 的空腹血糖值都显著低于对照组,与李捷萌^[29]等人的研究类似,通过对比全身麻醉复合硬膜外阻滞麻醉与全身麻醉对糖尿病行腹腔镜胆囊切除术患者术中血糖指标,发现全身麻醉复合硬膜外阻滞麻醉患者术后 1 d、2 d、3 d、4 d 不同时段血糖指标均低于全身麻醉患者,说明糖尿病患者实施腹腔镜胆囊切除术中选择全身麻醉复合硬膜外阻滞麻醉,有利于维持患者术中血糖指标稳定,安全性高。本研究结果表明股神经阻滞的应用能降低患者术后血糖值。股神经的解剖位置明确,是 TKA 较常用的阻滞神经^[30]。而超声的精准定位,可增强阻滞效果^[31]。股神经阻滞可抑制疼痛信号的传导与炎症因子的释放,也可扩张血管并促进功能恢复,从而有利于膝关节功能的改善^[32,33]。本研究显示研究组术后 1 d、3 d 与 7 d 的患肢膝关节活动度都显著高于对照组;职红^[34]等学者研究股神经阻滞和连续关节周围组织浸润麻醉及对全膝关节置换术后膝关节功能康复,结果显示股神经阻滞麻醉患者术后阿片类药物较少,但是术后 7 d、1 个月股四头肌肌力及膝关节活动度恢复,连续关节周围组织浸润麻醉优于股神经阻滞组,与本研究结果不同,主要原因是对比的麻醉方式不同,后续研究我们也需要纳入连续关节周围组织浸润麻醉的方法,探究其优缺点。本研究表明股神经阻滞的应用能持续改善患者的预后膝关节功能。不过该方法也有一定的不足,股神经阻滞对操作人员的技术水平、设备器材的要求比较高,且病例数量较少,将在后续研究中深入探讨。

总之,股神经阻滞联合全麻在老年糖尿病患者 TKA 中的

应用能缓解术后疼痛,减低术后血糖水平,并且促进提高膝关节活动度有益预后。

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