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股神经阻滞自控镇痛用于全膝置换术后镇痛和功能恢复的疗效观察 *

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摘要 目的：观察股神经阻滞自控镇痛用于全膝置换(total knee arthoplasty，TKA)术后镇痛和功能恢复的疗效。**方法**：选择 2017 年 8 月 ~2019 年 6 月院骨科收治的膝关节骨性关节炎患者 122 例，根据随机数字表法将其分为观察组与对照组，每组 61 例患者。所有患者均采用静吸复合全身麻醉，观察组给予股神经阻滞自控镇痛，对照组给予静脉自控镇痛，记录和比较两组患者术后镇痛效果与功能恢复情况。**结果**：观察组术后 1 d、3 d 与 7 d 的疼痛视觉模拟评分法(Visual Analogue Scale/Score，VAS)评分、血清白细胞介素(Interleukin，IL)-6 和 C- 反应蛋白(C-reactive protein，CRP)含量都显著低于对照组(P<0.05)，患肢膝关节活动度明显高于对照组(P<0.05)，术后 7 d 的恶心、头晕、嗜睡、心动过缓等并发症发生率(4.9 %)显著低于对照组(21.3 %，P<0.05)，术后 1 d、1 个月与 3 个月的患肢膝关节活动度显著高于对照组(P<0.05)。**结论**：股神经阻滞自控镇痛用于 TKA 可提高术后镇痛效果，促进膝关节功能恢复，减少术后并发症的发生，可能与其有效抑制 IL-6 和 CRP 的释放有关。

关键词：股神经阻滞自控镇痛；全膝置换；静脉自控镇痛；膝关节功能；炎症因子

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Effects of Self-controlled Analgesia of Femoral Nerve Block on the Analgesia and Functional Recovery after Total Knee Replacement*

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ABSTRACT Objective: To investigate the effects of self-controlled analgesia of femoral nerve block on analgesia and functional recovery after TKA. **Methods:** From August 2017 to June 2019, 122 cases of patients with knee osteoarthritis admitted to the orthopedic department of a certain hospital were randomly divided into observation group (61 cases) and control group (61 cases). All patients were underwent general anesthesia with static inhalation, and the observation group were received self-controlled analgesia of the femoral nerve block, the control group were received intravenous analgesia, recorded the postoperative analgesic effects and functional recovery. **Results:** The pain VAS of the observation group were significantly lower than that of the control group at 1 d, 3 d and 7 d after operation (P<0.05), and the serum IL-6 and CRP levels were significantly lower than the control group (P<0.05), the activity rate were significantly higher than that of the control group (P<0.05). The incidence of complication, such as nausea, dizziness, lethargy, and bradycardia on the 7 d after operation were 4.9 %, which were significantly lower than that of the control group (21.3 %)(P<0.05). The knee joint mobility in the observation group at 1 d, 1 month and 3 months after operation were significantly higher than that in the control group (P<0.05). **Conclusion:** The application of self-controlled analgesia of femoral nerve block in TKA can inhibit the release of inflammatory factors, improve the postoperative analgesic effect, promote the recovery of knee joint function, and reduce the occurrence of postoperative complications.

Key words: Femoral nerve block self-controlled analgesia; Total knee replacement; Intravenous controlled analgesia; Knee joint function; Inflammatory factor

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前言

随着我国人口老龄化的加剧，膝关节骨性关节炎(osteoarthritis，OA)的发病率逐年升高。全膝置换术术(total knee arthoplasty，TKA)为该病的主要治疗方法，可以减轻患者患膝疼痛，恢复患膝功能，提高生活质量[1,2]。但 TKA 术后患者多伴随有剧烈的疼痛反应，影响了患者术后康复的信心，还可能造成术后感染、深静脉血栓等并发症[3,4]。

TKA 术后镇痛的目的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[5,6]。目前镇痛的方法包括股神经

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阻滞自控镇痛、关节周围局部浸润阻滞镇痛、硬膜外镇痛、静脉自控镇痛等[7,8]。其中，股神经阻滞自控镇痛可以显著减轻术后疼痛，降低术后的应激反应，也可减少阿片类药物相关并发症的发生率[9,10]。目前，神经穿刺技术的发展为股神经阻滞自控镇痛提供了有力的技术保障[11,12]。本研究通过对比观察，探讨了股神经阻滞自控镇痛用于全膝置换术后镇痛和功能恢复的疗效，旨在寻找更优于患者的镇痛方式。现总结报道如下。

1 资料与方法

1.1 研究对象

选择 2017 年 8 月到 2019 年 6 月本院骨科收治的 OA 患者 122 例，年龄 55-75 岁，符合 OA 的诊断，具有单侧 TKA 的指征；麻醉风险评定Ⅰ-Ⅲ级；患者对治疗及麻醉、镇痛方案知情同意；本院伦理委员会批准了此次研究。排除标准：膝关节烧伤、感染及损伤者；凝血功能障碍、神经功能缺陷者；股神经阻滞穿刺置管部位局部感染或已知对局部麻醉药物过敏的患者；不能配合调查的患者。

所有研究对象按照术后镇痛方式的不同分为观察组和对照组，每组各 61 例。两组一般资料对比无统计学差异(P>0.05)，具有可比性。见表 1。

表 1 两组一般资料的对比

Table 1 Comparison of the general information between two groups

Groups	n	Surgical position (left / right)	Operation time (min)	Anaesthesia time (min)	Sex (male/ female)	Age (years)	BMI (kg/m^2)
Observation group	61	31/30	89.33± 11.59	113.89± 27.18	27/34	65.13± 6.21	22.17± 2.55
Control group	61	33/28	89.01± 12.04	114.00± 31.87	28/33	64.62± 5.92	22.10± 3.14

1.2 麻醉与镇痛方法

所有患者均采用静吸复合全身麻醉，入室后监测生命体征，手术切皮前患肢自远端至近端予驱血带驱血。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。

观察组：在麻醉诱导前行患肢股神经阻滞自控镇痛，均由同一组高年资麻醉医师完成。患者取仰卧位，患肢外展。在超声引导下定位股神经，采用 2 %利多卡因于穿刺部位行表面浸润麻醉，将穿刺针与神经刺激器相连，初始电流为 1 mA，进针深度 2-4 cm，将穿刺针平行于股动脉，朝头端 30°~45° 方向进针，确定无误后连接镇痛泵。镇痛泵配方为 0.2 %罗哌卡因 300 mL，在术前 30 min 开启镇痛泵，镇痛泵背景输注速度 5 mL/h，单次给药剂量 5 mL，安全锁定时间 30 min。

对照组：给予静脉自控镇痛，麻醉诱导前建立静脉通道，手术结束前 30 min 开启镇痛泵，给予初始计量 2 mL并静脉推注昂丹司琼 2 mL。镇痛泵配方为曲马多注射液 16 mL+ 氟比洛芬酯注射液 10 mL+ 地塞米松注射液 1 mL，加生理盐水配制成 80 mL溶液。镇痛泵安全锁定时间 15 min，背景输注速度 1 mL/h，单次给药剂量 2 mL。

1.3 观察指标

(1)术后 1 d、3 d 与 7 d，采用疼痛 VAS 评分评定患者的疼痛状况，0 分为无痛，10 分为剧烈疼痛，分数越高，疼痛越严重。(2)术后 1 d、3 d 与 7 d，采集患者的外周静脉血 4 mL，4 ℃ 2000 r/min 离心 10 min，采用 ELASA 法测定血清 IL-6 和 CRP 含量。(4)记录两组在术后 7 d 出现的恶心、头晕、嗜睡、心动过缓等并发症发生情况。(3)记录两组患者术后 1 d、1 个月与 3 个月的患肢膝关节活动度。

1.4 统计学分析

应用 SPSS 20.00 进行数据分析，计量资料以($\bar{x}\pm s$)表示，计数数据以%表示，组间对比分别采用 t 检验和 x^2 检验，以 P<0.05 为差异有统计学意义。

2 结果

2.1 两组术后疼痛评分对比

观察组术后 1 d、3 d 与 7 d 的疼痛 VAS 评都显著低于对照组，差异有统计学意义(P<0.05)。见表 2。

表 2 两组术后不同时间点的疼痛 VAS 评分对比 (分，$\bar{x}\pm s$)

Table 2 Comparison of the VAS scores at different time points after operation between two groups(score, $\bar{x}\pm s$)

Groups	n	1 d after operation	3 d after operation	7 d after operation
Observation group	61	3.02± 1.03*	1.22± 0.56*	0.89± 0.41*
Control group	61	4.78± 1.39	2.29± 0.49	1.67± 0.65

Note: Compared with the control group, *P<0.05.

2.2 两组术后血清 IL-6 与 CRP 含量对比

两组术后 1 d、3 d 与 7 d 的血清 IL-6 与 CRP 含量都较术前显著降低，且观察组以上指标均显著低于对照组(P<0.05)。见表 3。

2.3 两组并发症的发生情况对比

观察组术后 7 d 恶心、头晕、嗜睡、心动过缓等并发症的发生率为 4.9 %，显著低于对照组(21.3 %，P<0.05)，见表 4。

2.4 两组术后患肢膝关节活动度对比

两组术后 1 d、1 个月与 3 个月的患肢膝关节活动度都较术前显著升高，且观察组术后 1 d、1 个月与 3 个月的患肢膝关节活动度都显著高于对照组(P<0.05)，见表 5。

表 3 两组术后不同时间点的血清 IL-6 与 CRP 含量对比 (pg/mL，$\bar{x}\pm s$)

Table 3 Comparison of the serum IL-6 and CRP content at different time points between the two groups (pg/mL, $\bar{x}\pm s$)

Groups	n	At 1 d after operation		At 3 d after operation		At 7 d after operation	
		IL-6	CRP	IL-6	CRP	IL-6	CRP
Observation group	61	42.02± 3.49*	13.02± 2.84*	14.20± 2.22*#	7.20± 1.11*#	10.76± 2.11*#	6.72± 1.22*#
Control group	61	56.29± 6.10	23.87± 3.17	22.17± 3.18#	11.77± 2.19#	18.73± 3.17#	14.20± 2.11#

Note: Compared with the control group at the same time, *P<0.05; compared with the same group after 1 day, #P<0.05.

表 4 两组术后并发症发生情况的对比(例，%)

Table 4 Comparison of the incidence of postoperative complications between the two groups (n,%)

Groups	n	Nausea	Dizziness	Lethargy	Bradycardia	Incidence
Observation group	61	1	1	0	1	3 (4.9)*
Control group	61	4	3	2	4	13 (21.3)

Note: Compared with the control group, *P＜0.05.

表 5 两组术后不同时间点的患肢膝关节活动度对比(°，$\bar{x}\pm s$)

Table 5 Comparison of the knee joint mobility at different time points between the two groups (°, $\bar{x}\pm s$)

Groups	n	1 d after operation	1 month after operation	3 month after operation
Observation group	61	93.02± 3.29*	99.87± 11.49*#	106.79± 14.20*#
Control group	61	90.10± 6.24	92.72± 8.44#	100.76± 15.73#

Note: Compared with the control group at the same time, *P<0.05；compared with the same group after 1 day, #P<0.05.

3 讨论

TKA 是治疗膝关节骨性关节炎的重要方法，具有消除疼痛、恢复膝关节功能等优势[13]。有研究显示 TKA 可造成术后剧烈疼痛，术后疼痛程度重、持续时间长，是患者术后患膝功能的重要因素[15,16]。术后剧烈疼痛不仅会影响患者的功能恢复，也会影响术后效果[14]。静脉自控镇痛通过持续静脉给予患者一定剂量的镇痛药物，使血药浓度维持在最低有效剂量，从而达到有效镇痛的方法之一[17]，具有效果可靠、起效迅速、操作简单等优势，但个体差异大，给药剂量很难准确，导致患者容易出现恶心、头晕、嗜睡等，在一定程度上限制了静脉自控镇痛的应用[18,19]。

股神经阻滞自控镇痛是目前应用于骨科术后效果令人满意的镇痛方法，通过直接阻断疼痛的上行传导通路减少中枢对疼痛的应激，能稳定机体的血流动力学及自主神经功能且并发症的发生率也比较低[20]。本研究结果表明股神经阻滞自控镇痛能减少术后并发症。该方法中的麻醉药物作用于局部，对全身系统影响较小，安全性更高。且股神经阻滞自控镇痛具有明确作用点，可有效破坏 TKA 术后的疼痛传导通路，提高镇痛效果[21,22]。

良好的镇痛才能保证患者恢复效果良好，手术疼痛主要由创伤刺激引起，也可是炎症反应引发的外周和中枢敏化[23]。正常人体中 Th1/Th2 细胞因子处于动态平衡之中，当机体受到手术、麻醉与镇痛的影响时，这种平衡状态被打破[24]。本研究显示观察组术后 1 d、3 d 与 7 d 的血清 IL-6 与 CRP 含量都显著低于对照组，表明手术应激可对机体产生了负面的影响，降低了患者的细胞免疫功能。股神经阻滞自控镇痛可以有效阻止 Th 细胞向 Th2 细胞漂移，维持 Th1 细胞和 Th2 细胞的动态平衡；可以促进 IL-6 与 CRP 含量恢复正常[25]。同时，该方法是在术后以背景剂量及患者自控追加剂量持续给予局部麻醉药，可达到持续阻滞炎症因子引起的疼痛信号传的过程，也有利于抑制 IL-6 与 CRP 的释放[26,27]。

股神经是膝关节的主要支配神经，解剖位置明确，是 TKA 较常用于阻滞的神经。而刺激仪的引导可为神经探查提供了便利，能保证足够的阻滞范围，提高阻滞效果[28,29]。本研究显示观察组术后 1 d、1 个月与 3 个月的患肢膝关节活动度都显著高于对照组，主要在于该方法可有效地解除运动造成的肌肉痉挛，改善局部血液循环，同时扩张血管，可促进功能锻炼，从而有利于膝关节功能的持续改善[30]。但该方法也有一定的不足，如其还不能达到完全阻断膝关节感觉从而有效缓解疼痛的目的，对操作人员的技术水平、设备器材的要求比较高，可能在部分医院还无法施行，还需要医务人员的广泛努力。

总之，股神经阻滞自控镇痛用于 TKA 可提高术后镇痛效果，促进膝关节功能恢复，减少术后并发症的发生，可能与其有效抑制 IL-6 和 CRP 的释放有关。

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