

doi: 10.13241/j.cnki.pmb.2017.30.014

连续股神经阻滞与静脉自控镇痛对全膝关节置换术后患者凝血功能的影响

田明¹ 李战宁^{2△} 崔海斌³ 王楠¹ 李兰¹

(1 西安交通大学医学院附属市九院麻醉科 陕西 西安 710054;

2 武警陕西省总队医院医务处 陕西 西安 710054; 3 武警陕西省总队医院卫生处 陕西 西安 710054)

摘要 目的:比较连续股神经阻滞(CFNB)与静脉自控镇痛(PCIA)在全膝关节置换术中的应用效果及对患者凝血功能的影响。**方法:**选取2014年1月至2015年12月间我院行单侧全膝关节置换术的患者80例,按照随机数字表法分为CFNB组和PCIA组,每组各40例,两组患者分别接受CFNB和PCIA治疗。观察两组患者术后6 h、12 h、24 h、48 h视觉模拟疼痛评分(VAS),两组患者分别于麻醉前(T1)、术毕(T2)、术后1 d(T3)、术后2 d(T4)进行血栓弹力图检查,观察两组凝血功能变化。并于术后随访1年,比较两组患者膝关节功能。**结果:**术后6 h、12 h、24 h、48 h CFNB组患者VAS评分显著低于PCIA组患者($P<0.05$)。T2、T3、T4时点CFNB组患者凝血反应时间(R)、血凝块形成时间(K)较T1升高,血凝块聚合形成速率(α 角)、血凝块最大振幅(MA)较T1降低,PCIA组患者R、K较T1降低, α 角、MA较T1升高,T2、T3、T4时点CFNB组患者R、K高于PCIA组患者, α 角、MA低于PCIA组患者,差异均有统计学意义($P<0.05$)。两组患者术后均完成1年的随访,两组患者KSS评分、膝关节最大屈曲度、膝关节最大伸直度比较无统计学差异($P>0.05$)。**结论:**CFNB对于全膝关节置换术后患者镇痛效果优于PCIA,有利于改善患者凝血功能,不影响术后患者膝关节功能的恢复。

关键词:全膝关节置换术;连续股神经阻滞;静脉自控镇痛;凝血功能

中图分类号:R687; R614 **文献标识码:**A **文章编号:**1673-6273(2017)30-5862-04

Effects of Continuous Femoral Nerve Block and Intravenous Patient-controlled Analgesia on Coagulation Function in Patients after Total Knee Arthroplasty

TIAN Ming¹, LI Zhan-ning^{2△}, CUI Hai-bin³, WANG Nan¹, LI Lan¹

(1 Department of Anesthesiology, The Ninth Hospital Affiliated to Xi'an Jiaotong University School of Medicine, Xi'an, Shaanxi, 710054, China; 2 Department of Medical Matters, Armed Police Corps Hospital of Shaanxi Province, Xi'an, Shaanxi, 710054, China; 3 Department of Health, Armed Police Corps Hospital of Shaanxi Province, Xi'an, Shaanxi, 710054, China)

ABSTRACT Objective: To compare the effects of continuous femoral nerve block (CFNB) and intravenous patient-controlled analgesia (PCIA) in total knee arthroplasty (TKA) and the effects on coagulation function. **Methods:** Selected 80 patients who were treated with unilateral total knee arthroplasty in our hospital from January 2014 to December 2015, and they were divided into CFNB group (n=40) and PCIA group (n=40) according to the random number table method. Patients of two groups were treated with CFNB and PCIA, respectively. The visual analogue pain score (VAS) of patients in two groups were observed at 6 h, 12 h, 24 h and 48 h after operation. Thrombelastogram of patients in two groups were inspected before anesthesia (T1), after operation (T2), 1 d after operation (T3), 2 d after operation (T4), and the changes of coagulation function in the two groups were observed. The joint function was compared between the two groups after the follow-up of 1 years. **Results:** The VAS scores of CFNB group were significantly lower than that of PCIA group at 6 h, 12 h, 24 h, 48 h after operation ($P<0.05$). At T2, T3 and T4, the coagulation time (R) and blood clot formation time (K) of CFNB group were higher than those at T1, the rate of clot formation (α angle) and the maximum amplitude of blood clot (MA) were lower than that at T1, R, K in PCIA group were lower than at T1, α angle and MA were higher than those at T1, R and K of CFNB group were significantly higher than that of PCIA group at T2, T3, T4, while α angle and MA were lower than those in PCIA group, the differences were statistically significant ($P<0.05$). Patients in two groups were followed up for a total of 1 years, and the KSS score, maximum flexion and knee extension of the two groups were not significantly difference ($P>0.05$). **Conclusion:** CFNB is better than PCIA in patients after total knee arthroplasty, which is helpful to improve the coagulation function of patients and does not affect the recovery of knee function after operation.

Key words: Total knee arthroplasty; Continuous femoral nerve block; Patient-controlled intravenous analgesia; Coagulation function

作者简介:田明(1977-),女,本科,主治医师,从事全身麻醉与认知功能障碍及脑缺血神经保护的临床研究,E-mail: huangtu316@126.com

△ 通讯作者:李战宁(1975-),男,本科,副主任医师,从事脊柱、关节、运动医学临床方面的研究

(收稿日期:2017-02-27 接受日期:2017-03-23)

Chinese Library Classification(CLC):R687 R614 Document code: A

Article ID: 1673-6273(2017)30-5862-04

前言

人工全膝关节置换术是目前治疗严重膝关节疾病的重要方法,术后疼痛是全膝关节置换术后的常见并发症。有报道显示,接受全膝关节置换术治疗的患者术后中度疼痛和重度疼痛发生率高达 30%和 60%,严重影响患者康复^[1,2]。术后疼痛不仅会影响患者早期下床活动和术后康复训练,还会引起机体应激反应,影响患者凝血功能率^[3]。而对于接受人工全膝关节置换术治疗的患者,术后血液处于高凝状态,增加了深静脉血栓、肺栓塞的发生率。连续股神经阻滞(Continuous femoral nerve block, CFNB)与静脉自控镇痛(Patient controlled intravenous analgesia, PCIA)是目前人工全膝关节置换术常用的两种镇痛方法,两种方法各有利弊,在全膝关节置换术中何种模式较好仍存在争议^[4]。本研究比较两种镇痛方法在全膝关节置换术中的应用效果及对患者凝血功能的影响,旨在为临床应用提供依据,现报道如下。

1 资料和方法

1.1 临床资料

选取 2014 年 1 月至 2015 年 12 月间我院行单侧全膝关节置换术的患者 80 例,纳入标准:所有患者均接受单侧全膝关节置换术,术前美国麻醉医师协会(ASA)分级 I~II 级。排除标准:(1)术前凝血功能异常或接受抗凝治疗患者;(2)CFNB 操作部位存在感染的患者;(3)体质量指数(BMI)>35 kg/m² 的患者;(4)合并内分泌疾病及接受激素治疗的患者。80 例患者按照随机数字表法分为 CFNB 组和 PCIA 组,每组各 40 例。两组患者分别接受 CFNB 和 PCIA 治疗。本研究经医院伦理委员会审批,患者及家属对研究知情同意。两组患者年龄、性别、BMI、术中出血量、止血带时间、手术时间等一般资料比较无统计学差异($P>0.05$),具有可比性。见表 1。

表 1 两组患者一般资料比较

Table 1 Comparison of the general data between the two groups

Groups	n	Male/female	Age(years)	BMI(kg/m ²)	Bleeding volume (mL)	Tourniquet time (min)	Operative time (min)
CFNB group	40	12/28	64.2± 5.9	24.7± 2.4	208± 42	59.3± 11.5	79.5± 15.4
PCIA group	40	11/29	63.8± 6.2	24.5± 2.3	212± 38	60.5± 12.9	78.2± 14.9
χ^2 / t	-	0.061	0.449	0.392	1.023	0.738	0.228
P	-	0.805	0.689	0.767	0.098	0.584	0.893

1.2 方法

两组患者均接受静吸复合全身麻醉,在常规监测下进行快速静脉诱导,咪达唑仑 0.05 mg/kg,丙泊酚 1.0~2.0 mg/kg,罗库溴铵 0.6~0.8 mg/kg,舒芬太尼 0.4~0.5 μ g/kg。麻醉维持采用静脉持续泵注瑞芬太尼 6~10 μ g/kg·h、丙泊酚 2.5~4 mg/kg·h、吸入七氟烷 1%~3%,术中按需给予罗库溴铵和舒芬太尼。

1.2.1 CFNB 组 患者在麻醉诱导前由麻醉医生在超声及神经刺激器的引导下进行股神经置管,初始刺激电流频率为 2 Hz,强度为 1 mA,当观察到股四头肌收缩时调节电流强度至 0.3 mA,当仍存在肌肉收缩时将穿刺套针向头侧偏向 30° 进针置管,置管成功后给予初始剂量 0.2%罗哌卡因 20 mL,测定靶区域痛觉,当痛觉消失后认为阻滞成功,手术接受后给予 0.2%罗哌卡因 6 mL/h 持续输注,时间间隔 30 min。

1.2.2 PCIA 组 术前建立静脉通道连接 PCIA 镇痛泵,手术结束前 30 min 静脉推注昂丹司琼 2 mL,经输液自控输注泵泵入镇痛剂,镇痛剂配方为舒芬太尼 100 μ g,盐酸托烷司琼 10 mg,布托啡诺 4 mg,加入生理盐水至 100 mL,背景输注剂量为 2 mL/h,锁定时间间隔 30 min 单次给药剂量 0.5 mL。

1.3 观察指标

1.3.1 镇痛效果评价 ^[5] 分别于术后 6 h、12 h、24 h、48 h 应用视觉模拟疼痛评分(VAS)法评价镇痛效果,在一张纸上划一条

10 cm 的线,线上标有 10 个刻度,0 分表示无痛,10 分代表最剧烈的疼痛,叮嘱患者指出自己疼痛的等级。

1.3.2 凝血功能检测 两组患者分别于麻醉前(T1)、术毕(T2)、术后 1d(T3)、术后 2d(T4)应用血栓弹性描记仪(美国 Haemoscope 公司生产)进行血栓弹力图(TEG)检查,包括:(1)凝血反应时间(R):从凝血开始至 TEG 振幅至 2 mm 所用的时间,主要反映各凝血因子综合作用时间。(2)血凝块形成时间(K):从 R 的终点开始至振幅为 20 mm 所用的时间,反映纤维蛋白原作用情况。(3)血凝块聚合形成速率(α 角):K 起始点至描记图最大曲线弧度作一切线,其与水平的夹角为 α 角,反映血凝块形成速率。(4)血凝块最大振幅(MA):血凝块最大强度和稳定性,反映血小板功能。

1.3.3 膝关节功能评价 术后随访 1 年,应用膝关节学会评分系统(KSS)制定的评分标准评定两组患者膝关节功能^[6],包括疼痛 50 分、活动范围 25 分、稳定性 25 分,分数越低表明功能越差,同时观察两组膝关节最大屈曲度和最大伸直度。

1.4 统计学方法

数据分析应用 SPSS21.0 统计软件进行,其中计数资料以率表示,对比予以 χ^2 检验。计量资料以均数 $\pm$ 标准差($\bar{x}\pm s$)表示,比较予以 t 进行检验, $P<0.05$ 为差异有统计学意义。

2 结果

2.1 两组患者术后 VAS 评分比较 降低, 术后 6 h、12 h、24 h、48 h CFNB 组患者 VAS 评分低于术后 12 h、24 h、48 h 两组患者 VAS 评分较术后 6 h 显著 PCIA 组患者($P<0.05$)。见表 2。

表 2 两组患者术后 VAS 评分比较($\bar{x}\pm s$, 分)
Table 2 VAS scores of patients in the two groups($\bar{x}\pm s$, scores)

Groups	n	6h after operation	12h after operation	24h after operation	48h after operation
CFNB group	40	2.3± 0.8	1.8± 0.5*	1.6± 0.6*	1.0± 0.6*
PCIA group	40	3.6± 1.2	3.2± 0.9*	2.7± 0.8*	1.7± 0.9*
t value	-	2.806	3.104	2.846	2.746
P value	-	0.035	0.000	0.028	0.042

Note: compared with 6h after operation, * $P<0.05$.

2.2 两组患者不同时点 TEG 指标比较 ($P<0.05$); T2、T3、T4 时点 CFNB 组患者 R、K 高于 PCIA 组患者, α 角、MA 低于 PCIA 组患者, 差异均有统计学意义 ($P<0.05$)。见表 3。
较 T1 显著降低, α 角、MA 较 T1 升高, 差异均有统计学意义

表 3 两组患者不同时点 TEG 指标比较
Table 3 Comparison of TEG index between the two groups at different time points

Groups	Time	R(min)	K(min)	α angle(°)	MA(mm)
CFNB group(n=40)	T1	5.87± 1.08	1.32± 0.27	71.03± 5.43	66.67± 7.42
	T2	6.31± 1.22 ^{ab}	1.47± 0.42 ^{ab}	68.12± 5.58 ^{ab}	62.56± 7.34 ^{ab}
	T3	6.83± 1.12 ^{ab}	1.58± 0.44 ^{ab}	63.12± 5.35 ^{ab}	60.56± 7.96 ^{ab}
	T4	7.13± 1.08 ^{ab}	1.73± 0.53 ^{ab}	62.25± 5.15 ^{ab}	61.42± 6.85 ^{ab}
PCIA group(n=40)	T1	5.86± 1.10	1.33± 0.25	70.23± 6.12	65.33± 6.28
	T2	5.12± 1.05 ^a	1.22± 0.28 ^a	74.27± 6.18 ^a	68.32± 5.83 ^a
	T3	4.21± 0.86 ^a	0.87± 0.25 ^a	80.22± 7.23 ^a	71.45± 6.34 ^a
	T4	4.23± 0.95 ^a	0.83± 0.28 ^a	78.13± 7.65 ^a	71.32± 5.84 ^a

Note: compared with T1, ^a $P<0.05$; compared with PCIA group, ^b $P<0.05$.

2.3 两组患者术后 1 年膝关节功能比较 关节最大屈曲度、膝关节最大伸直度比较无统计学差异($P>0.05$), 见表 4。
两组患者术后均完成 1 年的随访, 两组患者 KSS 评分、膝

表 4 两组患者术后 1 年膝关节功能比较
Table 4 Comparison of knee function between the two groups 1 year after operation

Groups	n	KSS scores(scores)	Maximum knee flexion(°)	Maximum knee extension(°)
CFNB group	40	89.23± 5.23	112.21± 10.55	1.23± 0.33
PCIA group	40	87.96± 6.34	110.87± 10.28	1.21± 0.28
t	-	1.013	1.027	0.556
P	-	0.095	0.089	0.426

3 讨论

近年来, 随着医疗技术和仪器设备的进步, 人工全膝关节置换术得到了飞速发展, 目前这项技术已经成为治疗严重膝关节疾病的重要方法, 与其他手术相比, 人工全膝关节置换术可以明显减轻患者症状, 改善患者膝关节功能^[7,8]。但是术后疼痛是该项手术的常见并发症^[9]。术后疼痛不仅会影响患者早期下

床活动和术后康复训练, 还会引起机体应激反应, 影响患者凝血功能等, 影响治疗效果^[9]。因此, 降低全膝关节置换患者术后疼痛具有重要的意义。传统的镇痛方法多以静脉自控镇痛为主, 这种镇痛方式虽然能够有效缓解患者术后疼痛, 但需全身用药, 长期应用不良反应较高^[10]。研究表明^[11], 膝关节的神经支配主要来自股神经, 股神经的关节支可以覆盖膝关节疼痛最明显的前侧, 因此采用股神经阻滞可以显著缓解全膝关节置换手

术后疼痛。同时研究显示,接受全膝关节置换术的患者术后剧烈疼痛可以影响血小板活化、聚集,增加血液的凝集性,使机体处于高凝状态^[12]。血液高凝状态增加了深静脉血栓、肺栓塞的发生率。有报道显示,全膝关节置换术后下肢深静脉血栓发生率约为 15%~27%,肺栓塞发生率高达 2%~18%^[13,14]。对于接受全膝关节置换术治疗的患者应进行凝血功能检查。通过凝血功能检查可以及时了解患者的凝血功能,发现高凝状态,给予有效的处理。

本研究通过对我院收治的全膝关节置换术患者对比研究发现,术后 6 h、12 h、24 h、48 h CFNB 组患者 VAS 评分显著低于 PCIA 组患者,表明 CFNB 镇痛效果更佳。这主要由于 CFNB 应用 0.2%罗哌卡因 6 mL/h 持续输注,直接作用于股神经,阻断伤害性感觉,从而避免疼痛感觉传导到中枢神经系统,起到了更好的作用^[15]。而 PCIA 药物经静脉流入全身,对于膝关节的疼痛虽有作用,但作用效果不如 CFNB。因此 CFNB 更有利于患者早期开展功能训练,促进患者康复。本研究还对两组患者围手术期凝血功能进行了比较。凝血功能是全膝关节置换手术重要的监测指标,全膝关节置换术患者术后疼痛可能引发机体血液处于高凝状态,增加深静脉血栓、肺栓塞的风险^[16,17]。以往有学者应用凝血酶原时间、纤维蛋白原、部分凝血活酶时间对接受全膝关节置换术患者观察,发现患者术后血液处于高凝状态^[18]。但凝血酶原时间、纤维蛋白原、部分凝血活酶时间只能反映某个凝血阶段的变化,不能反映整个凝血过程的变化。本研究应用 TEG 对两组患者围手术期各个时点凝血情况进行了观察,结果 T2、T3、T4 时点 CFNB 组患者 R、K 较 T1 显著升高,α 角、MA 较 T1 显著降低,PCIA 组患者 R、K 较 T1 显著降低,α 角、MA 较 T1 显著升高,T2、T3、T4 时点 CFNB 组患者 R、K 显著高于 PCIA 组患者,α 角、MA 显著低于 PCIA 组患者。提示应用 CFNB 可以对患者降低高凝的风险,而 PCIA 的效果不及 CFNB。分析其原因可能由于:(1)CFNB 为区域阻滞,应用药物浓度较小,对机体凝血因子、血小板反应影响较小^[19];(2)CFNB 在降低术后疼痛的同时,改善了下肢血液循环,扩张下肢血管^[20];(3)CFNB 降低神经递质的传递,减轻了炎症反应,降低对血小板的活化^[21]。从两组患者术后 1 年膝关节功能比较来看,两组患者 KSS 评分、膝关节最大屈曲度、膝关节最大伸直度比较无统计学差异,表明 CFNB 虽然是局部操作,但对膝关节的康复并无影响,应用安全可靠。

综上所述,CFNB 对于全膝关节置换术术后镇痛效果优于 PCIA,同时对患者凝血功能影响较小,安全有效。

参考文献(References)

- [1] 王宁,翟文雯,李氏,等.超声引导连续隐神经阻滞对全膝关节置换术后镇痛效果影响的随机对照研究 [J]. 中国微创外科杂志,2016,16(10): 870-874
Wang Ning, Zhai Wen-wen, Li Min, et al. A randomized controlled study of the effect of ultrasound-guided continuous saphenous nerve block on postoperative analgesia after total knee arthroplasty [J]. Chinese Journal of Minimally Invasive Surgery, 2016, 16 (10): 870-874
- [2] 刘洋,胡长利,石岩江,等.全膝关节置换术对膝关节骨关节炎患者关

节功能的影响[J].现代生物医学进展,2016,16(24): 4705-4708

- Liu Yang, Hu Chang-li, Shi Yan-jiang, et al. Influencing Factors of Knee Function in Patients with Osteoarthritis after Total Knee Arthroplasty [J]. Progress in Modern Biomedicine, 2016, 16 (24): 4705-4708
- [3] 邢梅利,许彬,辛颖.全膝关节置换后局部浸润麻醉与股神经阻滞镇痛的 Meta 分析[J].中国组织工程研究,2016,20(39): 5904-5911
Xing Mei-li, Xu Bin, Xin Ying. Local infiltration analgesia and femoral nerve block for pain control after total knee arthroplasty:a meta-analysis [J]. Chinese Journal of Tissue Engineering Research, 2016, 20(39): 5904-5911
- [4] Ranjit S, Pradhan BB. Ultrasound Guided Femoral Nerve Block to Provide Analgesia for Positioning Patients with Femur Fracture Before Subarachnoid Block: Comparison with Intravenous Fentanyl [J]. Kathmandu Univ Med J (KUMJ), 2016, 14(54): 125-129
- [5] Bellam KP, Joy B, Sandhyala A, et al. Technique, Efficiency and Safety of Different Nerve Blocks for Analgesia in Laser Ablation and Sclerotherapy for Lower Limb Superficial Venous Insufficiency - A Multicentre Experience [J]. J Clin Diagn Res, 2016, 10 (11): TC13-TC17
- [6] Shin HJ, Soh JS, Lim HH, et al. In-plane three-step needle insertion technique for ultrasound-guided continuous femoral nerve block after total knee arthroplasty:a retrospective review of 488 cases[J]. Korean J Anesthesiol, 2016, 69(6): 587-591
- [7] Li J, Deng X, Jiang T. Combined femoral and sciatic nerve block versus femoral and local infiltration anesthesia for pain control after total knee arthroplasty: a meta-analysis of randomized controlled trials[J]. J Orthop Surg Res, 2016, 11(1): 158
- [8] Ahmed A, Arora D, Kochhar AK. Ultrasound-guided alcohol neurolysis of lateral femoral cutaneous nerve for intractable meralgia paresthetica:a case series[J]. Br J Pain, 2016, 10(4): 232-237
- [9] 王美容,何妹仪,李志鹏,等.自动定量输注法与持续输注法在 TKA 术后股神经旁置管镇痛中的应用效果比较[J].广东医学,2016,37(17): 2614-2616
Wang Mei-rong, He Mei-yi, Li Zhi-peng, et al. Comparison of the effects of automatic quantitative infusion and continuous infusion in the treatment of TKA after femoral nerve catheter placement [J]. Guangdong Medical Journal, 2016, 37(17): 2614-2616
- [10] 徐永成,祝平,张建楠,等.右美托咪定预处理对全膝关节置换术后连续股神经阻滞镇痛效果的影响 [J]. 江苏医药,2016,42(18): 2004-2006
Xu Yong-cheng, Zhu Ping, Zhang Jian-nan, et al. Effect of dexmedetomidine on rthroplasty continuous femoral nerve block analgesia pretreatment after total knee arthroplasty [J]. Jiangsu Medical Journal, 2016, 42(18): 2004-2006
- [11] 潘小燕,许旭东,武静茹.连续股神经阻滞联合口服镇痛药用于全膝关节置换术术后镇痛的效果 [J]. 临床麻醉学杂志,2016,32(9): 861-864
Pan Xiao-yan, Xu Xu-dong, Wu Jing-ru. Analgesia effect of combination of continuous femoral nerve block and oral analgesics after total knee arthroplasty [J]. Journal of Clinical Anesthesiology, 2016, 32(9): 861-864

- 25(11): 2016-2021
- [24] Frohlich M, Imhof A, Berg G, et al. Association between C-reactive protein and features of the metabolic syndrome: a population-based study[J]. *Diabetes Care*, 2000, 23(12): 1835-1839
- [25] Mazidi M, Karimi E, Rezaie P, et al. Treatment with GLP1 receptor agonists reduce serum CRP concentrations in patients with type 2 diabetes mellitus: A systematic review and meta-analysis of randomized controlled trials [J]. *Journal of Diabetes and Its Complications*
- [26] Wolf M, Sandler L, Hsu K, et al. First-trimester C-reactive protein and subsequent gestational diabetes [J]. *Diabetes Care*, 2003, 26(3): 819-824
- [27] Babaei Z, Moslemi D, Parsian H, et al. Relationship of obesity with serum concentrations of leptin, CRP and IL-6 in breast cancer survivors[J]. *J Egypt Natl Canc Inst*, 2015, 27(4): 223-229
- [28] Kern Pessoa V N, Rodacki M, Negrato C A, et al. Changes in lipid profile after treatment of women with gestational diabetes mellitus[J]. *J Clin Lipidol*, 2016, 10(2): 350-355
- [29] Tan M H, Johns D, Glazer N B. Pioglitazone reduces atherogenic index of plasma in patients with type 2 diabetes[J]. *Clin Chem*, 2004, 50(7): 1184-1188
- [30] 王荣欣, 秦俭, 胡水清, 等. 自身免疫性胰腺炎的胰腺外表现 [J]. 现代生物医学进展, 2015, 17(17): 3360-3362
Wang Rong-xin, Qin Jian, Hu Shui-qing, et al. Extraintestinal Manifestations of Autoimmune Pancreatitis [J]. *Progress in Modern Biomedicine*, 2015, 17(17): 3360-3362
- [31] Li C, Ford E S, Meng Y X, et al. Does the association of the triglyceride to high-density lipoprotein cholesterol ratio with fasting serum insulin differ by race/ethnicity?[J]. *Cardiovasc Diabetol*, 2008, 7: 4
- [32] Zahn D, Tug S, Wenzel M, et al. Glucose metabolism and self-regulation - Is insulin resistance a valid proxy of self-control?[J]. *Personality and Individual Differences*
- [33] Lee W, Min W K, Chun S, et al. Low-density lipoprotein subclass and its correlating factors in diabetics [J]. *Clin Biochem*, 2003, 36(8): 657-661
- [34] 任利民, 高鑫, 林震东, 等. 新诊断 2 型糖尿病血脂谱特点及低密度脂蛋白颗粒直径的影响因素分析 [J]. 复旦学报 (医学版), 2008, (02): 282-285
Ren Li-Min, Gao Xin, Lin Huan-dong, et al. Dyslipidemia feature of newly diagnosed type 2 diabetes and influential factors of low density lipoprotein size[J]. *Fudan Univ J Med Sci*, 2008, 35(2): 282-285

(上接第 5865 页)

- [12] Lindberg MF, Rustøen T, Miasowski C, et al. The relationship between pain with walking and self-rated health 12 months following total knee arthroplasty: a longitudinal study [J]. *BMC Musculoskeletal Disord*, 2017, 18(1): 75
- [13] Lefevre N, Klouche S, de Pamphilis O, et al. Peri-articular local infiltration analgesia versus femoral nerve block for postoperative pain control following anterior cruciate ligament reconstruction: Prospective, comparative, non-inferiority study[J]. *Orthop Traumatol Surg Res*, 2016, 102(7): 873-877
- [14] Ma J, Zhang W, Yao S. Liposomal bupivacaine infiltration versus femoral nerve block for pain control in total knee arthroplasty: A systematic review and meta-analysis [J]. *Int J Surg*, 2016, 36 (Pt A): 44-55
- [15] 戴国华, 杨晓峰, 谭克益. 超声引导下神经阻滞应用于全膝关节置换术后镇痛效果分析 [J]. 中国实用神经疾病杂志, 2016, 19(13): 62-63
Dai Guo-hua, Yang Xiao-feng, Tan Ke-yi. Analysis of the effect of ultrasound guided nerve block on postoperative analgesia after total knee arthroplasty [J]. *Chinese Journal of Practical Nervous Diseases*, 2016, 19(13): 62-63
- [16] Moussa ME, Lee YY, Westrich GH, et al. Comparison of Revision Rates of Non-modular Constrained Versus Posterior Stabilized Total Knee Arthroplasty: a Propensity Score Matched Cohort Study[J]. *HSS J*, 2017, 13(1): 61-65
- [17] Yu B, He M, Cai GY, et al. Ultrasound-guided continuous femoral nerve block vs continuous fascia iliaca compartment block for hip replacement in the elderly: A randomized controlled clinical trial (CONSORT)[J]. *Medicine (Baltimore)*, 2016, 95(42): e5056
- [18] Alzeftawy AE, El-Daba AA. Cold bupivacaine versus magnesium sulfate added to room temperature bupivacaine in sonar-guided femoral and sciatic nerve block in arthroscopic anterior cruciate ligament reconstruction surgery [J]. *Anesth Essays Res*, 2016, 10(3): 667-673
- [19] 李涓, 程智刚. 采用血栓弹力图评估不同麻醉方式对膝关节置换术患者血液凝固动态变化的影响 [J]. 中国现代医学杂志, 2016, 26(16): 114-117
Li Juan, Cheng Zhi-gang. Evaluation of different anesthesia methods on coagulation function in knee replacement patients during perioperative period using thrombelastography[J]. *Chinese Journal of Modern Medicine*, 2016, 26(16): 114-117
- [20] Fu MC, McLawhorn AS, Padgett DE, et al. Hypoalbuminemia Is a Better Predictor than Obesity of Complications After Total Knee Arthroplasty: a Propensity Score-Adjusted Observational Analysis[J]. *HSS J*, 2017, 13(1): 66-74
- [21] 耿伟, 张志刚, 皮斌, 等. 血栓弹力图与传统凝血检查监测围关节置换期的凝血状态[J]. 中国组织工程研究, 2015, 19(48): 7709-7716
Geng Wei, Zhang Zhi-gang, Pi Bin, et al. Thrombelastography and conventional coagulation test for monitoring the perioperative coagulation state after joint arthroplasty[J]. *Chinese Journal of Tissue Engineering Research*, 2015, 19(48): 7709-7716