·临床研究·

不放置引流管对中重度膝骨关节炎初次全膝关节置换术后快速康复的影响

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摘　要　目的:观察不放置引流管对中重度膝骨关节炎初次全膝关节置换术后快速康复的影响。**方法:**采用随机数字表将符合要求的 70 例中重度膝骨关节炎患者随机分为引流管组和非引流管组,每组 35 例。2 组患者均行全膝关节置换术且在安装骨水泥假体时使用止血带,引流管组在切口闭合前放置负压引流管并持续留置 48 h,非引流管组正常闭合切口而不放置负压引流管。记录并比较 2 组患者的手术时间、住院时间、理论失血总量、输血情况、膝关节主动屈曲 90°所需时间、血红蛋白下降值、膝关节疼痛视觉模拟量表(visual analogue scale,VAS)评分、膝关节周径增加率、膝关节屈曲度、美国膝关节协会评分(knee society score,KSS)及并发症发生情况。**结果:**①一般指标。2 组患者手术时间、住院时间及理论失血总量比较,组间差异均无统计学意义[(87.11 ± 7.16)min,(85.42 ± 5.49) min,t = 1.105,P = 0.273;(7.74 ± 2.20) d,(7.17 ± 1.84) d,t = 1.179,P = 0.243;(1 268.00 ± 299.86)mL,(1 170.00 ± 182.62)mL,t = 1.639,P = 0.106];引流管组 11 例输血、非引流管组 8 例输血,2 组患者输血率比较,差异无统计学意义(χ^2 = 0.650,P = 0.420);引流管组膝关节主动屈曲 90°所需时间长于非引流管组[(5.63 ± 1.06)d,(4.91 ± 1.15)d,t = 2.206,P = 0.009]。②血红蛋白下降值。时间因素与分组因素不存在交互效应(F = 1.005,P = 0.342);2 组患者血红蛋白下降值总体比较,组间差异无统计学意义,即不存在分组效应(F = 1.598,P = 0.211);手术前后不同时间点之间血红蛋白下降值的差异有统计学意义,即存在时间效应(F = 16 255.255,P = 0.000);2 组患者血红蛋白下降值均呈先上升后平稳再下降趋势,且 2 组的变化趋势完全一致[(31.26 ± 2.84) g · L^{-1},(44.80 ± 3.61) g · L^{-1},(44.09 ± 3.97) g · L^{-1},(9.77 ± 2.07) g · L^{-1},F = 10 065.255,P = 0.000;(30.00 ± 3.09) g · L^{-1},(43.86 ± 3.93) g · L^{-1},(43.14 ± 3.85) g · L^{-1},(9.14 ± 1.94) g · L^{-1},F = 6 776.683,P = 0.000]。③膝关节疼痛 VAS 评分。时间因素与分组因素不存在交互效应(F = 0.046,P = 0.984);2 组患者膝关节疼痛 VAS 评分总体比较,组间差异无统计学意义,即不存在分组效应(F = 0.596,P = 0.443);手术前后不同时间点之间膝关节疼痛 VAS 评分的差异有统计学意义,即存在时间效应(F = 97.350,P = 0.000);2 组患者膝关节疼痛 VAS 评分均呈降低趋势,且 2 组的降低趋势完全一致[(3.71 ± 0.80)分,(3.44 ± 0.87)分,(2.53 ± 0.85)分,(1.74 ± 0.76)分,F = 65.184,P = 0.000;(3.58 ± 0.74)分,(3.29 ± 0.99)分,(2.45 ± 1.10)分,(1.67 ± 0.79)分,F = 38.258,P = 0.000]。④膝关节周径增加率。时间因素与分组因素不存在交互效应(F = 1.321,P = 0.269);2 组患者膝关节周径增加率总体比较,组间差异有统计学意义,即存在分组效应(F = 19.211,P = 0.000);手术前后不同时间点之间膝关节周径增加率的差异有统计学意义,即存在时间效应(F = 85.058,P = 0.000);2 组患者膝关节周径增加率随时间均呈先上升后降低趋势,但 2 组的变化趋势不完全一致[(4.97 ± 0.86)%,(5.84 ± 0.83)%,(5.11 ± 0.77)%,(3.96 ± 0.77)%,F = 34.279,P = 0.000;(5.72 ± 0.93)%,(6.51 ± 0.98)%,(5.67 ± 0.89)%,(4.22 ± 0.84)%,F = 52.107,P = 0.000];术后 1 d、3 d 和 6 d,引流管组膝关节周径增加率均小于非引流管组(t = −3.522,P = 0.001;t = −3.053,P = 0.003;t = −2.808,P = 0.007);术后 1 个月,2 组患者膝关节周径增加率比较,差异无统计学意义(t = −1.370,P = 0.175)。⑤膝关节屈曲度。时间因素与分组因素存在交互效应(F = 3.402,P = 0.011);2 组患者膝关节屈曲度总体比较,组间差异有统计学意义,即存在分组效应(F = 6.676,P = 0.012);手术前后不同时间点之间膝关节屈曲度的差异有统计学意义,即存在时间效应(F = 1 196.369,P = 0.000);2 组患者膝关节屈曲度随时间均呈先下降后上升趋势,且 2 组的变化趋势不完全一致(87.80° ± 4.92°,44.09° ± 5.52°,67.09° ± 4.18°,81.51° ± 6.24°,103.34° ± 6.18°,F = 636.930,P = 0.000;86.34° ± 5.32°,49.02° ± 5.56°,69.29° ± 5.07°,83.03° ± 5.37°,104.46° ± 5.17°,F = 561.441,P = 0.000);术后 1 d、6 d、1 个月和 1 年,2 组患者膝关节屈曲度比较,差异均无统计学意义(t = 1.190,P = 0.238;t = −1.981,P = 0.052;t = −1.089,P = 0.280;t = −0.818,P = 0.416);术后 3 d,引流管组膝关节屈曲度小于非引流管组(t = −3.734,P = 0.000)。⑥KSS 评分。术前和术后 1 年,2 组患者 KSS 评分比较,差异均无统计学意义[(67.00 ± 4.32)分,(66.23 ± 4.77)分,t = 0.710,P = 0.480;(159.85 ± 5.93)分,(160.57 ± 6.81)分,t = −0.468,P = 0.641];术后 1 年,2 组患者 KSS 评分均较术前增加(t = −85.886,P = 0.000;t = −81.456,P = 0.000)。⑦安全性。引流管组 2 例发生无症状性肌间静脉血栓,1 例发生切口相关并发症;非引流管组 3 例发生无症状性肌间静脉血栓,3 例发

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生切口相关并发症。切口相关并发症经对症处理后,切口均完全愈合;无症状性肌间静脉血栓给予常规抗凝处理后,血栓消失。2 组患者均无手术相关感染、肺栓塞等并发症发生。2 组患者并发症发生率比较,差异无统计学意义($\chi^2 = 0.510$,$P = 0.475$)。**结论**:在中重度膝骨关节炎初次全膝关节置换术后不放置引流管,能早期改善膝关节活动度,并发症少,虽然对早期预防血肿形成不利,但对膝关节疼痛缓解和膝关节功能恢复无明显影响,有利于术后快速康复的实施。

关键词　骨关节炎,膝;关节成形术,置换,膝;引流管;康复

Effects of drainage tube on rapid rehabilitation after primary total knee arthroplasty in patients with moderate-to-severe knee osteoarthritis

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ABSTRACT　**Objective**: To observe the effects of drainage tube on rapid rehabilitation after primary total knee arthroplasty (TKA) in patients with moderate-to-severe knee osteoarthritis (KOA). **Methods**: Seventy patients with moderate-to-severe KOA were enrolled in the study and were randomly divided into drainage tube group and non-drainage tube group by using random digits table, 35 cases in each group. The TKA were performed on all patients in the 2 groups, and a tourniquet was used when the bone cement prosthesis was installed. The negative-pressure drainage tube was placed before the incision was closed and was retained for 48 hours in patients of drainage tube group, while the incision was normally closed and no negative-pressure drainage tube was placed in patients of non-drainage tube group. The operative time, hospital stay, theoretical total blood loss, blood transfusion, the time spent in bending knee initiatively to a angle of 90 degrees, decreased values of hemoglobin (Hb) content, knee pain visual analogue scale (VAS) score, knee circumference increasing rate, knee flexion-extension range, American knee society score (KSS) and postoperative complications were recorded and compared between the 2 groups. **Results**: There was no statistical difference in operative time, hospital stay and theoretical total blood loss between the 2 groups (87.11 +/- 7.16 vs 85.42 +/- 5.49 min, $t = 1.105$, $P = 0.273$; 7.74 +/- 2.20 vs 7.17 +/- 1.84 days, $t = 1.179$, $P = 0.243$; 1 268.00 +/- 299.86 vs 1 170.00 +/- 182.62 mL, $t = 1.639$, $P = 0.106$). Blood transfusions were performed on 11 patients in drainage tube group and 8 patients in non-drainage tube group. There was no statistical difference in the blood transfusion rate between the 2 groups ($\chi^2 = 0.650$, $P = 0.420$). The time spent in bending knee initiatively to a angle of 90 degrees was longer in drainage tube group compared to non-drainage tube group (5.63 +/- 1.06 vs 4.91 +/- 1.15 days, $t = 2.206$, $P = 0.009$). There was no interaction between time factor and group factor in decreased values of Hb content ($F = 1.005$, $P = 0.342$). There was no statistical difference in decreased values of Hb content between the 2 groups in general, in other words, there was no group effect ($F = 1.598$, $P = 0.211$). There was statistical difference in decreased values of Hb content between different timepoints before and after the surgery, in other words, there was time effect ($F = 16\,255.255$, $P = 0.000$). The decreased values of Hb content presented a time-dependent trend of increasing firstly and keeping subsequently and decreasing finally in both of the 2 groups, and the 2 groups were consistent with each other in the variation tendency of decreased values of Hb content (31.26 +/- 2.84, 44.80 +/- 3.61, 44.09 +/- 3.97, 9.77 +/- 2.07 g/L, $F = 10\,065.255$, $P = 0.000$; 30.00 +/- 3.09, 43.86 +/- 3.93, 43.14 +/- 3.85, 9.14 +/- 1.94 g/L, $F = 6\,776.683$, $P = 0.000$). There was no interaction between time factor and group factor in knee pain VAS scores ($F = 0.046$, $P = 0.984$). There was no statistical difference in knee pain VAS scores between the 2 groups in general, in other words, there was no group effect ($F = 0.596$, $P = 0.443$). There was statistical difference in knee pain VAS scores between different timepoints before and after the surgery, in other words, there was time effect ($F = 97.350$, $P = 0.000$). The knee pain VAS scores presented a time-dependent decreasing trend in both of the 2 groups, and the 2 groups were consistent with each other in the decreasing trend of knee pain VAS scores (3.71 +/- 0.80, 3.44 +/- 0.87, 2.53 +/- 0.85, 1.74 +/- 0.76 points, $F = 65.184$, $P = 0.000$; 3.58 +/- 0.74, 3.29 +/- 0.99, 2.45 +/- 1.10, 1.67 +/- 0.79 points, $F = 38.258$, $P = 0.000$). There was no interaction between time factor and group factor in knee circumference increasing rate ($F = 1.321$, $P = 0.269$). There was statistical difference in knee circumference increasing rate between the 2 groups in general, in other words, there was group effect ($F = 19.211$, $P = 0.000$). There was statistical difference in knee circumference increasing rate between different timepoints before and after the surgery, in other words, there was time effect ($F = 85.058$, $P = 0.000$). The knee circumference increasing rate presented a time-dependent trend of increasing firstly and decreasing subsequently in both of the 2 groups, and the 2 groups were inconsistent with each other in the knee circumference increasing rate (4.97 +/- 0.86, 5.84 +/- 0.83, 5.11 +/- 0.77, 3.96 +/- 0.77%, $F = 34.279$, $P = 0.000$; 5.72 +/- 0.93, 6.51 +/- 0.98, 5.67 +/- 0.89, 4.22 +/- 0.84%, $F = 52.107$,

$P=0.000$). The knee circumference increasing rate was smaller in drainage tube group compared to non-drainage tube group at postoperative day 1,3 and 6($t=-3.522$,$P=0.001$;$t=-3.053$,$P=0.003$;$t=-2.808$,$P=0.007$). There was no statistical difference in knee circumference increasing rate between the 2 groups at 1 month after the surgery ($t=-1.370$,$P=0.175$). There was interaction between time factor and group factor in knee flexion-extension range($F=3.402$,$P=0.011$). There was statistical difference in knee flexion-extension range between the 2 groups in general,in other words,there was group effect($F=6.676$,$P=0.012$). There was statistical difference in knee flexion-extension range between different timepoints before and after the surgery,in other words,there was time effect($F=1\,196.369$,$P=0.000$). The knee flexion-extension range presented a time-dependent trend of decreasing firstly and increasing subsequently in both of the 2 groups,and the 2 groups were inconsistent with each other in the knee flexion-extension range(87.80 +/- 4.92,44.09 +/- 5.52,67.09 +/- 4.18,81.51 +/- 6.24,103.34 +/- 6.18 degrees,$F=636.930$,$P=0.000$;86.34 +/- 5.32,49.02 +/- 5.56,69.29 +/- 5.07,83.03 +/- 5.37,104.46 +/- 5.17 degrees,$F=561.441$,$P=0.000$). There was no statistical difference in knee flexion-extension range between the 2 groups at 1 day,6 days,1 month and 1 year after the surgery($t=1.190$,$P=0.238$;$t=-1.981$,$P=0.052$;$t=-1.089$,$P=0.280$;$t=-0.818$,$P=0.416$). The knee flexion-extension range was smaller in drainage tube group compared to non-drainage tube group at postoperative day 3($t=-3.734$,$P=0.000$). There was no statistical difference in KSS scores between the 2 groups before the surgery and at 1 year after the surgery(67.00 +/- 4.32 vs 66.23 +/- 4.77 points,$t=0.710$,$P=0.480$;159.85 +/- 5.93 vs 160.57 +/- 6.81 points,$t=-0.468$,$P=0.641$). The KSS scores increased in both of the 2 groups at 1 year after the surgery compared to pre-surgery($t=-85.886$,$P=0.000$;$t=-81.456$,$P=0.000$). The asymptomatic intermuscular venous thrombosis were found in 2 patients of drainage tube group and 3 patients of non-drainage tube group,and incision-related complications were found in 1 patient of drainage tube group and 3 patients of non-drainage tube group. The incision healed completely after the incision-related complications were treated with symptomatic supportive treatment,and the asymptomatic intermuscular venous thrombosis disappeared after conventional anticoagulation. No complications such as surgery-related infection and pulmonary embolism were found in the 2 groups. There was no statistical difference in complication incidences between the 2 groups($\chi^2=0.510$,$P=0.475$). **Conclusion**: Non-drainage can improve the range of motion of knee in the early period after primary TKA in patients with moderate-to-severe KOA,and it has less complications. Although it is detrimental to the early prevention of hematoma formation,it has no obvious effect on knee pain relief and knee function recovery,and it is conducive to the implementation of postoperative rapid rehabilitation.

Keywords osteoarthritis,knee;arthroplasty,replacement,knee;drainage tube;rehabilitation

人工全膝关节置换术(total knee arthroplasty,TKA)是重建膝关节功能、缓解疼痛、纠正畸形的有效治疗方法,但术后存在康复时间长、患者满意度差、并发症多等问题。快速康复外科于 2001 年由丹麦外科医生 Kehle[1] 提出,该理念是指通过一系列有循证医学证据的围手术期优化处理方案,减轻手术创伤应激反应、减少器官功能障碍和并发症的发生、缩短住院时间,以达到患者快速康复的目的[2]。近年来我们已将快速康复理念应用于 TKA,且在临床取得了良好的效果。术中使用止血带及术后放置引流管是大部分关节外科医生实施 TKA 的常规操作。近年来有许多 meta 分析提示,TKA 术中使用止血带的时间越短,在患者早期康复阶段会更有利于改善关节疼痛和活动度,恢复关节功能[3-5]。从理论上讲,TKA 术后放置引流管能有效预防血肿的形成、减少切口相关并发症的发生和减轻局部组织的张力和疼痛,从而有利于术后快速康复的实施;但放置引流管同样也带来一些问题,如缺乏填塞效应而增加失血量,通过引流管引入细菌而致深部感染,同时还需额外的护理和成本支出,而且引流管的存在会导致患者心存顾虑,不能配合早期功能锻炼,不利于术后快速康复。TKA 术后是否放置引流管目前尚存争议。为了进一步探讨 TKA 术后不放置引流管对术后快速康复的影响,我们对 70 例中重度膝骨关节炎患者行 TKA 治疗时,在切口闭合前分别使用负压引流管和不使用负压引流管,并对其疗效和安全性进行了比较,现报告如下。

1 临床资料

1.1 一般资料 纳入研究的患者共 70 例,男 31 例、女 39 例。年龄 52~78 岁,中位数 68 岁。均为 2015 年 6 月至 2017 年 6 月在常州市中医医院住院治疗的中重度骨关节炎患者。均为初次接受单侧 TKA 术患者。体质量指数 18~36 kg·m^{-2},中位数 26 kg·m^{-2}。试验方案经医院医学伦理委员会审查通过。

1.2 诊断标准 采用《骨关节炎诊治指南(2007 年

版)》中的膝骨关节炎诊断标准[6]:①近 1 个月内反复膝关节疼痛;②X 线片(站立或负重位)示关节间隙变窄、软骨下骨硬化和(或)囊性变、关节缘骨赘形成;③关节液(至少 2 次)清亮、黏稠,白细胞 <2000 个·mL^{-1};④年龄≥40 岁;⑤晨僵≤30 min;⑥活动时有骨摩擦音(感)。符合①②条或①③⑤⑥条或①④⑤⑥条即可诊断为膝骨关节炎。

1.3　纳入标准　①符合上述诊断标准;②单纯中重度膝骨关节炎经积极非手术治疗后无效;③首次行 TKA;④自愿参与本研究,并签署知情同意书。

1.4　排除标准　①合并局部或全身活动性感染者;②合并出血性疾病者;③术前血红蛋白(hemoglobin,Hb)偏低者(男性 Hb < 130 g·L^{-1},女性 Hb < 120 g·L^{-1});④最近服用抗凝药物和抗血小板药物者。

2　方　法

2.1　分组方法　采用随机数字表将符合要求的 70 例患者随机分为引流管组和非引流管组。

2.2　治疗方法　2 组患者手术方法一样,均选用 Gemini 型后叉保留型活动平台骨水泥关节假体(德国 LINK 公司)。采用腰硬联合阻滞麻醉,患者仰卧位,取膝前正中髌旁内侧入路。2 组患者在完成胫骨及股骨截骨后均上止血带,在所有假体组件安装好后松止血带;均不进行髌骨置换,去除骨赘后行周围去神经化。引流管组在切口闭合前放置负压引流管并持续留置 48 h,非引流管组正常闭合切口而不放置负压引流管。整个手术过程进行仔细充分的止血,髓腔开口处取自体骨条填塞。2 组患者在围手术期均按文献[7]的方法进行快速康复模式管理。

2.3　疗效及安全性对比方法　记录并比较 2 组患者的手术时间、住院时间、理论失血总量、输血情况、膝关节主动屈曲 90°所需时间、Hb 下降值、膝关节疼痛视觉模拟量表(visual analogue scale,VAS)评分[8]、膝关节周径增加率、膝关节屈曲度、美国膝关节协会评分(knee society score,KSS)[9]及并发症发生情况。Hb 下降值 = 术前 Hb 值 - 术后 Hb 值。应用 Nadler 方程[10]计算血容量:血容量 = k1 × 身高(m)3 + k2 × 体质量(kg) + k3(男性 k1 = 0.367、k2 = 0.032、k3 = 0.604;女性 k1 = 0.356、k2 = 0.033、k3 = 0.183)。应用 Gross 线性方程[11]计算手术理论失血总量:理论失血总量 = 术前血容量 ×(术前红细胞压积 - 术后红细胞压积)/术前红细胞压积(按术后第 3 天红细胞压积计算)。当 Hb < 70 g·L^{-1}或有心肌梗塞、动脉硬化性血管疾病等危险因素的患者 Hb 为 80 ~ 100 g·L^{-1}时进行输血并记录输血量。膝关节周径增加率(%) =(术后膝关节周径 - 术前膝关节周径)/术前膝关节周径 ×100%。

2.4　数据统计方法　采用 SPSS20.0 统计软件对所得数据进行统计学分析,2 组患者性别、输血率的组间比较采用 χ^2 检验,年龄、体质量指数、术前 Hb、手术时间、住院时间、理论失血总量、膝关节主动屈曲 90°所需时间的组间比较及 KSS 评分的组间、组内比较均采用 t 检验,Hb 下降值、膝关节疼痛 VAS 评分、膝关节周径增加率、膝关节屈曲度的比较均采用重复测量资料的方差分析,并发症发生率的比较采用四格表校正 χ^2 检验,检验水准 $\alpha = 0.05$。

3　结　果

3.1　分组结果　引流管组和非引流管组各 35 例。2 组患者基线资料比较,差异无统计学意义,有可比性(表 1)。

3.2　一般指标　2 组患者手术时间、住院时间、理论失血总量及输血率比较,组间差异均无统计学意义;引流管组膝关节主动屈曲 90°所需时间长于非引流管组(表 2)。

3.3　Hb 下降值　时间因素与分组因素不存在交互效应;2 组患者 Hb 下降值总体比较,组间差异无统计学意义,即不存在分组效应;手术前后不同时间点之间 Hb 下降值的差异有统计学意义,即存在时间效应;2 组患者 Hb 下降值均呈先上升后平稳再下降趋势,且 2 组的变化趋势完全一致(表 3)。

表 1　2 组中重度膝骨关节炎患者的基线资料

组别	样本量(例)	性别(例)		年龄($\bar{x} \pm s$,岁)	体质量指数($\bar{x} \pm s$,kg·m^{-2})	术前血红蛋白($\bar{x} \pm s$,g·L^{-1})
		男	女			
引流管组	35	15	20	68.91 ± 5.09	26.89 ± 3.47	135.00 ± 5.83
非引流管组	35	16	19	68.14 ± 4.85	26.06 ± 3.21	129.00 ± 5.66
检验统计量		$\chi^2 = 0.058$		$t = 0.649$	$t = 1.037$	$t = 0.790$
P 值		0.810		0.581	0.303	0.432

3.4　膝关节疼痛 VAS 评分　时间因素与分组因素不存在交互效应;2 组患者膝关节疼痛 VAS 评分总体比较,组间差异无统计学意义,即不存在分组效应;手术前后不同时间点之间膝关节疼痛 VAS 评分的差异有统计学意义,即存在时间效应;2 组患者膝关节疼痛 VAS 评分均呈降低趋势,且 2 组的降低趋势完全一致(表 4)。

3.5　膝关节周径增加率　时间因素与分组因素不存在交互效应;2 组患者膝关节周径增加率总体比较,组间差异有统计学意义,即存在分组效应;手术前后不同时间点之间膝关节周径增加率的差异有统计学意义,即存在时间效应;2 组患者膝关节周径增加率随时间均呈先上升后降低趋势,但 2 组的变化趋势不完全一致;术后 1 d、术后 3 d、术后 6 d,引流管组膝关节周径增加率均小于非引流管组;术后 1 个月 2 组患者膝关节周径增加率比较,差异无统计学意义(表 5)。

3.6　膝关节屈曲度　时间因素与分组因素存在交互效应;2 组患者膝关节屈曲度总体比较,组间差异有统计学意义,即存在分组效应;手术前后不同时间点之间膝关节屈曲度的差异有统计学意义,即存在时间效应;2 组患者膝关节屈曲度随时间均呈先下降后上升趋势,且 2 组的变化趋势不完全一致;术后 1 d、术后 6 d、术后 1 个月,2 组患者膝关节屈曲度比较,差异均无统计学意义;术后 3 d 引流管组膝关节屈曲度小于非引流管组(表 6)。

表 2　2 组中重度膝骨关节炎患者的一般指标

组别	样本量（例）	手术时间（$\bar{x}\pm s$,min）	住院时间（$\bar{x}\pm s$,d）	理论失血总量（$\bar{x}\pm s$,mL）	膝关节主动屈曲 90° 所需时间（$\bar{x}\pm s$,d）	输血情况（例）	
						输血	未输血
引流管组	35	87.11±7.16	7.74±2.20	1 268.00±299.86	5.63±1.06	11	24
非引流管组	35	85.42±5.49	7.17±1.84	1 170.00±182.62	4.91±1.15	8	27
t 值		1.105	1.179	1.639	2.206	0.650	
P 值		0.273	0.243	0.106	0.009	0.420	

表 3　2 组中重度膝骨关节炎患者的血红蛋白下降值

组别	样本量（例）	血红蛋白下降值（$\bar{x}\pm s$,$g\cdot L^{-1}$）					F 值	P 值
		术后 1 d	术后 2 d	术后 3 d	术后 1 个月	合计		
引流管组	35	31.26±2.84	44.80±3.61	44.09±3.97	9.77±2.07	32.48±14.57	10 065.255	0.000
非引流管组	35	30.00±3.09	43.86±3.93	43.14±3.85	9.14±1.94	31.54±14.48	6 776.683	0.000
合计	70	30.63±3.01	44.33±3.78	43.61±3.91	9.46±2.02	32.01±14.51	16 255.255[1)]	0.000[1)]
检验统计量		1.772	1.044	1.009	1.309	1.598[1)]	$F=1.005$[2)],	
P 值		0.081	0.300	0.317	0.195	0.211[1)]	$P=0.342$[2)]	

1）主效应的 F 值和 P 值;2）交互效应的 F 值和 P 值

表 4　2 组中重度膝骨关节炎患者的膝关节疼痛视觉模拟量表评分

组别	样本量（例）	膝关节疼痛视觉模拟量表评分（$\bar{x}\pm s$,分）					F 值	P 值
		术后 1 d	术后 3 d	术后 6 d	术后 1 个月	合计		
引流管组	35	3.71±0.80	3.44±0.87	2.53±0.85	1.74±0.76	2.85±1.13	65.184	0.000
非引流管组	35	3.58±0.74	3.29±0.99	2.45±1.10	1.67±0.79	2.75±1.18	38.258	0.000
合计	70	3.64±0.77	3.37±0.93	2.49±0.98	1.71±0.77	2.80±1.15	97.350[1)]	0.000[1)]
检验统计量		0.698	0.678	0.328	0.400	0.596[1)]	$F=0.046$[2)],	
P 值		0.488	0.500	0.744	0.690	0.443[1)]	$P=0.984$[2)]	

1）主效应的 F 值和 P 值;2）交互效应的 F 值和 P 值

表 5　2 组中重度膝骨关节炎患者的膝关节周径增加率

组别	样本量（例）	膝关节周径增加率（$\bar{x}\pm s$）					F 值	P 值
		术后 1 d	术后 3 d	术后 6 d	术后 1 个月	合计		
引流管组	35	(4.97±0.86)%	(5.84±0.83)%	(5.11±0.77)%	(3.96±0.77)%	(4.97±1.05)%	34.279	0.000
非引流管组	35	(5.72±0.93)%	(6.51±0.98)%	(5.67±0.89)%	(4.22±0.84)%	(5.73±0.93)%	52.107	0.000
合计	70	(5.35±0.97)%	(6.18±0.97)%	(5.39±0.87)%	(4.09±0.81)%	(5.25±1.17)%	85.058[1)]	0.000[1)]
检验统计量		−3.522	−3.053	−2.808	−1.370	19.211[1)]	$F=1.321$[2)],	
P 值		0.001	0.003	0.007	0.175	0.000[1)]	$P=0.269$[2)]	

1）主效应的 F 值和 P 值;2）交互效应的 F 值和 P 值

3.7　KSS 评分　术前和术后 1 年,2 组患者 KSS 评分比较,差异均无统计学意义;术后 1 年,2 组患者 KSS 评分均较术前增加(表 7)。

3.8　安全性　引流管组 2 例发生无症状性肌间静脉血栓,1 例发生切口相关并发症;非引流管组 3 例发生无症状性肌间静脉血栓,3 例发生切口相关并发症。切口相关并发症经对症处理后,切口均完全愈合;无症状性肌间静脉血栓给予常规抗凝处理后,血栓消失。2 组患者均无手术相关感染、肺栓塞等并发症发生。2 组患者并发症发生率比较,差异无统计学意义($\chi^2=0.510$,$P=0.475$)。

4　讨　论

目前 TKA 已被认为是治疗终末期膝骨关节炎的最佳方案[12-13]。但行 TKA 术后仍存在康复和住院时间过长以及部分患者功能恢复欠佳等问题[14]。国内外有学者报道[15-19]将快速康复模式应用于 TKA,能促进膝关节功能改善,缩短康复时间,减少住院时间和并发症的发生等。我们前期研究[7]同样也发现将快速康复模式应用于 TKA,能促进患肢功能早期恢复,缩短住院和康复时间;同时还发现止血带优化使用能明显减少患肢肌肉软组织损伤及术后应激反应,更有利于快速康复模式的实施。在本研究中 2 组患者均采用止血带优化策略,仅在安装骨水泥假体时使用止血带。

有研究认为[20-21]引流可以减少 TKA 术后切口内血肿形成,降低切口张力,减少切口疼痛,降低切口感染和不愈合率,促进关节功能早期康复,理论上有利于配合 TKA 术后快速康复的实施。但 Parker 等[22-24]研究认为,在感染发生率、术后肢体肿胀率、关节功能康复等方面,引流管组和非引流管组比较,差异无统计学意义。本研究结果显示,非引流管组患者术后膝关节主动屈曲 90°所需时间小于引流管组,且术后 3 d 膝关节主动屈曲角度大于引流管组。说明放置引流管不利于患者术后早期膝关节活动度的改善,而不放置引流管则更有利于术后早期膝关节活动度的改善。这可能与引流管的存在导致患者心存顾虑,难以配合早期功能锻炼有关,从而不利于术后快速康复的进程。通过观察术后膝关节周径增加率的变化可以评估血肿形成情况。术后 1 d、3 d 和 6 d 引流管组膝关节周径增加率均小于非引流管组,说明放置引流管对早期预防血肿形成有利。

放置引流管会使切口内血肿填塞作用消失、切口内压力下降进而导致术后显性失血增加,隐性失血减少;而不放置引流管因关节腔隙相对封闭,术后出血积聚在关节腔内,使关节腔内压力增高,压迫出血的微小血管,从而使术后的显性失血减少,但隐性失血明显增加,理论上失血总量并不会有很大差异[25]。本研究中 2 组患者理论失血总量及输血率比较差异均无统计学意义,也印证了上述观点,这与 Märdian 等[26]的研究结果也类似。Hb 常被用作临床上失血的参数,我们的研究结果显示不管是否放置引流管,2 组患者术后不同时间点 Hb 下降值比较,差异均无统计学意义。在本研究中,细致的止血操作贯穿于整个手术过程,止血带只是在安装骨水泥假体的短时间内

表 6　2 组中重度膝骨关节炎患者的膝关节屈曲度

组别	样本量(例)	膝关节屈曲度($\bar{x}\pm s$,°)						F 值	P 值
		术后 1 d	术后 3 d	术后 6 d	术后 1 个月	术后 1 年	合计		
引流管组	35	87.80±4.92	44.09±5.52	67.09±4.18	81.51±6.24	103.34±6.18	76.77±20.83	636.930	0.000
非引流管组	35	86.34±5.32	49.02±5.56	69.29±5.07	83.03±5.37	104.46±5.17	78.43±19.27	561.441	0.000
合计	70	87.07±5.14	46.56±6.04	81.51±6.24	82.27±5.83	103.90±5.68	77.60±20.05	1 196.369[1)]	0.000[1)]
检验统计量		1.190	−3.734	−1.981	−1.089	−0.818	6.676[1)]	$F=3.402$[2)],	
P 值		0.238	0.000	0.052	0.280	0.416	0.012[1)]	$P=0.011$[2)]	

1)主效应的 F 值和 P 值;2)交互效应的 F 值和 P 值

表 7　2 组中重度膝骨关节炎患者的美国膝关节协会评分

组别	样本量(例)	美国膝关节协会评分($\bar{x}\pm s$,分)		t 值	P 值
		术前	术后 1 年		
引流管组	35	67.00±4.32	159.85±5.93	−85.886	0.000
非引流管组	35	66.23±4.77	160.57±6.81	−81.456	0.000
t 值		0.710	−0.468		
P 值		0.480	0.641		

使用,髓腔开口使用自体骨填塞,同时切口内局部使用氨甲环酸,这些操作均对控制术后出血及失血总量有直接影响。此外,术后 1 d、3 d、6 d 和 1 年 2 组患者膝关节疼痛 VAS 评分比较,差异均无统计学意义。可见不采用引流装置并不会增加患者术后疼痛,而且对患者膝关节早期功能锻炼及快速康复并无阻碍。

有研究表明[21],不同骨科手术后留置创面引流可防止术后血肿的形成,从而降低感染率。但也有学者报道[23,27]骨科手术后留置创面引流可能会因引流物逆行至切口而致感染率增加。在本研究中,2 组患者均无手术相关感染情况的发生,且 2 组并发症发生率比较,差异无统计学意义。

本研究结果显示,在中重度膝骨关节炎初次全膝关节置换术后不放置引流管,能早期改善膝关节活动度,并发症少,虽然对早期预防血肿形成不利,但对膝关节疼痛缓解和膝关节功能恢复无明显影响,有利于术后快速康复的实施。

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