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初次膝关节置换术后放置引流管与否临床疗效的前瞻性对照研究*

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摘要 目的:分析对比初次膝关节置换术后放置和不放置引流管的临床疗效。**方法:**纳入2017年1月-2017年7月在青岛大学附属医院行初次膝关节双间室置换的患者107例(107膝),其中术后放置引流管组(实验组)54例,术后不放置引流管组(对照组)53例。分别观察比较两组患者的一般临床资料、住院天数。术前和术后第3天血红蛋白、红细胞压积、视觉疼痛模拟评分、膝关节屈曲度数以及两组患者术后出现发热、伤口问题、24 h内辅料渗透、输血情况的例数。**结果:**两组患者在年龄、性别组成、体重、身高、手术时间等一般临床资料之间以及术前血红蛋白、红细胞压积、视觉疼痛模拟评分、膝关节屈曲度数等方面均无明显差异($P > 0.05$)。术后实验组患者在血红蛋白、红细胞压积、膝关节屈曲度数均高于对照组($P < 0.05$)。在视觉疼痛模拟评分上,实验组患者术后第1天低于对照组($P < 0.05$),但术后第3天两组无明显差异($P > 0.05$)。实验组患者的住院天数、输血患者的数量低于对照组,而发热例数明显高于对照组($P < 0.05$)。**结论:**初次膝关节置换术后不放置引流管更有利于患者术后的早期康复,并减少患者术后输血率,而且不增加并发症的发生。

关键词:膝关节置换;引流管;临床疗效;并发症

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Clinical Effects of Primary Total Knee Arthroplasty with or without Drain: A Prospective Comparative Study*

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ABSTRACT Objective: The aim of this study was to evaluate the clinical effects in patients who had undergone primary total knee arthroplasty (TKA) with or without a postoperative drain. **Methods:** A total of 107 patients (107 knees) underwent primary TKA in our hospital in 2017 was conducted. They were divided into two groups: A study group ($n = 54$), with no drainage and a control group ($n = 53$), with drainage. The baseline characteristics, hospital stay, hemoglobin, hematocrit, visual analogue scale scores, knee flexion, blood transfusion, fever, wound complications were recorded. **Results:** There were no significant difference in the baseline characteristics including age, gender, height, weight and time of operation between the two groups ($P > 0.05$). There were also no significant difference in hemoglobin, hematocrit, visual analogue scores, knee flexion before operation between the two groups ($P > 0.05$). However, the hemoglobin, hematocrit, and knee flexion after operation in study group were higher than that in control group ($P < 0.05$). The visual analogue scores in study group was lower than that in control group the first day after operation ($P < 0.05$) and was no difference between the two groups the third day after operation ($P > 0.05$). The time of hospital stay and blood transfusion after operation in study group was lower than that in control group ($P < 0.05$). The fever patients after operation in study group were more than that in control group ($P < 0.05$). **Conclusion:** TKA without drainage is benefit of recovery after operation, and reduce the blood transfusion rate, and do not increase the obvious adverse consequences.

Key words: Total knee arthroplasty; Drain; Clinical effects; Complications

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前言

膝关节置换术已成为治疗终末期膝关节疾病最有效的方法^[1,2]。虽然目前这项技术已经非常成熟,但是专家们对许多细节处理上仍然存在不同观点^[2-5],例如,膝关节置换术后是否放置引流管^[5-7],而这正是本文讨论的重点。目前有学者认为膝关

节置换术后应该常规放置引流管,因为放置引流管可以减轻伤口内血肿形成、减少伤口并发症以及继发感染的可能性等^[8,9];而另一些学者则认为膝关节置换术后可以不放置引流管,因为这样可以减少出血和输血率,并可以使患者更早的开始康复训练,从而促进患者康复^[10,11];同时也有学者认为膝关节置换术后放置与不放置引流管,在术后康复、并发症的发生率等方面并

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无差别^[2]。由此可见,目前对于膝关节置换术后是否应该放置引流管并没有形成统一的意见,本文将从本科室选取 107 例单膝患者进行前瞻性随机对照研究,以期对这个问题进行进一步的研究。

1 资料与方法

1.1 一般资料

自 2017 年 1 月 -2017 年 7 月行初次膝关节双间室置换的患者,纳入标准为:① 确诊为膝关节骨性关节炎,且保守治疗无效需要手术;② 无明显内科手术禁忌症;③ 同意参加本实验并且得到医院伦理委员会的批准。排除标准为:① 非初次膝关节双间室置换患者;② 膝关节重度畸形(内翻畸形 15°,外翻畸形 15°,屈曲畸形 20°)。③ 患者患有血液系统疾病或者长期服用抗凝药物者;④ 术后患者不能配合康复方案者。

根据上述纳入和排除标准,共入组 107 例(107 膝,均为单膝)患者,其中女 76 例,男 32 例,年龄为 53-82 岁,入院后采用分层随机分组法将患者随机分为对照组(放置引流)53 例和实验组(不放置引流)54 例。

1.2 实验方法

所有患者均采用神经阻滞复合浅全麻,手术均由同一手术医师完成,手术入路均采用经股内侧肌入路,安装假体前均采用"鸡尾酒"法(配方:罗哌卡因 100 mg、吗啡 5 mg、以及复方倍他米松 7 mg,用生理盐水稀释至 60 mL)局部浸润至患膝的关节囊、内外侧副韧带、股四头肌以及皮下等部位。安装假体后,冲洗枪充分冲洗,对照组经股外侧肌放置引流,逐层缝合,缝合结束后向关节腔内注射氨甲环酸(6 g 氨甲环酸稀释至 50 mL 生理盐水),然后引流管常规夹闭 4 h;实验组不放置引流管,直接逐层缝合,关节囊缝合完成后直接向膝关节内穿刺

注射等量氨甲环酸。

1.3 术后处理

术后两组患者均第 1 天进行膝关节持续被动屈曲练习,直腿抬高练习、踝关节主动屈伸练习以及下地活动,常规给予抗凝、消炎、止痛等治疗。对照组术后 48 h 拔出引流管,两组患者术后第 3 天化验血常规、行膝关节正侧位片检查。患者出院指征为:① 患肢直腿抬高可维持 30 s;② 患肢膝关节活动度可达 0° -100°;③ 患者无贫血、发热、恶心等并发症;④ 患者伤口无感染迹象。

1.4 观察指标

主要观察指标如下:① 手术时间;② 患者术前和术后第 3 天血红蛋白和红细胞压积;③ 住院天数;④ 患者术前、术后第 1 天和术后第 3 天视觉疼痛模拟评分(VAS);⑤ 患者术前和术后第 3 天的膝关节屈曲度数;⑥ 两组术后出现并发症的数量,检测的并发症包括发热(术后出现体温≥ 38.5℃)、伤口问题;⑦ 24 h 内辅料渗透的患者数量;⑧ 输血患者的数量,其中输血标准为血红蛋白≤ 70 g/L 且患者有面色苍白、头晕等贫血症状。

1.5 统计学方法

应用 SPSS 17.0 软件对数据进行分析。计量资料的比较采用独立样本 t 检验;计数资料采用 χ^2 检验, $P < 0.05$ 为差异有统计学意义。

2 结果

2.1 患者一般资料比较

本研究共纳入 107 例(107 膝)患者,随机分为对照组(放置引流)53 例和实验组(不放置引流)54 例。对患者基本资料比较发现,两组患者在年龄、性别组成、身高、体重以及手术时间等方面差别无统计学意义(表 1)。

表 1 两组患者临床资料的比较($\bar{x} \pm s$)

Table 1 Comparison of the clinical data between two groups ($\bar{x} \pm s$)

Group	Age (years)	Gender (male : female)	High (cm)	Weight (kg)	Operation time (min)
Control group	66.47± 6.89	15:38	1.61± 0.07	64.92± 8.13	62.04± 5.38
Study group	65.72± 7.89	17:37	1.62± 0.07	65.48± 8.07	60.37± 6.93
T or χ^2	0.522	0.129	0.660	0.356	1.388
P	0.602	0.719	0.511	0.723	0.168

2.2 患者术前基本情况比较

对患者术前血红蛋白、红细胞压积、VAS 评分和膝关节屈

曲度等指标进行比较,结果发现这些指标在对照组和实验组之间差别没有统计学意义(表 2)。

表 2 术前患者观察指标比较($\bar{x} \pm s$)

Table 2 Comparison of the results between two groups before operation ($\bar{x} \pm s$)

Group	Hb (g/L)	HCT (%)	VAS	knee flexion (°)
Control group	132.32± 10.62	42.30± 4.06	6.09± 2.09	111.13± 16.43
Study group	133.20± 9.46	43.43± 3.81	6.28± 2.36	112.41± 11.27
t	0.454	1.477	0.424	0.469
P	0.651	0.143	0.672	0.64

Note: Hb, hemoglobin; HCT, hematocrit; VAS, visual analogue scores.

2.3 患者术后基本情况比较

本研究分别对术后第3天血红蛋白、红细胞压积,术后第1和第3天VAS评分,术后第3天膝关节屈曲度数、术后住院天数进行比较,实验结果发现实验组术后第3天的血红蛋白、红细胞压积以及膝关节屈曲度均明显高于对照组,差别有统计

学意义;实验组术后住院天数明显少于对照组,差别有统计学意义。而对于VAS评分,术后第1天实验组明显低于对照组,差别有统计学意义;术后第3天实验组和对照组之间无明显差别(表3)。

表3 术后患者观察指标比较($\bar{x} \pm s$)

Table 3 Comparison of the results between two groups after operation ($\bar{x} \pm s$)

Group	Hb (g/L) (3 d)	HCT (%) (3 d)	VAS (1 d)	VAS (3 d)	knee flexion (°) (3 d)	Hospital stay after operation
Control group	88.96± 15.66	28.33± 4.03	6.85± 1.36	3.75± 1.77	88.55± 12.99	5.42± 1.49
Study group	98.70± 14.96	30.67± 3.76	5.74± 1.99	3.89± 2.34	94.81± 12.66	4.15± 1.41
t	3.291	3.089	3.351	0.333	2.527	4.53
P	0.001	0.003	0.001	0.74	0.013	0.000

Note: Hb, hemoglobin; HCT, hematocrit; VAS, visual analogue scores.

2.4 患者术后并发症的比较

本研究主要观察的并发症包括发热和伤口问题,研究结果发现实验组术后发热患者的数量明显高于对照组,差别有统计学意义,但是发热症状均在出院前消失。而实验组和对照组出现伤口问题的患者数量无明显差异,伤口问题均在出院前得到

控制,伤口问题主要指伤口红肿、渗液等(表4)。本研究同时还观察了各组24 h内敷料渗透的情况和输血情况;实验结果发现,实验组和对照组术后24 h内敷料渗透的情况无明显差异;而对照组术后输血的患者明显多于实验组,差异有统计学意义(表4)。

表4 患者术后并发症的比较

Table 4 Comparison of the complications between two groups after operation

Group	Fever	Incision	Dressing	Blood transfusion
Control group	5	3	9	8
Study group	14	6	5	2
X ²	4.982	1.032	1.402	4.096
P	0.026	0.31	0.236	0.043

3 讨论

手术后常规放置引流管最早是由 Waugh 等学者提出^[13],他们认为术后放置引流管可以防止伤口形成血肿,促进伤口愈合等优点,并得到大家一致认同。但是随着手术技术的提高,术中、术后出血的减少,越来越多的学者认为关节置换术后放置引流管是没有必要的^[14,15],而且关节置换术后使用引流管会增加出血量或者输血率^[16-19]。本研究中同样发现术后放置引流管会明显增加患者失血量,导致术后更低的血红蛋白和红细胞压积,同时明显增加了术后输血患者的数量。有文献报道,膝关节置换术后不放置引流管或者短时间夹闭引流管会使血液积聚于封闭的膝关节腔内,促使微小血管的闭合,从而减少术后出血^[20,21],这正为本研究的结果提供了理论依据,但是前提条件必须是膝关节囊缝合牢固且致密。

最近,有文献报道术后不使用引流管可以减轻患者的疼痛^[12,22],他们认为引流管的存在会刺激皮肤以及深部组织,从而引起感觉敏化最终降低痛阈,而在我们的研究中同样发现术后第一天放置引流管的患者VAS评分的确高于未放置引流管的患者,当拔除引流管后,两组患者的VAS评分之间的差异无明显统计学意义。因此,从疼痛这方面考虑,膝关节置换术后不放置

引流管的临床疗效要优于放置引流管的患者。而且在拔除因引流管的过程中会增加患者的疼痛和不适感,并且会有引流管断裂、在关节囊内缝住等不良事件的可能性,这更说明了膝关节置换术后不放置引流管的优越性。

随着快速康复外科的兴起,膝关节置换术后早期锻炼与康复显得越来越重^[23-27]。以前有学者认为术后不放置引流管会明显增加膝关节腔内的积血,从而更容易行形成膝关节内血肿以及引起膝关节的粘连,不利于膝关节置换术后早期锻炼与康复^[28]。当然同时也有一些持相反观点的研究,他们认为膝关节置换术后是否放置引流管对患者术后膝关节的活动度以及住院时间没有影响^[12,18]。本研究发现膝关节置换术后不放置引流管更有利于患者的早期康复,实验组患者术后第3天膝关节活动度明显高于对照组,而且明显缩短住院时间。我们分析认为,膝关节置换术后不放置引流管可以明显减弱患者的恐惧感和疼痛感,从而使患者更早和更有信心开始膝关节锻炼,这将无形中增加了患者术后康复的速度。本研究同时还发现实验组的患者术后有14位患者发热,这明显高于对照组,但是所有患者的发热症状均在出院前消失,我们分析这主要因为膝关节腔内积血吸收引起的。所以说,虽然膝关节置换术后不放置引流管更有利于患者快速康复以及缩短住院时间,但是更容易引起患者的

吸收热,这一点也是需要临床医生特别注意的。

许多学者在研究膝关节置换术后是否放置引流管时都比较关心伤口以及敷料问题,因为使用引流管最初的目的就是防止出现伤口血肿等问题。目前大多数学者认为术后不放置引流管会增加敷料渗透的可能性以及伤口感染的几率^[29,30],而我们的研究发现膝关节置换术后放置与不放置引流管对敷料渗透和伤口是没有影响的。我们分析认为这与术后缝合的关系非常大,只要膝关节囊缝合牢固且致密,不放置引流管并不会增加敷料渗透的次数以及伤口问题的几率。

综上所述,初次膝关节置换术后不放置引流管更有利于术后的早期康复,并减少患者围手术期输血率,同时并不增加患者伤口问题,虽然会增加术后吸收热的概率,但是这并不影响患者的康复。总之,膝关节置换术后不放置引流管是利大于弊,同时由于本研究样本量受限,随访时间受限,有待于进一步大样本继续研究。

参考文献 (References)

- [1] Rutherford RW, Jennings JM, Dennis DA. Enhancing Recovery After Total Knee Arthroplasty[J]. The Orthopedic clinics of North America, 2017, 48(4): 391-400
- [2] Brown TS, Van Citters DW, Berry DJ, et al. The use of highly crosslinked polyethylene in total knee arthroplasty [J]. The bone & joint journal, 2017, 99-b(8): 996-1002
- [3] Sharma GM, Palekar G, Tanna DD. Use of closed suction drain after primary total knee arthroplasty - an overrated practice [J]. Sicot-j, 2016, 2(39): 1-4
- [4] Yin D, Delisle J, Banica A, et al. Tourniquet and closed-suction drains in total knee arthroplasty. No beneficial effects on bleeding management and knee function at a higher cost [J]. Orthopaedics & traumatology, surgery & research, 2017, 103(4): 583-589
- [5] Zhang Y, Zhang JW, Wang BH. Efficacy of tranexamic acid plus drain-clamping to reduce blood loss in total knee arthroplasty: A meta-analysis[J]. Medicine, 2017, 96(26): e7363
- [6] 何洁, 张峡, 易德坤, 等. 关于人工膝关节置换术后伤口引流管留置与管理方案的临床进展[J]. 中国矫形外科杂志, 2016, 24(01): 58-60
He Jie, Zhang Xia, Yi De-kun, et al. Research progress of drainage indwelling scheme in total knee arthroplasty[J]. Orthopedic Journal of China, 2016, 24(01): 58-60
- [7] Li N, Liu M, Wang D, et al. Comparison of complications in one-stage bilateral total knee arthroplasty with and without drainage[J]. Journal of orthopaedic surgery and research, 2015, 10(1): 1-3
- [8] 黄志峰, 林进, 翁习生, 等. 全膝关节置换术后引流对血红蛋白下降和并发症的影响[J]. 中华骨与关节外科杂志, 2017, 10(01): 22-26
Huang Zhi-feng, Lin Jin, Weng Xi-sheng, et al. Effects of drainage on postoperative hemoglobin decrease and complications after total knee arthroplasty [J]. Chinese Journal of Bone and Joint Surgery, 2017, 10(01): 22-26
- [9] 陈立雄, 黄伟, 陈虹, 等. 初次人工膝关节表面置换术后留置引流与否的系统评价[J]. 重庆医科大学学报, 2014, 39(08): 1139-1144
Chen Li-wei, Huang Wei, Chen Hong, et al. Systematic review of drainage and nondrainage following primary total knee arthroplasty [J]. Journal of Chongqing medical university, 2014, 39(08): 1139-1144
- [10] Demirkale I, Tecimel O, Sesen H, et al. Nondrainage decreases blood transfusion need and infection rate in bilateral total knee arthroplasty [J]. The Journal of arthroplasty, 2014, 29(5): 993-997
- [11] 任国清, 刘红云, 滕学仁, 等. 人工全膝关节置换后是否放置引流管: 随机对照试验[J]. 中国组织工程研究, 2016, 20(22): 3219-3226
Ren Guo-qing, Liu Hong-yun, Teng Xue-ren, et al. Effects of drainage versus nondrainage after total knee arthroplasty: a randomized controlled trial [J]. Chinese Journal of Tissue Engineering Research, 2016, 20(22): 3219-3226
- [12] Keska R, Paradowski TP, Witonski D. Outcome in primary cemented total knee arthroplasty with or without drain: A prospective comparative study [J]. Indian journal of orthopaedics, 2014, 48(4): 404-409
- [13] Waugh TR, Stinchfield FE. Suction drainage of orthopaedic wounds [J]. The Journal of bone and joint surgery American volume, 1961, 43(a): 939-946
- [14] Quinn M, Bowe A, Galvin R, et al. The use of postoperative suction drainage in total knee arthroplasty: a systematic review [J]. International orthopaedics, 2015, 39(4): 653-658
- [15] Li T, Zhuang Q, Weng X, et al. Non-continuous versus continuous wound drainage after total knee arthroplasty: a meta-analysis [J]. International orthopaedics, 2014, 38(2): 361-371
- [16] 甘泉, 赵文, 马瑞鹏. 引流管处理方式对全膝关节置换术后影响的对比研究[J]. 河北医学, 2015, 21(12): 2010-2013
Gan Quan, Zhao Wen, Ma Rui-peng. Effects of primary total knee arthroplasty with or without drainage [J]. Hebei medicine, 2015, 21(12): 2010-2013
- [17] Ritter MA, Keating EM, Faris PM. Closed wound drainage in total hip or total knee replacement. A prospective, randomized study[J]. The Journal of bone and joint surgery American volume, 1994, 76(1): 35-38
- [18] Chen JY, Lee WC, Chan HY, et al. Drain use in total knee arthroplasty is neither associated with a greater transfusion rate nor a longer hospital stay[J]. International orthopaedics, 2016, 40(12): 2505-2509
- [19] Levine BR, Haughom B, Strong B, et al. Blood management strategies for total knee arthroplasty [J]. The Journal of the American Academy of Orthopaedic Surgeons, 2014, 22(6): 361-371
- [20] 陶坤, 吴海山, 李晓华, 等. 闭式引流在全膝关节置换术中的作用评价[J]. 中华外科杂志, 2006, 44(16): 1111-1114
Tao Kun, Wu Hai-shan, Li Xiao-hua, et al. The use of a closed-suction drain in total knee arthroplasty: a prospective, randomized study[J]. Chinese journal surgery, 2006, 44(16): 1111-1114
- [21] Park JH, Choi SW, Shin EH, et al. The optimal protocol to reduce blood loss and blood transfusion after unilateral total knee replacement: Low-dose IA-TXA plus 30-min drain clamping versus drainage clamping for the first 3 h without IA-TXA [J]. Journal of orthopaedic surgery (Hong Kong), 2017, 25(3): 2309499017731626
- [22] Confalonieri N, Manzotti A, Pullen C. Is closed-suction drain necessary in unicompartmental knee replacement? A prospective randomised study[J]. The Knee, 2004, 11(5): 399-402

- [10] 赵雄飞, 张伟, 张林, 等. 电视胸腔镜下行胸腺切除 50 例[J]. 现代中西医结合杂志, 2013, 22(13): 1446-1447
Zhao Xiong-fei, Zhang Wei, Zhang Lin, et al. Video thoracoscopic thymus resection in 50 cases [J]. Modern Integrative Medicine, 2013, 22(13): 1446-1447
- [11] 张云峰, 于磊, 景筠, 等. 合并重症肌无力的胸腺瘤治疗与预后特点分析[J]. 中华外科杂志, 2015, 53(8): 612-616
Zhang Yun-feng, Yu Lei, Jing Yun, et al. Thymoma with myasthenia gravis and prognosis characteristics [J]. Chinese Journal of Surgery, 2015, 53 (8): 612-616
- [12] Kondo K, Monden Y. Myasthenia gravis appearing after thymectomy for thymoma [J]. European journal of cardio-thoracic surgery, 2005, 28(1): 22-25
- [13] 李洪选, 吕长兴, 刘俊, 等. 胸腺瘤术后放疗疗效与 WHO 组织学分型和 Masaoka 分期相关性分析[J]. 中华放射肿瘤学杂志, 2009, 18 (5): 386-389
Li Hong-xuan, Lv Chang-xing, Liu Jun, et al. Thymoma postoperative radiotherapy and WHO histological classification and Masaoka staging Analysis[J]. Chinese Journal of Radiation Oncology, 2009, 18 (5): 386-389
- [14] Zieliński M, Rybak M, Wilkojc M, et al. Subxiphoid video-assisted thoracoscopic thymectomy for thymoma [J]. Annals of cardiothoracic surgery, 2015, 4(6): 564
- [15] 王剑翁, 于修义, 方正, 等. 胸腔镜入路和胸骨正中入路胸腺扩大切除术治疗胸腺瘤合并重症肌无力的疗效比较[J]. 福建医科大学学报, 2012, 46(5): 337-339
Wang Jian-weng, Yu Xiu-yi, Fang Zheng, et al. Thoracoscopic approach and thoracic midcentral access thymus enlargement resection for the treatment of thymoma combined Comparison of the efficacy of myasthenia gravis [J]. Journal of Fujian Medical University, 2012, 46 (5): 337-339
- [16] 宋世辉, 张鹏, 商忠良, 等. 胸腔镜手术切除胸腺瘤治疗重症肌无力[J]. 中国微创外科杂志, 2008, 14(7): 594-595
Song Shi-hui, Zhang Peng, Shang Zhong-liang, et al. Thoracoscopic resection of thymoma in the treatment of myasthenia gravis [J]. Chinese Journal of Minimally Invasive Surgery, 2008, 14 (7): 594-595
- [17] 罗国军, 庄江能, 李卓东, 等. 胸腺瘤不同外科手术治疗方式的临床对比研究[J]. 中华全科医学, 2012, 10(4): 531-532
Luo Guo-jun, Zhuang Jiang-neng, Li Zhuo-dong et al. Thymoma different surgical treatment of clinical comparison study [J]. Chinese Journal of General Practice, 2012, 10 (4): 531-532
- [18] Ye B, Li W, Ge X X, et al. Surgical treatment of early-stage thymomas: robot-assisted thoracoscopic surgery versus transsternal thymectomy[J]. Surgical endoscopy, 2014, 28(1): 122-126
- [19] 宋楠, 姜格宁. 胸腺瘤的分类进展[J]. 中国胸心血管外科临床杂志, 2009, 16(2): 132-136
Song Nan, Jiang Ge-ning. Progress in the classification of thymoma [J]. Chinese Journal of Thoracic and Cardiovascular Surgery, 2009, 16 (2): 132-136
- [20] 宋楠, 姜格宁, 陈晓峰, 等. 经颈胸腺及胸腺瘤切除术 21 例[J]. 中国胸心血管外科临床杂志, 2011, 18(6): 578-579
Song Nan, Jiang Ge-ning, Chen Xiao-feng, et al. Transjugular thymus and thymoma resection in 21 cases [J]. Chinese Journal of Thoracic and Cardiovascular Surgery, 2011, 18(6): 578-579

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- [23] Drosos GI, Ververidis A, Valkanis C, et al. A randomized comparative study of topical versus intravenous tranexamic acid administration in enhanced recovery after surgery (ERAS) total knee replacement[J]. Journal of orthopaedics, 2016, 13(3): 127-131
- [24] Maempel JF, Walmsley PJ. Enhanced recovery programmes can reduce length of stay after total knee replacement without sacrificing functional outcome at one year [J]. Annals of the Royal College of Surgeons of England, 2015, 97(8): 563-567
- [25] Sanchez Mayo B, Rodriguez-Mansilla J, Gonzalez Sanchez B. Recovery from total knee arthroplasty through continuous passive motion [J]. Anales del sistema sanitario de Navarra, 2015, 38 (2): 297-310
- [26] Koh IJ, Choi YJ, Kim MS, et al. Femoral Nerve Block versus Adductor Canal Block for Analgesia after Total Knee Arthroplasty[J]. Knee surgery & related research, 2017, 29(2): 87-95
- [27] Chughtai M, Sodhi N, Jawad M, et al. Cryotherapy Treatment After Unicompartmental and Total Knee Arthroplasty: A Review[J]. The Journal of arthroplasty, 2017
- [28] 冯敏, 符永青, 童玉梅, 等. I 期双侧人工全膝关节置换术后放置引流对患者康复进程的影响 [J]. 现代中西医结合杂志, 2013, 22 (19): 2088-2089+2091
Feng Min, Fu Yong-qing, Tong Yu-mei, et al. Effects of I period bilateral total knee arthroplasty with drainage on recovery[J]. Modern Journal of Integrated Traditional Chinese and Western Medicine, 2013, 22(19): 2088-2089+2091
- [29] Ovdia D, Luger E, Bickels J, et al. Efficacy of closed wound drainage after total joint arthroplasty. A prospective randomized study [J]. The Journal of arthroplasty, 1997, 12(3): 317-321
- [30] Holt BT, Parks NL, Engh GA, et al. Comparison of closed-suction drainage and no drainage after primary total knee arthroplasty [J]. Orthopedics, 1997, 20(12): 1121-1125