

全膝关节置换术后疗效评价的研究进展

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摘要

全膝关节置换术是治疗各种终末期膝关节疾病的主要手术方法, 包括膝关节骨性关节炎、创伤性关节炎及类风湿性关节炎。随着假体设计优化材料的更新以及手术技术改良, 膝关节假体生存率明显提高, 虽然该手术在解决患者疼痛, 改善行走能力, 提高生活质量水平等方面取得明显进步, 但是仍有研究结果表明, 有部分患者对术后效果不满意, 如术后膝前痛、下腰痛等。笔者就关于全膝关节置换术后患者不满意的相关影响因素研究进展作一综述, 报道如下。

关键词

全膝关节置换术, 患者满意率, 术后疼痛

Research Progress in Efficacy Evaluation after Total Knee Arthroplasty

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Abstract

Total knee arthroplasty is the main surgical method for the treatment of various end-stage knee diseases, including knee osteoarthritis, traumatic arthritis, and rheumatoid arthritis. With the update of optimized materials and the improvement of surgical techniques, the survival rate of knee prosthesis has been significantly improved. Although the operation has made significant progress in solving patients' pain, improving walking ability and improving quality of life, there are still research results, and some patients are not satisfied with the postoperative results, such as postoperative

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anterior knee pain, low back pain, etc. The author reviews the progress of the influencing factors affecting patient dissatisfaction after total knee arthroplasty as follows.

Keywords

Total Knee Arthroplasty, Patient Satisfaction, Postoperative Pain

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1. 引言

全膝关节置换术(total knee arthroplasty, TKA)是关节外科的一种成熟手术, 推荐用于矫正膝骨关节炎畸形、缓解疼痛和恢复正常下肢力线, 且在全球范围内全膝关节置换术手术量逐年递增[1]-[3]。虽然 TKA 是一种成功且具有成本效益的手术, 甚至已经被誉为 20 世纪最成功的外科手术之一, 但在假体位置良好下肢力线恢复正常的情况下仍有 20% 的患者由于术后疼痛及并发症等问题对手术效果不满意[4]。其中较为常见的不满意的社人口学因素是年龄、性别、文化程度等。术前因素包括较低的 Kellgren-Lawrence 评分、抑郁/焦虑和疼痛灾难化。术后大多数不满意是由于并发症、未达到期望值、持续疼痛和僵硬。

2. 术后疼痛

2.1. 年龄

有研究发现术后膝关节功能恢复与并发症发生率控制良好的情况下, 仍有大约五分之一接受膝关节置换手术的患者在手术后会经历慢性疼痛, 这会对他们的生活质量产生负面影响[5]。近年来越来越多的证据证明, 年龄可能是 TKA 术后慢性疼痛的影响因素之一, 且年龄是 TKA 术后疼痛的保护因素, Singh 等人研究发现 TKA 患者年龄与疼痛呈负相关, 这可能是年龄越大对疼痛耐受性越高, 因此术后疼痛程度相对较低[6]。Scott 等研究发现年龄小于 55 岁的全膝关节置换术患者术后不满意程度较高, 且随着年龄增加患者术后不满意程度会降低[7]。此外有研究显示 TKA 术后不满意度与年龄小于 60 岁显著相关[8]。Martinez-Carranza 等人在一项 669 例病例对照研究中得出, 接受 TKA 身体健康且年龄较小的患者反而是术后不满意和并发症较多的群体[9]。上述情况可能是因为低龄患者的病变程度较低但术后期望值较高, 且低龄患者往往活动量及工作强度较大, 因此更易术后不满意等情况。

2.2. BMI 指数

BMI 为 TKA 术后疼痛的危险因素, 且 BMI 越大, TKA 术后患者疼痛程度越严重[10]。有研究显示 BMI 升高与假体的无菌性松动发生率增加密切相关[11]。此外有研究显示 II 级和 III 级肥胖患者报告对 TKA 的不满程度更高[12]。Woon CY 等人对 2645 名肥胖患者和 1150 名病态肥胖患者进行研究。结果表明, 与非肥胖患者相比, 肥胖和病态肥胖患者的输血率更低, 住院时间更短, 住院伤口感染或静脉血栓栓塞并发症没有增加[13]。这表明患者 BMI 较大, 仅是后期假体松动、疼痛等不满意的因素, 但对于手术相关的其他问题, 有待进一步研究。

2.3. 文化程度及地区发展水平

Barrack 等人提出 TKA 后临床结果的研究应考虑按社会经济地位对患者进行分层。与收入较高的患

者相比, 低收入人群可能更容易对 TKA 结果感到不满意[14]。同时经济发达地区由于医疗水平较高可以获得更多的医疗帮助及院外医疗援助, 其发生术后不满意的可能性低于经济相对落后地区。有研究报道受教育程度低(小学或以下教育水平)是疼痛的独立预测因素, 其原因一方面可能是受教育程度较低, 患者没有意识到长期康复的重要性, 无法将康复治疗进行到底, 另一方面的原因是教育可以使术后患者更全面地了解并获得有效的术后管理知识, 且拥有较高学历似乎能确保较高的假体生存率[15]。因此教育程度不但是导致 TKA 不满意的独立危险因素, 而且对 TKA 的预后具有重要影响。

3. 心理因素

3.1. 抑郁及焦虑

越来越多的学者发现心理因素也是影响患者术后满意度的重要方面, 术前存在情绪问题可作为术后疼痛和残疾率升高的危险因素, 而不仅仅是与术后疼痛和残疾率升高具有相关性[16]。Sorel JC 等人的一项 meta 分析中发现术前有焦虑和或抑郁症的患者, TKA 后疼痛和功能障碍的发生率更高[17], 同时术前较差的精神状态与全膝关节置换术后患者不满意密切相关[18]。何涛等发现术前焦虑、抑郁与术后 6 个月膝关节疼痛呈正相关, 与膝关节功能呈负相关[19]。Alattas SA 等人建议, 对于患有抑郁和焦虑症状的患者, 应在进行 TKA 之前进行识别和咨询。同时将抑郁症和焦虑症分开进行识别和对待[20]。Brander 等通过对 5 年 83 例患者进行随访分析得出, 焦虑与术后患者满意度具有相关性, 抑郁则与患者满意度不相关[21]。分析原因可能是, 术后 6 个月内是膝关节功能锻炼的黄金时间, 大多数患者因自身疼痛和膝关节功能锻炼情况容易产生焦虑、抑郁等消极情绪, 从而影响康复训练, 而焦虑、抑郁也会影响患者的睡眠甚至生活质量, 从而对患者满意度产生影响。Knapp 等人对 4107 例 90 天内再次入院患者进行前瞻性研究发现, 服用抗焦虑药物并接受 TKA 的患者在 90 天内再次入院的可能性增加, 而单独服用抑郁症药物的患者再入院风险没有增加。这提示, 焦虑和抑郁都是再入院的危险因素, 但结果显示焦虑似乎有更显著的影响[22]。Vajapey 等人综述的结果表明, 与接受 TKA 的非抑郁症患者相比, 抑郁症患者可能产生更高的费用, 且抑郁症患者 TKA 后持续疼痛、不满和并发症的风险都有不同程度的增加[23]。

3.2. 疼痛灾难化

疼痛灾难化量表(Pain Catastrophizing Scale, PCS)是目前最常用的评估疼痛灾难化的量表, 该量表被广泛应用于包括癌症患者等的慢性疼痛患者的疼痛评估和预测[24]。疼痛灾难化是近年疼痛心理学领域的研究热点, 同时也是目前受到广泛关注的影响 TKA 术后疼痛的心理因素之一, 是指在经历实际或预期的疼痛时一种夸大的消极心理定式, 包括沉思、放大和无助 3 个方面, 即反复思考疼痛经历, 夸大疼痛对自身的威胁, 以及认为自己无法面对和摆脱疼痛[25]。越来越多的证据表明, TKA 后患者报告的结果与社会心理因素和疼痛灾难化有关。睡眠障碍、疼痛和心理健康具有复杂的相互作用, 如果这些术前未被准确识别, 则可能导致患者 TKA 后出现不满意等情况[26]。Burns LC 等认为疼痛灾难化可作为 TKA 后慢性疼痛的独立预测因子提供了中等水平的证据[27]。后续的临床实践中应对 TKA 患者围术期疼痛灾难化思想进行常规评估, 对于已识别的疼痛灾难化的患者, 应该有针对性地, 个体化的, 心理干预措施, 帮助患者正确认识疼痛, 并且适应疼痛给生活带来的变化。

4. 疾病相关因素

术前疾病严重程度

TKA 术后患者满意率很大程度上取决于膝关节疼痛缓解程度、膝关节最大屈曲度及活动度[28]。而患病年限及病情严重程度即 K-L 分级越高, 软骨下骨髓损伤程度越高, 术后恢复越慢。同时骨髓损伤较

大者,即使行 TKA 治疗,软骨下损伤造成的术后疼痛及周围组织损伤也会对膝关节功能恢复产生不利的影响[29]。与重度骨关节炎患者相比,轻度影像学骨关节炎患者预计从全膝关节置换术获得的收益更少。他们也有慢性疼痛和不满的风险,应在手术前咨询这种风险[30]。虽然轻度影像学关节炎改变的患者在 TKA 后有所改善,但与中重度关节炎患者相比,他们更有可能报告更高的不满意率、膝关节功能和 OKS 的改善更少[31]。此外也有研究表明轻度影像学膝关节 OA 是 TKA 后不满意的主要预测因素。对此类患者进行 TKA 时应告知这些患者不满意的风险增加[32]。术前膝关节前痛患者发生 TKA 术后膝关节前疼痛的风险是无术前膝关节疼痛患者的两倍[33]。

Lynskey 等人的研究表明,术前健康状况与满意度之间存在很强的正相关关系[34]。这可能与患者的恢复能力及心理状态有关。Klasan 等人对 300 例原发性 TKA 患者的资料进行分析,并在术后 12 个月记录膝关节情况。最终得出结论,术前疼痛等级较高和放射学等级低的患者与 TKA 后 12 个月的疼痛强度较高相关。此类患者疼痛原因可能更复杂,需要额外的心理干预以优化 TKA 的结果[35]。术前疼痛持续时间是 TKA 后慢性疼痛的危险因素。因此,一旦出现适应症,患者应立即进行手术。如果膝关节炎的手术治疗被推迟,强烈建议进行强化和个体化的疼痛管理[36]。

5. 术后并发症

5.1. 膝前痛

术后膝关节前部疼痛也是患者不满意中很常见的一个因素,并且对 TKA 后 AKP 的几个容易辨别和可诊断的原因感到不满,包括组件错位、感染、磨损和骨质溶解、不稳定和松动等。因素已被广泛研究,但仍存在争议,包括髌骨表面置换、髌骨去神经支配等[37]。有文献指出,术后膝关节感染、术后关节不稳、术后膝关节僵硬、术后髌骨运动轨迹不良和术后关节线上移是 TKA 术后疼痛导致患者不满意的独立危险因素[38]。此外有文献指出初次 TKA 相比,翻修手术后的改善预期更少,患者满意度更低[39]。近年来髌周软组织的术中管理受到的关注相对较少,文献中一直存在争议,需要进一步的调查和研究,以更好地了解并最终避免 TKA 后的膝前痛[37]。一项 meta 分析显示,进行髌骨置换术患者,在膝关节前部疼痛、功能结局和并发症发生率方面没有显著差异。同时进行环形髌骨烧灼术的患者是否能减少术后膝前痛是有争议的[40]。

5.2. 术后下腰痛

正常人体的直立身体姿势是通过脊柱、骨盆和下肢的骨与包括肌肉,韧带等软组织的支持来维持的,由于骨及软骨的退化和肌肉的失用性萎缩,这种姿势随着年龄的增长而变化。目前针对这类疾病,外科治疗的手段通常是 TKA 和腰椎融合术。但是仍有部分患者在行腰椎融合术或者 TKA 后会出现新发腰痛或者原有症状加重等情况[41]。近年来,虽然已有较多关于 KLS 病理基础与生物力学机制方面的研究,系统探讨其具体的发病机制,但是目前临床医师对膝-腰综合征的生物力学机制以及临床表现、诊断和治疗方法尚缺乏全面认识,其治疗方案和手术时机选择等问题仍存在争议。2016 年 W.J. Wang 等人从 59 例严重 KOA 患者和 58 例无 KOA 的无症状对照组中获得了直立站立姿势的侧位 x 线片。通过测量几个影像学参数来量化脊柱、骨盆、髌关节和股骨近端的矢状面对齐。根据 C7 铅垂线与髌骨和股骨头的相对位置进行整体平衡。得出,人类通过协调脊柱、骨盆和下肢,特别是在矢状面,保持稳定和符合人体工程学的直立站立姿势。躯干或小腿任何节段的病理均可扰乱整体姿势平衡,导致其他节段的代偿性改变。严重的 KOA 显著影响了脊柱-骨盆-下肢轴的矢状面对齐。腰椎是主要的补偿来源,而髌关节屈曲和骨盆前倾增加可以进一步补偿[42]。2021 年 Kim 等人进行了回顾性研究分析,通过评价 101 例接受 TKA 治疗且有连续全身 EOSx 线检查的患者站立前后、后、外侧全身 EOSx 线参数,得出,膝关节外科医生还应

在术前评估脊柱下肢整体对位, 而不是只关注膝关节力线矫正的变化, 以考虑站立的预后, 并预测全身对齐的可能变化。此术前评估可改善 TKA 的预后[43]。针对临床此类问题, 北美膝关节协会和脊柱侧凸研究协会的选定的临床成员对五种并发、晚期、退行性膝关节和腰椎疾病的临床场景进行分别调查, 该调查中对于同时发生退行性膝关节和腰椎疾病的患者, 膝关节畸形的严重程度和类型影响着膝关节置换术和脊柱外科医生对治疗顺序的偏好。并且提出对于患有严重的外翻畸形和膝关节的顺风畸的患者, 促使人们决定选择“TKA 优先”。而无膝关节畸形的患者通常会得出“先做脊柱手术”的决定[44]。

6. 手术方式

6.1. 传统及机器人手术

Butarbutar 等人对 12 项随机临床试验汇总分析显示, 与传统 TKA 相比, 机器人辅助 TKA, 虽然两组患者的并发症发生率差异无统计学意义, 但与传统 TKA 相比, 机器人辅助 TKA 可以产生更准确的假肢放置和更好的关节对齐精度, 这在几个关节角度的异常值更少[45]。此外有研究发现, 与机器人辅助 TKA 患者相比, 传统 TKA 患者需要更长的住院时间, 以及更多的吗啡消耗量, 物理治疗就诊次数增加也有相应的增加, 30 天再入院率增加近 6 倍[46]。Hoveidaei 等人进行一项比较 rTKA 和 cTKA 的荟萃分析发现, 患者满意度无统计学意义差异[47]。这项研究的结果发现, 与传统方法相比, rTKA 在中短期的患者满意度结果没有差异。但与传统 TKA 相比, 机器人辅助 TKA 患者满意度显著提高。这可能由于机器人辅助手术在 TKA 中具有多项优势, 包括以毫米为单位的实时信息, 以帮助获得平衡间隙、准确的骨切、减少软组织损伤并实现目标对齐, 从而提高患者满意度[48]。此外软组织失衡被认为是 TKA 后不满意的主要手术原因。有研究显示, 与手动平衡相比, 在 TKA 中使用传感器实现膝关节平衡将改善患者报告的结果[49]。

6.2. 术后急性疼痛

膝关节置换术患者发生急性疼痛的危险因素为高 BMI、糖尿病史、手术时间延长、疼痛灾难化评分 ≥ 27 分, 而放置引流管、术前药物预防性镇痛、术后使用镇痛泵、术后行神经阻滞为保护因素[5]。此外, TKA 患者予以早期局部冰敷治疗可麻醉局部末梢神经, 降低神经敏感性, 合理使用冰敷可减轻 TKA 术后早期疼痛、肿胀和出血等症状, 可有效减轻疼痛, 促进膝关节功能尽快恢复。由于其操作简便、经济实用, 目前已成为 TKA 术后临床最常用的辅助镇痛措施[50]。

7. 结语

人口老龄化的趋势导致 TKA 的手术率不断提高, 同时人们对生活质量的追求、对手术预后的期待也给医疗护理水平提出了更高的要求。对于成功的 TKA, 应注意术前满足以下方面: 临床和放射学晚期骨关节炎、患者年龄最好大于 60 岁、有足够的社会心理资源来应对术后压力等。术后, 应检查持续疼痛或不满意的患者是否有任何与假体相关的问题。如果未检测到与假体相关的问题, 则应将患者转诊进行跨学科治疗。

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