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· 临床医学 ·

关节置换术并发症的相关危险因素研究进展

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摘要: 随着中国老龄化进程的加快, 慢性骨关节疾病的发病率也在逐年增加, 最有效的治疗方法之一为关节置换术。目前, 关节置换术已广泛应用于临床, 但仍有部分患者出现并发症。由于关节置换术的术前因素可以影响术后并发症的发生率, 通过改善术前危险因素, 为关节置换术患者提供最佳的手术机会, 减少手术并发症的发生率。介绍关节置换术的常见术前危险因素对术后并发症发生率的影响, 希望对骨科医生在预防术后并发症方面有一定的指导意义。

关键词: 关节置换术; 膝关节置换术; 髋关节置换术; 术前危险因素; 术后并发症

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Developments on risk factors of complications in joint replacement

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Abstract: With the acceleration of China's aging process, the incidence of chronic bone and joint diseases is increasing year by year, and one of the most effective treatments is total joint arthroplasty. At present, total joint arthroplasty has been widely used in clinic, but some patients still have complications. Because the preoperative factors of total joint arthroplasty can affect the incidence of postoperative complications, by improving the preoperative risk factors, we can provide the patients with artificial joint replacement with the best operation opportunity and reduce the incidence of surgical complications. This paper introduces the influence of common preoperative risk factors of total joint arthroplasty on the incidence of postoperative complications, hoping to provide some guidance for orthopedic surgeons in preventing postoperative complications.

Key words: total joint arthroplasty; total knee arthroplasty; total hip arthroplasty; preoperative risk factors; postoperative complications

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随着中国老龄化进程的加快,中国 60 岁及以上老年人口比例已达到总人口的 17.9%,与老年相关的健康问题也日渐增多,50%以上的老年人患有慢性病^[1]。其中骨关节炎作为一种常见的慢性退行性骨关节病困扰着越来越多的中老年人。在中国,骨关节炎的总患病率约 15%,40 岁以上的患病率为 10%~17%,60 岁以上达 50%,而在 75 岁以上则高达 80%^[2]。随着人口老龄化和人类平均寿命的延长,骨关节炎的发生率不但居高不下,而且还在不断上升。关节置换术是治疗骨关节炎及其他关节晚期病变最有效的治疗方法之一。关节置换术通过重建关节,能够恢复病变关节的功能,改善患者的生活质量。然而,术前危险因素的存在及处理不当,导致术后并发症的发生率高达 10%^[3-4]。一旦术后发生并发症如关节假体周围感染^[5-6]、手术部位感染、假体松动、假体周围骨折等^[7],将会延长患者的住院时间、增加治疗费用,甚至导致手术失败以及进行术后假体的翻修^[8-9],这些术后并发症给家庭及社会带来了沉重的经济负担^[10-11]。

1 肥胖

由于社会生活水平的提高,肥胖逐渐成为影响人类健康的因素之一。流行病学研究表明,全世界肥胖人口超过 5.02 亿人^[12]。一项研究评估了近 30 万名接受关节置换术治疗的患者,结果表明,体质指数 (body mass index, BMI) >30 kg/m² 的患者在接受关节置换术后骨科并发症的发生率显著增加^[13]。在另一项临床研究中^[14],研究人员将进行膝关节置换术的患者分为 2 组,实验组为 BMI 平均得分 39.9 kg/m² 的患者,对照组为 BMI 正常的患者;实验组术后伤口感染的发生率是对照组的 2 倍,而深层软组织感染率是对照组的 3 倍。Ersozlu 等^[15]证实,接受膝关节置换术患者的术后浅表软组织感染在肥胖患者中更常见。而在接受髋关节置换术的患者中, BMI>30 kg/m² 的肥胖女性与非肥胖女性相比,深层软组织感染风险也要比正常人高^[16]。另一项临床实验研究进一步证明,在接受全髋关节置换术的患者中,肥胖是关节假体周围感染的独立影响因素^[17]。术前 BMI≤30 kg/m² 的患者,可缩短住院时间、减少手术次数,减少手术部位感染、肾功能不全和下肢静脉血栓形成等术后并发症的发生率^[13,18-19]。因此,在选择择期手术的患者中,要尽可能控制患者的 BMI≤30 kg/m²,从而降低患者术后并发症的发生率。

2 营养不良

营养不良是一个比肥胖更强大的独立危险因素,也会影响关节置换术并发症的发生率^[20],与关节置换术术后的所有并发症都息息相关^[21-23],此外与伤口引流、伤口愈合失败、手术部位感染以及更长的住院时间都有很大的相关性^[24-25]。徐兴全等^[26]回顾性分析了行初次关节置换术患者的住院时长、人口统计学资料及围手术期相关资料的信息,结果表明,营养不良组患者总的住院时长平均为 11 d,正常组患者总的住院时长平均为 10 d,2 组差异有统计学意义 ($P<0.001$)。一些医生对接受全髋关节置换术患者进行的临床研究发现,营养不良是术后手术部位感染、肺炎和再入院的一个独立危险因素^[27]。芦珊等^[28]进行了营养不良与关节置换术并发症 (手术部位感染和关节假体周围感染) 发生率的 Meta 分析,结果显示,营养不良患者与正常患者相比,术后发生手术部位感染及关节假体周围感染的风险明显增加 ($P<0.01$),同时营养不良患者关节置换术后手术部位发生感染的风险是正常患者的 2.63 倍。在另一项临床实验中^[29],研究者开始将重点从严格的 BMI 标准制定转移到营养不良的优化,在择期进

行关节置换术之前，对患者进行营养不良筛查（白蛋白和前白蛋白水平）和优化可能比单独控制患者 BMI<40 kg/m² 的阈值更有益。实验结果也表明，在病态肥胖患者中，优化白蛋白，改善患者营养不良的状况可能比单独降低患者 BMI 更容易，也更有益。

3 糖尿病

糖尿病是一个可调节的危险因素，可以通过积极控制血糖水平改善。Citak 等^[30] 在一项前瞻性研究中对择期进行关节置换翻修术的患者进行了 HbA1c 检测，实验结果表明，HbA1c 与关节置换术后伤口感染的发生率具有明显的相关性。Stryker 等^[31] 研究表明，在进行关节置换术术前平均血糖大于 11.11 mmol/L 或术前 HbA1c 水平大于 6.7% 的患者中，术后出现伤口并发症的风险增加，并且术前血糖控制不良与术后伤口感染的发生独立相关。研究人员认为在接受膝关节置换术的糖尿病患者中，血糖与各种术后并发症之间存在正相关；还发现术前 HbA1c ≥8% 和空腹血糖 ≥11.11 mmol/L 与术后浅表伤口感染关系最为密切^[32]。尽管在另一项研究中没有证实 HbA1c 水平与关节假体周围感染之间存在联系，但围手术期高血糖、糖尿病和糖尿病药物治疗与关节假体周围感染的发生率有关^[33]。目前，学者对于关节置换术术前 HbA1c 水平与术后感染并发症发生率是否存在相关性仍存在争议，但是能够确定的是，围手术期空腹血糖 ≥11.11 mmol/L 会增加关节置换术患者术后感染并发症的发生率。因此，在关节置换术术前应常规检测空腹血糖，对于术前空腹血糖 ≥11.11 mmol/L 的患者应采取行之有效的降糖措施，并且在术后也应该规律监测血糖并进行相应治疗，以降低关节置换术术后伤口感染并发症的发生率。

4 吸烟

吸烟是与术后伤口愈合情况、心肺并发症以及术后重症监护相关的最重要的危险因素之一^[34]。一项研究表明，吸烟与关节置换术患者术后并发症、植入物松动、再入院和病死率都有一定的相关性^[35]。研究显示，吸烟者在关节置换术后再入院的可能性是非吸烟者的 3 倍，手术并发症的发生率是非吸烟者的 2 倍^[36-37]。研究人员进行了 6~8 周的吸烟干预计划，实验结果显示尼古丁的摄入量减少了 50%，表明在进行关节置换术之前，进行 6~8 周的吸烟干预方案可以降低术后并发症的发生率^[34-37]。另外一项实验研究显示，戒烟可以使吸烟患者的术后并发症发生率从 52% 降低到 18%^[34]。应注意的是，有吸烟史的患者在进行关节置换术后，术后相关并发症的发生风险仍较非吸烟患者高^[35-36]。术前常规的吸烟干预对术后患者的恢复及减少术后并发症的发生率至关重要。

5 心血管疾病

心脏病和高血压疾病是关节置换术术后并发症的又一危险因素^[38]。Pulido 等^[39] 明确了关节置换术患者术前常见危险因素，包括心室颤动、心肌梗死和冠状动脉疾病等，这些常见危险因素与关节置换术后假体周围感染发病率密切相关。高危血栓栓塞患者（近期的心脏支架、心室颤动、心肌梗死、机械性心脏瓣膜或反复的静脉血栓栓塞）术前需要接受长期的抗凝治疗，以减少出血风险和关节置换术后周围血栓栓塞发生的风险。最近一项研究表明，与预防性治疗相比，术前使用桥接疗法的关节置

换术患者，术后出血相关并发症的发生率显著降低^[40]。术前进行常规检查，明确关节置换术的术前危险因素，尽可能地降低术前危险因素对患者术后并发症的影响，可改善患者术后病情的恢复情况。

6 贫血

术前贫血在接受关节置换术的患者中较为常见^[41]，一项临床研究表明，接受关节置换术的患者中，有 15%~33% 患者有贫血症状^[42]。研究人员还发现，贫血会导致患者住院时间、术后感染和病死率都明显增加^[43-45]。一些研究表明，术前贫血与术后并发症存在直接联系，会增加关节置换术患者术后假体周围感染的发病率，也与术后其他并发症、病死率和翻修关节置换术相关^[46-48]，还与心脏和泌尿生殖系统并发症及视网膜病变的发病密切相关。关节置换术患者的血液管理策略是通过最大限度地提高术前患者体内血红蛋白的水平来预防术后贫血，旨在减少对异体血的需要，避免术后输血的风险^[49]。临床研究显示，在不考虑术前血红蛋白水平的情况下，围手术期使用氨甲环酸，术后切口处静脉注射，术后在麻醉恢复过程中口服，可以显著降低围手术期的失血量，并大大减少术中及术后输血的需求^[50-51]。

7 术前止痛药及麻醉药的使用

骨关节炎引起的疼痛干扰患者日常生活，损害认知，影响情绪，导致生活质量下降。因此，使用药物控制疼痛是治疗骨关节炎的重要组成部分。目前，阿片类药物已经广泛地用于治疗慢性疼痛综合征，如骨关节炎^[52]。Bekeris 等^[53]对 591 865 例全髋关节置换术患者和 1 139 616 例全膝关节置换术患者进行研究，观察指标为关节置换术后 30 d 内胃肠道并发症和相关急诊手术的发生率，结果发现，关节置换术患者术后罕见但严重的急性胃肠道并发症的发生率（需要手术）与术前应用的麻醉/镇痛药物呈正相关。Pivec 等^[54]将接受全髋关节置换术患者分为术前服用慢性麻醉药物和术前未服用慢性麻醉药物 2 组，比较 2 组患者术后的病情变化，结果表明，术前服用慢性麻醉药物的患者较未服用慢性麻醉药物的患者住院时间增加，后续继续使用麻醉药的需求也增加。Nguyen 等^[55]对接受关节置换术患者的研究发现，术前减少阿片类药物使用的患者比那些术前没有减少阿片类药物剂量的患者术后并发症的发生率低，术后病情的恢复情况也较好。表明术前减少麻醉药物的使用剂量有助于降低关节置换术后相关并发症的发生风险。

8 术前激素类药物的使用

皮质醇激素主要用于免疫相关性疾病和炎症性疾病，但在其发挥抗感染和免疫抑制作用的同时也会导致伤口延迟愈合^[56-57]。Kittle 等^[58]对 403 566 例关节置换术患者进行了回顾性分析，其中有 10 774 名患者长期服用皮质醇类药物，研究人员将使用皮质醇类药物的患者与未使用皮质醇类药物的患者在术后并发症的发生率方面进行了比较，发现使用药物的患者术后浅表伤口感染、切口深层部位感染、器官间隙手术部位感染、伤口开裂、全身感染、肺炎及尿路感染的发生率均较未使用皮质醇类药物的患者高（ $P<0.001$ ），说明术前使用激素类药物能够增加术后并发症的发生率，影响患者术后身体的恢复。

9 耐甲氧西林金黄色葡萄球菌感染

甲氧西林耐药的金黄色葡萄球菌（methicillin resistant staphylococcus aureus，MRSA）和甲氧西林敏感的金黄色葡萄球菌（methicillin sensitive staphylococcus aureus，MSSA）的体内定植也会导致关节置换术患者术后手术部位感染的发生率提高，MRSA 和 MSSA 鼻腔筛查以及围手术期治疗方案的优化使手术部位感染的发病率降低了 69%^[59]。临床试验研究表明，鼻内莫匹罗欣治疗，能有效消除定植于体内的金黄色葡萄球菌^[60-61]。另外，Chen 等^[62]建议在手术前使用洗必泰 3~5 d，也能有效去除定植于体内的金黄色葡萄球菌，降低患者术后并发症的发生率。另一项临床实验结果显示，聚维酮碘是莫匹罗星的一种替代品，在治疗金黄色葡萄球菌定植方面也显示出良好的效果，为临床医生在术前进行相应治疗提供了一种方案，防止或减少术后感染并发症的发生^[63]。

10 精神类疾病

Bozic 等^[64]在 2012 年的研究中首次将抑郁症与全膝关节置换术患者术后假体周围感染的发病风险联系起来，此外，一些研究也表明，抑郁和精神疾病与全关节置换术术后并发症的增加有关^[65-67]。Edusei 等^[68]研究了抑郁症和精神疾病与关节置换术术后常见并发症的相关性，将术前患有抑郁症和精神疾病的患者与对照组（未患有精神疾病的患者）相比，精神疾病患者发生术后并发症如假体周围感染、骨折、内伸肌腱断裂、髌骨损伤和翻修关节置换术的概率较对照组显著高。神经认知功能障碍是一种对手术结果产生负面影响的疾病，特别是在老年人中，会降低全膝关节置换术患者的预后效果。抑郁、焦虑和悲伤等神经认知问题会导致患者的预后较差，增加了康复时间，还会增加膝关节置换术患者再入院的风险^[68-71]；焦虑和抑郁也导致膝关节置换术患者术后满意度降低，术后并发症的发生风险增加^[72-73]。因此，术前对抑郁和焦虑等情绪进行筛查，并针对特定的患者进行有效的心理疏通，从而降低关节置换术患者术后并发症发生率^[74-75]，提高患者术后的生活质量。

11 小结

对于进行关节置换术的患者，医生要对术前危险因素如病态肥胖、营养不良、糖尿病、吸烟、药物的使用、心血管疾病、贫血、葡萄球菌定植及心理疾病等进行提前干预、改善及治疗，可以降低关节置换术术后常见并发症的发生率。因此，对于进行关节置换术的患者，应该在术前进行详细的相关手术危险因素分析，对相关的危险因素进行优化，有助于降低患者术后并发症的发生率及相关治疗费用。本文对于关节置换术术前相关危险因素的分析，可以指导临床医生对患者术前危险因素进行评估，并在术前对相关危险因素进行最大程度的干预，从而降低术后并发症的发生率。

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