

doi: 10.3978/j.issn.2095-6959.2022.05.016

View this article at: <https://dx.doi.org/10.3978/j.issn.2095-6959.2022.05.016>

髋关节置换术后症状性静脉血栓栓塞症的发生情况及危险因素

吴煜琪, 陈文月, 刘臻, 钱至恺, 侯宣竹, 徐彦, 仇婷

(南京大学医学院附属鼓楼医院骨科, 南京 210003)

[摘要] 目的: 探讨髋关节置换术后症状性静脉血栓栓塞症(venous thromboembolism, VTE)发生情况及危险因素。方法: 选择2018年10月至2020年10月南京大学医学院附属鼓楼医院收治的行髋关节置换术患者300例, 将术后发生症状性VTE患者纳入VTE组, 将术后未发生症状性VTE患者纳入非VTE组。对比两组临床资料、D-二聚体水平, 并对髋关节置换术后症状性VTE发生的危险因素进行单因素分析与logistic回归分析。结果: 在300例患者中, 15例发生症状性深静脉血栓, 4例发生症状性肺栓塞, 症状性VTE发生率为6.33%(19/300); 与非VTE组比较, VTE组在年龄、手术类型、住院时间、有脑梗死病史、合并糖尿病等方面的差异均有统计学意义(均 $P < 0.05$); 经多因素logistic回归分析, 年龄 ≥ 72 岁、住院时间 > 14 d、有脑梗死病史、糖尿病是引发髋关节置换术后症状性VTE发生的危险因素($P < 0.05$)。非VTE组术后第1天、第3天、第7天的D-二聚体水平均高于VTE组, 差异均有统计学意义(均 $P < 0.05$)。结论: 髋关节置换术患者术后发生症状性VTE的主要危险因素为年龄高、住院时间长、存在脑梗死病史、合并糖尿病, 临床应密切观察高危人群, 并密切监测术后7 d内D-二聚体水平变化, 便于及时采取有效措施, 减少症状性VTE的发生。

[关键词] 髋关节置换术; 症状性静脉血栓栓塞症; D-二聚体; 危险因素

Occurrence and risk factors of symptomatic venous thromboembolism after hip arthroplasty

WU Yuqi, CHEN Wenyue, LIU Zhen, QIAN Zhikai, HOU Xuanzhu, XU Yan, QIU Ting

(Department of Orthopedics, Drum Tower Hospital, Nanjing University School of Medicine, Nanjing 210003, China)

Abstract **Objective:** To investigate the occurrence and risk factors of symptomatic venous thromboembolism (VTE) after hip arthroplasty. **Methods:** A total of 300 patients undergoing hip arthroplasty admitted to Drum Tower Hospital, Nanjing University School of Medicine from October 2018 to October 2020 were selected. Patients with symptomatic VTE after surgery were included in the VTE group, and patients without symptomatic VTE after surgery were included in the non-VTE group. The clinical data and D-dimer levels of the two groups were compared, and the risk factors of symptomatic VTE after hip arthroplasty were analyzed by univariate analysis

收稿日期 (Date of reception): 2021-12-07

通信作者 (Corresponding author): 仇婷, Email: lunwen0730@163.com

基金项目 (Foundation item): 国家自然科学基金 (82072518); 南京市鼓楼医院科研项目 (ZSB1582)。This work was supported by the National Natural Science Foundation (82072518) and the Scientific Research Project of Nanjing Drum Tower Hospital (ZSB1582), China.

and logistic regression analysis. **Results:** Among the 300 patients, 15 cases of symptomatic deep vein thrombosis and 4 cases of symptomatic pulmonary embolism occurred. The incidence of symptomatic VTE was 6.33% (19/300); the age, type of surgery, length of stay, history of cerebral infarction, diabetes mellitus were compared between the two groups, and the difference was statistically significant ($P < 0.05$). According to multivariate logistic regression analysis, age ≥ 72 years old, hospital stay > 14 days, diabetes mellitus and history of cerebral infarction caused symptoms after hip arthroplasty were the risk factors for the occurrence of symptomatic VTE ($P < 0.05$). The levels of *D*-dimer in the non-VTE group were higher on the 1st, 3rd, and 7th days after operation than the that in the VTE group, and the difference was statistically significant ($P < 0.05$). **Conclusion:** The main risk factors for symptomatic VTE in patients undergoing hip arthroplasty surgery are high age, long hospital stay, diabetes mellitus and history of cerebral infarction. High-risk populations should be closely observed clinically, and the changes of *D*-dimer levels within 7 days after surgery should be closely monitored in order to take effective measures in time to reduce the occurrence of symptomatic VTE.

Keywords hip arthroplasty; symptomatic venous thromboembolism; *D*-dimer; risk factors

髋关节置换术是目前临床治疗终末期髋关节疾病的最有效手术方式, 但患者术后易出现静脉血栓栓塞症(venous thromboembolism, VTE), 从而对患者健康造成较大危害, 严重时甚至造成死亡^[1-2]。相关调查^[3]显示: 若患者未得到有效预防措施, 术后VTE的发生率在40%~80%。髋关节置换术后发生VTE还会造成患者出现明显的肿胀、疼痛感, 并引发胸痛、胸闷等症状, 因此对此类并发症的危险因素进行分析具有重要意义^[4]。本研究对南京大学医学院附属鼓楼医院收治的行髋关节置换术患者的临床资料、*D*-二聚体水平进行分析, 旨在为髋关节置换术患者术后预防症状性VTE提供依据。

1 对象与方法

1.1 对象

选择2018年10月至2020年10月南京大学医学院附属鼓楼医院收治的行髋关节置换术患者300例, 其中男159例, 女141例; 年龄45~83(68.92 ± 7.94)岁; 住院次数: 1次175例, > 1 次125例; 住院时间: < 7 d者52例、7~14 d者79例、 > 14 d者169例; 合并症: 高血压201例、冠心病133例; 既往存在脑梗死病史209例; 糖尿病226例。诊断标准: 符合《深静脉血栓形成的诊断和治疗指南(第2版)》^[5]。纳入标准: 年龄 ≥ 18 周岁; 均行全髋关节置换术; 均行蛛网膜下-硬膜外麻醉; 冠心病患者术前均使用抗凝药物治疗; 住院时实施规范化VTE预防干预; 患者及家属签署知情同意书。排除标准: 术前行VTE; 术后治疗依从性差; 行人工股骨头置换术; 临床资料不全。本

研究经南京大学医学院附属鼓楼医院医学伦理委员会审核通过(审批号: 2018LC3122)。

1.2 方法

对合并冠心病者给予口服曲美他嗪、阿托伐他汀治疗; 对合并糖尿病患者给予胰岛素联合二甲双胍治疗; 对合并高血压患者给予缬沙坦治疗。将术后是否发生症状性VTE分为VTE组与非VTE组, 并调查和记录所有患者一般资料情况, 包括性别、年龄、手术类型、住院次数、住院时间、病史情况及*D*-二聚体水平。调查人员均采用相同指导用语, 让患者自主填写。同时观察患者术后*D*-二聚体水平的变化情况, 并及时向医师进行反馈。

1.3 统计学处理

采用SPSS 22.0统计学软件进行数据分析, 两组*D*-二聚体水平以均数 \pm 标准差($\bar{x} \pm s$)表示, 采用 t 检验; 两组不同性别、年龄、手术类型、住院次数、住院时间、合并症、既往病史的VTE发生情况以例(%)表示, 采用 χ^2 检验; 单因素分析后, 采用多元logistics回归行多因素分析。 $P < 0.05$ 为差异有统计学意义。

2 结果

2.1 髋关节置换术患者术后VTE发生情况

在300例患者中, 15例发生症状性深静脉血栓, 4例发生症状性肺栓塞, 症状性VTE发生率为6.33%(19/300)。

2.2 髋关节置换术患者术后 VTE 发生的单因素分析

与非VTE组比较, VTE组在年龄、手术类型、住院时间、有脑梗死病史、合并糖尿病等方面的差异均有统计学意义(均 $P<0.05$, 表1)。

2.3 髋关节置换术患者术后 VTE 发生的多因素分析

经多因素logistic回归分析, 年龄 ≥ 72 岁、住

院时间 >14 d、有脑梗死病史是引发髋关节置换术后症状性VTE发生的危险因素($P<0.05$, 表2)。

2.4 髋关节置换术患者术后 D-二聚体水平变化

非VTE组术后第1天、第3天、第7天的D-二聚体水平均高于VTE组, 差异均有统计学意义(均 $P<0.05$, 表3)。

表1 髋关节置换术患者术后VTE发生的单因素分析

Table 1 Univariate analysis of postoperative VTE in patients with hip arthroplasty

| 项目 | VTE组($n=19$) | 非VTE组($n=281$) | χ^2 | P |
|-----------|----------------|------------------|----------|-------|
| 性别 | | | 2.217 | 0.137 |
| 男 | 7 | 153 | | |
| 女 | 12 | 128 | | |
| 年龄/岁 | | | 4.976 | 0.026 |
| <71 | 12 | 105 | | |
| ≥ 72 | 7 | 176 | | |
| 住院次数 | | | 0.849 | 0.357 |
| 1 | 13 | 162 | | |
| >1 | 6 | 119 | | |
| 住院时间/d | | | 6.428 | 0.040 |
| <7 | 1 | 51 | | |
| 7~14 | 2 | 77 | | |
| >14 | 16 | 153 | | |
| 高血压/例 | | | 1.894 | 0.169 |
| 有 | 10 | 191 | | |
| 无 | 9 | 90 | | |
| 冠心病/例 | | | 2.668 | 0.102 |
| 有 | 5 | 128 | | |
| 无 | 14 | 153 | | |
| 既往脑梗死病史/例 | | | 5.864 | 0.015 |
| 有 | 18 | 191 | | |
| 无 | 1 | 88 | | |
| 糖尿病/例 | | | 5.300 | 0.021 |
| 有 | 19 | 207 | | |
| 无 | 0 | 74 | | |

表2 髋关节置换术患者术后VTE发生的多因素分析

Table 1 Univariate analysis of postoperative VTE in patients with hip arthroplasty

| 因素 | 偏回归系数 | 标准误 | OR | 95%CI | P |
|----------------|-------|-------|-------|-----------|----------|
| 年龄 ≥ 72 岁 | 2.013 | 0.961 | 1.794 | 1.17~1.45 | 0.007 |
| 手术类型 | 0.018 | 0.039 | 0.028 | 0.14~0.49 | 0.102 |
| 住院时间 >14 d | 2.316 | 0.603 | 1.495 | 1.02~2.16 | 0.002 |
| 有既往脑梗死病史 | 4.155 | 0.714 | 1.982 | 1.22~3.04 | <0.001 |
| 糖尿病 | 4.514 | 1.025 | 3.214 | 1.37~4.04 | <0.001 |

表3 髋关节置换术患者术后D-二聚体水平变化

Table 3 Changes of D-dimer levels after hip arthroplasty

| 组别 | n | D-二聚体水平/(mg·L ⁻¹) | | | |
|-------|-----|-------------------------------|-------------|-------------|-------------|
| | | 术前 | 术后第1天 | 术后第3天 | 术后第7天 |
| VTE组 | 19 | 0.36 ± 0.15 | 9.47 ± 1.35 | 4.02 ± 0.94 | 6.86 ± 1.07 |
| 非VTE组 | 281 | 0.39 ± 0.18 | 4.82 ± 1.07 | 2.51 ± 0.86 | 3.68 ± 0.91 |
| t | | 0.71 | 18.014 | 7.364 | 14.575 |
| P | | 0.479 | <0.001 | <0.001 | <0.001 |

3 讨论

本研究结果显示：在300例患者中，15例发生症状性深静脉血栓，4例发生症状性肺栓塞，症状性VTE发生率为6.33%。研究^[6-7]显示：骨科大手术患者发生症状性深静脉血栓的发生率约为4.08%，而发生症状性肺栓塞的概率为1.13%，且髋关节置换术患者在术后3个月的发生症状性深静脉血栓的概率为6.38%，与本研究结果相似。提示南京大学医学院附属鼓楼医院对于髋关节置换术后预防症状性深静脉血栓的预防措施较好，除给予患者常规药物及物理抗凝预防措施外，还采用Caprini评估模型对患者进行危险分级，对不同危险分级者给予个性化针对性处理，因此症状性VTE发生率较低。对于症状性VTE患者术后应针对性指导其进行康复锻炼，从而帮助术后下肢血液循环，尽可能避免血液高凝状态，最终可降低症状性深静脉血栓的发生率^[8-9]。

本研究结果显示：年龄 ≥ 72 岁是引发髋关节置换术后症状性VTE发生的独立危险因素。分析原因主要为：72岁及以上高龄患者，其自身凝血系统反应已相较于其他年龄段者出现明显降低，并且易出现血管内皮损伤、硬化等^[10-11]，因此在术后发生症状性深静脉血栓的概率较高。住院时

间 >14 d亦是髋关节置换术后症状性VTE发生的重要因素，其原因与患者术前存在心脑血管疾病、自身不稳定病情，因而需术后长时间卧床造成下肢血液瘀滞等相关^[12-13]。本研究结果显示：合并糖尿病是引发髋关节置换术后症状性VTE发生的独立危险因素。分析原因主要为糖尿病患者的长期高血糖水平会对患者血管内皮造成损伤，从而增加血栓产生的概率，易诱发术后症状性VTE。此外，脑梗死病史为髋关节置换术后症状性VTE发生的独立危险因素，其作为高危人群，会造成术后患者卧床时间增加，且手术会对机体造成一定刺激，从而增加了症状性VTE的发生率^[14-15]。因此临床需对上述患者进行有效评估，并采取相应抗凝预防等措施。在髋关节置换术后一周为患者发生症状性VTE的高发时间，在此期间需给予患者有效干预措施以预防症状性VTE的发生^[16-17]。因此骨科大手术通常将预防症状性VTE的预防时间定位12 d左右，而出院患者建议将血栓预防时间进一步延长^[18]。D-二聚体在症状性VTE的诊断中具有较高灵敏度和特异度，因此其可作为诊断此类症状的首选措施^[19-20]。本研究结果显示：非VTE组术后第1天、第3天、第7天的D-二聚体水平均高于VTE组 ($P<0.05$)。表明髋关节置换术后患者1周内的D-二聚体水平波动幅度较大，在术后1 d其D-二聚体水

平达到最高,而在3 d后逐渐下降,在术后7 d仍明显高于正常值,因此监测术后D-二聚体水平对于预测症状性VTE具有重要意义。

综上所述,髋关节置换术患者术后发生症状性VTE的主要危险因素为年龄高、住院时间长、存在脑梗死病史,临床应密切观察高危人群,并密切监测术后7 d内D-二聚体水平变化,便于及时采取有效措施,减少症状性VTE发生。但本研究不足之处在于所选样本量不足,且未能够对D-二聚体变化与各危险因素的相关性进行分析,因此今后应扩大样本量实施进一步分析。

参考文献

1. Zeng C, Bennell K, Yang Z, et al. Risk of venous thromboembolism in knee, hip and hand osteoarthritis: a general population-based cohort study[J]. *Ann Rheum Dis*, 2020, 79(12): 1616-1624.
2. Keller K, Hobohm L, Engelhardt M. Risk of venous thromboembolism after endoprosthetic surgeries: lower versus upper extremity endoprosthetic surgeries[J]. *Heart Vessels*, 2019, 34(5): 815-823.
3. 李鑫宝,姬忠贺,张彦斌,等.肿瘤细胞减灭术加腹腔热灌注化疗围手术期静脉血栓栓塞症的危险因素及防治技术[J]. *肿瘤防治研究*, 2019, 46(2): 121-126.
LI Xinbao, JI Zhonghe, ZHANG Yanbin, et al. Risk factors and prevention and treatment of perioperative venous thromboembolism after tumor cell reduction and intraperitoneal thermal perfusion chemotherapy[J]. *Cancer Research on Prevention and Treatment*, 2019, 46(2): 121-126.
4. 王爱刚,蔺永强,王振香,等.膝关节置换术后深静脉血栓形成的危险因素分析[J]. *解放军医药杂志*, 2019, 31(6): 61-64.
WANG Aigang, LIN Yongqiang, WANG Zhenxiang, et al. Analysis of risk factors for deep vein thrombosis after knee arthroplasty[J]. *Medical & Pharmaceutical Journal of Chinese People's Liberation Army*, 2019, 31(6): 61-64.
5. 中华医学会外科学分会血管外科学组.深静脉血栓形成的诊断和治疗指南(第2版)[J]. *中国医学前沿杂志(电子版)*, 2013, 5(3): 53-57.
Chinese Medical Association Surgery Branch Vascular Surgery Group. Guidelines for the diagnosis and treatment of deep vein thrombosis (2nd edition)[J]. *Chinese Journal of Medical Frontiers. Electronic Edition*, 2013, 5(3): 53-57.
6. Rexitu P, Wutiku M, Wulamu W, et al. Pulmonary hypertension could be a risk for deep vein thrombosis in lower extremities after joint replacement surgery[J]. *Rev Assoc Med Bras (1992)*, 2019, 65(7): 946-950.
7. 刘效敏,张玥,李华文,等.骨科大手术后静脉血栓栓塞症的危险因素研究[J]. *中国现代医学杂志*, 2019, 29(18): 53-57.
LIU Xiaomin, ZHANG Yue, LI Huawen, et al. Study on risk factors of venous thromboembolism after major orthopaedic surgery[J]. *China Journal of Modern Medicine*, 2019, 29(18): 53-57.
8. Cunningham D, Karas V, DeOrio J, et al. Patient risk factors do not impact 90-day readmission and emergency department visitation after total ankle arthroplasty: implications for the comprehensive care for joint replacement (CJR) bundled payment plan[J]. *J Bone Joint Surg Am*, 2018, 100(15): 1289-1297.
9. Cappato R, Welsh R. Exploring unmet needs in venous and arterial thromboembolism with rivaroxaban[J]. *Thromb Haemost*, 2016, 116(Suppl 2): S2-S12.
10. 杨晶慧,甘秀妮,胡亚丽.髋关节置换患者不同阶段深静脉血栓风险调查及影响因素分析[J]. *重庆医科大学学报*, 2019, 44(9): 1201-1206.
YANG Jinghui, GAN Xiuni, HU Yali. Risk investigation and influencing factors of deep vein thrombosis in different stages of hip replacement patients[J]. *Journal of Chongqing Medical University*, 2019, 44(9): 1201-1206.
11. 乔瑞,杨佳瑞,陈豪杰,等.髋关节置换术患者术前深静脉血栓形成的危险因素及术后血栓形成可能原因分析[J]. *国际外科学杂志*, 2020, 47(11): 753-758.
QIAO Rui, YANG Jiarui, CHEN Haojie, et al. Risk factors of preoperative deep vein thrombosis and possible causes of postoperative thrombosis in patients with hip arthroplasty[J]. *International Journal of Surgery*, 2020, 47(11): 753-758.
12. Adriane M, Philipp S, Bernd F. A comparison of apixaban and dabigatran etexilate for thromboprophylaxis following hip and knee replacement surgery[J]. *Arch Orthop Trauma Surg*, 2017, 137(6): 797-803.
13. Neumann I, Rada G, Claro JC, et al. Oral direct Factor Xa inhibitors versus low-molecular-weight heparin to prevent venous thromboembolism in patients undergoing total hip or knee replacement: a systematic review and meta-analysis[J]. *Ann Intern Med*, 2012, 156(10): 710-719.
14. Mahmoudi M, Sobieraj DM. The cost-effectiveness of oral direct factor Xa inhibitors compared with low-molecular-weight heparin for the prevention of venous thromboembolism prophylaxis in total hip or knee replacement surgery[J]. *Pharmacotherapy*, 2013, 33(12): 1333-1340.
15. Pansu N, Hamoui M, Manna F, et al. Implant retention and high rate of treatment failure in hematogenous acute knee and hip prosthetic joint infections[J]. *Med Mal Infect*, 2020, 50(8): 702-708.
16. 邵翔,司超增,甄凯元,等.医院相关性静脉血栓栓塞症的临床特征及相关危险因素分析[J]. *中华医学杂志*, 2020, 100(20):

- 1539-1543.
- SHAO Xiang, SI Chaozeng, ZHEN Kaiyuan, et al. Analysis of clinical features and related risk factors of hospital-associated venous thromboembolism[J]. National Medical Journal of China, 2020, 100(20): 1539-1543.
17. Wall C, de Steiger R. Pre-operative optimisation for hip and knee arthroplasty: minimise risk and maximise recovery[J]. Aust J Gen Pract, 2020, 49(11): 710-714.
18. Armstrong AD, Hassenbein SE, Black S, et al. Risk factors for increased postoperative pain and recommended orderset for postoperative analgesic usage[J]. Clin J Pain, 2020, 36(11): 845-851.
19. Guo H, Xu C, Chen J. Risk factors for periprosthetic joint infection after primary artificial hip and knee joint replacements[J]. J Infect Dev Ctries, 2020, 14(6): 565-571.
20. 刘青青, 李杨, 夏志伟, 等. 北京某大型综合医院术后静脉血栓栓塞症发生的危险因素分析[J]. 现代预防医学, 2019, 46(16): 3063-3067.
- LIU Qingqing, LI Yang, XIA Zhiwei, et al. Analysis of risk factors for postoperative venous thromboembolism in a large general hospital in Beijing[J]. Modern Preventive Medicine, 2019, 46(16): 3063-3067.

本文引用: 吴煜琪, 陈文月, 刘臻, 钱至恺, 侯宣竹, 徐彦, 仇婷. 髋关节置换术后症状性静脉血栓栓塞症的发生情况及危险因素[J]. 临床与病理杂志, 2022, 42(5): 1117-1122. doi: 10.3978/j.issn.2095-6959.2022.05.016

Cite this article as: WU Yuqi, CHEN Wenyue, LIU Zhen, QIAN Zhikai, HOU Xuanzhu, XU Yan, QIU Ting. Occurrence and risk factors of symptomatic venous thromboembolism after hip arthroplasty[J]. Journal of Clinical and Pathological Research, 2022, 42(5): 1117-1122. doi: 10.3978/j.issn.2095-6959.2022.05.016