

# 3种关节内注射药物治疗膝骨关节炎长期疗效的网状Meta分析<sup>Δ</sup>

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**摘要** **目的** 评价关节内注射透明质酸(HA)、富血小板血浆(PRP)、自体微碎脂肪组织(MFAT)治疗膝骨关节炎(KOA)的长期疗效。**方法** 检索PubMed、Web of Science、Embase、Cochrane Library、中国知网、万方数据、维普网和中国生物医学文献服务系统以及各临床试验注册平台,收集KOA患者关节内注射上述3种药物的随机对照试验(RCT),检索时限为2016年1月至2025年12月。筛选文献、提取数据和评价纳入文献质量后,采用RevMan 5.3、Stata MP 16.0软件进行网状Meta分析。**结果** 共纳入31篇RCT,共计2 964例患者。在缓解疼痛方面,PRP+HA、PRP治疗后6个月时患者的视觉模拟评分法(VAS)评分均显著低于生理盐水和HA治疗者( $P<0.05$ ),累积排序曲线下面积(SUCRA)排名前2位的是PRP+HA、PRP;PRP治疗后12个月时患者的VAS评分显著低于HA和生理盐水治疗者( $P<0.05$ ),SUCRA排名前2位的是PRP、PRP+HA。在功能改善方面,PRP治疗后6个月,MFAT、PRP、PRP+HA治疗后12个月时患者的西安大略和麦克马斯特大学骨关节炎指数(WOMAC)评分均显著低于HA或生理盐水治疗者( $P<0.05$ );MFAT、PRP治疗后6、12个月时患者的国际膝关节文献委员会(IKDC)评分显著高于生理盐水治疗者( $P<0.05$ ),PRP治疗后12个月时患者的IKDC评分显著高于HA治疗者( $P<0.05$ );WOMAC评分、IKDC评分SUCRA排名前2位的均为MFAT、PRP。**结论** 缓解疼痛方面,PRP+HA治疗后6个月时优势显著,单用PRP在治疗后12个月时具有潜在优势;功能改善方面,MFAT在治疗后6个月和12个月时显示出显著优势。

**关键词** 膝骨关节炎;关节内注射;透明质酸;富血小板血浆;自体微碎脂肪组织;镇痛;功能改善

## Long-term efficacy of three intra-articular injections in the treatment of knee osteoarthritis: a network meta-analysis

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**ABSTRACT** **OBJECTIVE** To evaluate the long-term efficacy of intra-articular injection of hyaluronic acid (HA), platelet-rich plasma (PRP), and micro-fragmented adipose tissue (MFAT) in treatment of knee osteoarthritis (KOA). **METHODS** Randomized controlled trials (RCTs) of KOA patients receiving intra-articular injection of the three agents were collected from PubMed, Web of Science, Embase, Cochrane Library, CNKI, Wanfang Data, VIP, Chinese Biomedical Literature Service System, and clinical trial registration platforms. The retrieval time limit was from January 2016 to December 2025. After screening the literature, extracting the data, and evaluating the quality of the literature, network meta-analysis was performed using RevMan 5.3 and Stata MP 16.0 software. **RESULTS** A total of 31 RCTs involving 2 964 patients were included. For pain relief, after 6 months of treatment, the Visual Analogue Scale (VAS) scores in the PRP+HA and PRP groups were significantly lower than those in the saline and HA

groups ( $P<0.05$ ), PRP+HA and PRP were ranked as the top two by surface under the cumulative ranking curve (SUCRA). After 12 months of treatment, the VAS scores in the PRP group were significantly lower than those in the HA and saline groups ( $P<0.05$ ), PRP and PRP+HA were ranked as the top two by SUCRA. For functional recovery, after 6 months of

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