Improved Clinical Outcomes Through Enhanced Pathway Adherence in 13,966 Total Knee Arthroplasty Patients: A Prospective Multicenter Evaluation

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INTRODUCTION:

Enhanced recovery programs are increasingly adopted in arthroplasty care, but large-scale evidence on the impact of pathway adherence remains limited. This prospective study evaluated the relationship between adherence to a standardized Rapid Arthroplasty Assessment and Care (RAAC) pathway and postoperative outcomes following total knee arthroplasty (TKA) within a regional hospital network.

METHODS:

A prospective cohort of 10,267 patients undergoing TKA across a regional healthcare system of 37 hospitals was analyzed. Patients were stratified by adherence level (low, mid, high) to the RAAC protocol. Primary outcomes included total length of stay (LOS) and 30-day postoperative complications. Multivariable regression was used to assess independent associations between adherence and outcomes, adjusting for confounders.

RESULTS:

Higher adherence was significantly associated with improved outcomes. Both mid and high adherence groups had independently shorter LOS ($p<0.001$) and fewer complications ($p<0.001$) than the low adherence group. No differences were observed in emergency visits or readmission rates.

Five specific RAAC elements were independently associated with shorter LOS ($p<0.001$): anemia screening and intervention, preventive NSAID use, opioid-sparing anesthesia, local joint infiltration, and early mobilization (≤ postoperative day 1).

Five other elements predicted fewer complications ($p<0.001$): anemia screening and intervention, antiemetic prophylaxis, tranexamic acid use, multimodal pain management, early mobilization (≤ postoperative day 1).

DISCUSSION AND CONCLUSION:

In this large prospective TKA study, pathway adherence was a strong, independent predictor of improved clinical outcomes. Identifying specific elements driving these benefits offers elements that can guide targeted quality improvement in surgical care delivery.