The effect of tourniquet usage on intraoperative metrics – a service wide analysis

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INTRODUCTION:

Tourniquet use in total knee arthroplasty (TKA) is debated due to its impact on surgical time, visualization, discharge time, bleeding complications, and postoperative pain. This study investigates the effect of tourniquet usage on surgical time, blood loss, and bleeding complications.

METHODS:

17,850 patients who underwent unilateral TKA between March 2016 and May 2023 were included. Patients were categorized based on the ratio of inflated tourniquet time to total time from procedure start to postoperative acute care unit alert, henceforth called Ratio, into four groups: no-tourniquet (1,243 patients); short-tourniquet (Ratio <0.6; 2,914 patients); tourniquet-until-arthrotomy-closure (Ratio 0.6-<1; 10,003 patients); and full-tourniquet (Ratio ≥1; 3,690 patients). Ratio cutoffs were chosen to maximize accuracy of classification in surgeons with defined tourniquet usage patterns and clinical experience of the senior authors. The 4 resulting groups were compared using Kruskal Wallis test, followed by the pairwise Wilcoxon Test, with subsequent multivariable regression analysis.

RESULTS:

Full-tourniquet had the shortest surgical time (77.9 minutes), significantly faster than tourniquet-until-arthrotomy-closure (92.19 minutes), no-tourniquet (100.3 minutes), and short-tourniquet (102.4 minutes). Differences are significant in regression and pairwise analysis. However, short-tourniquet had the least amount of blood loss (1.62 g/dl), significantly less than full-tourniquet (1.71 g/dl) and no-tourniquet (1.83 g/dl). Similarly, short-tourniquet had a significantly lower incidence of unplanned wound vac application, used as a proxy for bleeding complications, with 0.79% compared to 1.95% in the until-arthrotomy-closure group, 4.18% in no-tourniquet and 6.83% in-full tourniquet.

DISCUSSION AND CONCLUSION:

This study reveals a trade-off with tourniquet practice in TKA. The use of tourniquet throughout procedure is associated with shorter surgical time, however, increased blood loss and rate of bleeding complications. On the other hand, short tourniquet use is associated with a lower rate of blood-loss-related events, however, longer surgical time. Surgeons must balance operative efficiency against bleeding risk based on institutional priorities when establishing tourniquet protocols.