

Title:

Optimal Tourniquet Pressure in Total Knee Arthroplasty: A Prospective Randomized Comparison of 230 mmHg vs 280 mmHg

Introduction:

Tourniquets are routinely used during total knee arthroplasty (TKA) to reduce intraoperative bleeding; however, the optimal inflation pressure remains debated. Excessive pressure can increase postoperative pain and soft-tissue injury, whereas insufficient pressure may compromise visualization. This study aimed to identify a tourniquet pressure that ensures adequate hemostasis while minimizing postoperative pain and swelling.

Methods:

In this prospective randomized trial, 80 knees undergoing primary TKA between January 2023 and March 2025 were allocated to either a low-pressure group (L; 230 mmHg) or a high-pressure group (H; 280 mmHg). All surgeries were performed using a midvastus approach and a cruciate-substituting mobile-bearing TKA (Vanguard ROCC; Zimmer Biomet). Standardized anesthesia, thromboprophylaxis, and rehabilitation protocols were applied. Postoperative outcomes included wound and tourniquet site pain (Numeric Rating Scale), thigh and calf circumference, estimated blood loss, changes in hemoglobin and creatine kinase, D-dimer, range of motion (ROM) at 2 weeks, KOOS at 6 months, and complications.

Results:

Baseline demographics were comparable between groups. Wound pain at 2 weeks was slightly lower in group L (0.4 ± 0.6 vs 0.7 ± 0.9 , $P = 0.048$), though not clinically meaningful. Thigh circumference increase was significantly smaller in group L (0.58 ± 0.9 cm vs 1.2 ± 0.9 cm, $P = 0.0025$). No significant differences were observed in blood loss, CK, D-dimer, ROM, KOOS, or complications.

Conclusion:

A tourniquet pressure of 230 mmHg provides sufficient hemostasis and may reduce postoperative thigh swelling compared with 280 mmHg. Lower pressures may minimize soft-tissue trauma without compromising surgical safety or outcomes.