ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

Double-blinded Prospective Randomized Clinical Trial in Total Knee Arthroplasty: Impact of Tourniquet Inflation Timing on Postoperative Pain, Joint Function, and Quality of Life

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Faculty Disclosure Information

- The authors declare having no conflicts of interest.

Purpose

- The **tourniquet** is widely used in **total knee arthroplasty (TKA).** According to the literature, surgeons performing TKA utilize a tourniquet intraoperatively to achieve hemostasis. However, its use may lead to complications such as skin blistering, wound hematoma, muscle injury, and deep vein thrombosis, which can delay postoperative recovery and rehabilitation.
- This study analyzes the timing of intraoperative tourniquet application to investigate differences in postoperative knee function, pain, and quality of life in TKA patients, providing a reference for healthcare professionals in patient care.

Methods

- A double-blind, prospective, randomized study
- Patient undergoing TKA
- Dividing patients into two groups
  - Experimental group: partial tourniquet use, limited to the period of bone cement application
  - Control group: full tourniquet use, from the incision until wound closure.

Methods

- Primary outcomes
  - Pain score (preop, postop D1, D2, D3, 1M, 2M)
  - Knee joint function (preop, postop D1, D2, D3, 1M, 2M)
    - Range of motion
    - Knee circumference, thigh circumference and leg circumference
  - Patient-reported outcomes (preop, postop 1M, 2M)
    - Knee injury and Osteoarthritis Outcome Score (KOOS)
    - 36-item Short Form Health Survey (SF-36)

- Secondary outcomes
  - Intraoperative blood loss
  - Operative time
  - Intraoperative fluid infusion volume
  - Length of hospital stay

Results

- From July 2023 to March 2024, a total of 66 patients met the inclusion criteria and participated in the study (34 in the experimental group and 32 in the control group)

Demographics and Characteristics[a]

	Experimental group (n = 34)	Control group (n = 32)	p value
Gender, n (%)			
Women	27 (79.4%)	29 (90.6%)	.306[b]
Men	7 (20.6%)	3 (9.4%)	
Age at surgery	75.7 ± 7.1	73.4 ± 8.6	.252[c]
Hospital stay length	5.2 ± 1.2	4.9 ± 0.4	.147[c]
BMI	27.0 ± 4.0	27.2 ± 4.0	.874[c]
Side			.336[b]
Left	13 (38.2%)	16 (50.0%)	
Right	21 (61.8%)	16 (50.0%)	

[a] Data are expressed as mean ± SD, unless otherwise indicated.
[b] P value compares the 2 groups by the Fisher's exact text test.
[c] P value compares the 2 groups by the student t test.

Results

- **Intraoperative blood loss: significant difference**
  - The experimental group had an average blood loss of **100.87 ± 134.736 mL.**
  - The control group had **32.38 ± 42.884 mL(p-value: 0.029)**

- No significant differences in hospital stay duration, total surgical time, or intraoperative fluid administration.

Results

- **Pain score**
  - There was no statistically significant difference in pain score between the two groups.
- **Knee Joint Function**
  - There were no statistically significant differences between the two groups in knee joint range of motion or circumference of knee, thigh and leg.
- **Patient report outcome**
  - There were no statistically significant differences between the two groups in the knee function assessment scales (KOOS and SF-36) before surgery, one month and two months after surgery.

Conclusion

- Previous studies have shown that tourniquet use can increase postoperative pain, reduce knee joint mobility, and prolong hospital stays, as well as increase postoperative complications, thereby elevating surgical risks.
- However, the results of this study suggest that **preoperative evaluation should assess whether patients have contraindications to tourniquet use**. For patients **without relevant contraindications**, tourniquet application is recommended.

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