

Comparison of dexmedetomidine and ketamine on pain after total knee arthroplasty

Submission date	Recruitment status	<input type="checkbox"/> Prospectively registered
13/06/2025	No longer recruiting	<input type="checkbox"/> Protocol
Registration date	Overall study status	<input type="checkbox"/> Statistical analysis plan
13/06/2025	Completed	<input checked="" type="checkbox"/> Results
Last Edited	Condition category	<input type="checkbox"/> Individual participant data
06/01/2026	Surgery	

Plain English summary of protocol

Background and study aims

This study looked at two medications, dexmedetomidine and ketamine, to find out which one works better in reducing pain and the need for strong painkillers after knee replacement surgery (total knee arthroplasty). Both drugs are often used during surgery as part of a pain relief strategy called multimodal analgesia.

Who can participate?

Adults aged 18 years or over, who were scheduled for elective single-knee replacement surgery under spinal anesthesia and were physically fit

What does the study involve?

Participants were randomly placed into two groups. One group received dexmedetomidine, the other received ketamine, both during surgery. Everyone also received a femoral nerve block and standard spinal anesthesia. Pain levels, use of painkillers, vital signs, and satisfaction were monitored for 24 hours after surgery.

What are the possible benefits and risks of participating?

There may be better pain control and a lower need for opioids. No serious side effects were observed, and there were no cases of low blood pressure or slow heart rate. All patients reported high satisfaction.

Where is the study run from?

Hatay Mustafa Kemal University (Turkey)

When is the study starting and how long is it expected to run for?

June 2023 to December 2024

Who is funding the study?

Hatay Mustafa Kemal University (Turkey)

Who is the main contact?

Dr Senem Urfali, senemurfali@gmail.com

Contact information

Type(s)

Public, Scientific, Principal investigator

Contact name

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Additional identifiers

Clinical Trials Information System (CTIS)

Nil known

Integrated Research Application System (IRAS)

Nil known

Protocol serial number

Nil known

Study information

Scientific Title

Comparing the effects of intraoperative dexmedetomidine and ketamine on postoperative pain in total knee arthroplasty: a randomized trial

Acronym

DK-TKA

Study objectives

It was hypothesized that intraoperative dexmedetomidine infusion would provide better postoperative pain control and reduce opioid consumption compared to ketamine in patients undergoing total knee arthroplasty.

Ethics approval required

Ethics approval required

Ethics approval(s)

approved 21/06/2023, Hatay Mustafa Kemal University Clinical Research Ethics Committee (Tayfur Sökmen Kampüsü Alahan-Antakya/HATAY, Hatay, 31060, Türkiye; +90 (0)(326) 221 33 17 - 18 - 19; rektorlukyaziisleri@mku.edu.tr), ref: 02

Study design

Single-centre double-blinded prospective randomized controlled trial

Primary study design

Interventional

Study type(s)

Treatment

Health condition(s) or problem(s) studied

Total knee arthroplasty

Interventions

Patients were randomly allocated into two groups (1:1 ratio) using a computer-generated randomisation list created by an independent biostatistician before patient enrolment. Block randomisation was not used. Allocation was concealed, and both patients and outcome assessors were blinded to group assignments.

Patients were randomly assigned to receive either intraoperative dexmedetomidine infusion (1 µg/kg over 10 minutes followed by 0.5 µg/kg/h) or ketamine infusion (0.1 mg/kg/h without a loading dose) under spinal anesthesia.

Intervention Type

Drug

Phase

Not Applicable

Drug/device/biological/vaccine name(s)

Dexmedetomidine, ketamine

Primary outcome(s)

Total opioid consumption (in milligrams of tramadol) is measured using data obtained from the intravenous PCA device at 24 hours postoperatively.

Key secondary outcome(s)

1. Pain intensity is measured using the Visual Analogue Scale (VAS) (0 = no pain, 10 = worst pain) in both sitting and supine positions at 0, 4, 8, 12, 18, and 24 hours postoperatively
2. Need for rescue analgesia is determined based on VAS ≥4, and the administration of IV meperidine (0.3 mg/kg) is recorded during the first 24 hours
3. Hemodynamic parameters including heart rate, systolic, diastolic, and mean arterial pressure are measured using noninvasive monitoring at 0, 4, 8, 12, 18, and 24 hours postoperatively
4. Ambulation time (in hours) is recorded based on the time to first mobilization after surgery
5. Side effects including postoperative nausea and vomiting, hypotension, and bradycardia are documented based on clinical observation and medication use within the first 24 hours
6. Patient satisfaction is measured using a four-point scale (0 = poor, 1 = moderate, 2 = good, 3 = excellent) at 24 hours postoperatively

Completion date

31/12/2024

Eligibility

Key inclusion criteria

1. Adult patients aged ≥ 18 years
2. Scheduled for elective unilateral primary total knee arthroplasty under spinal anesthesia
3. American Society of Anesthesiologists (ASA) physical status I–III
4. Provided written informed consent

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Mixed

Lower age limit

18 years

Upper age limit

110 years

Sex

All

Total final enrolment

104

Key exclusion criteria

1. Body mass index (BMI) $>35 \text{ kg/m}^2$
2. Uncontrolled hypertension
3. Renal or hepatic disease
4. Mental, psychiatric or neuromuscular disorders
5. Known allergies or contraindications to dexmedetomidine, ketamine, or local anesthetics
6. Contraindications to spinal anesthesia
7. Refusal to participate in the study

Date of first enrolment

01/07/2023

Date of final enrolment

31/12/2024

Locations

Countries of recruitment

Türkiye

Study participating centre

Hatay Mustafa Kemal University, Tayfur Ata Sökmen Faculty of Medicine

Tayfur Sökmen Kampüsü (31060) Alahan-Antakya

Hatay

Türkiye

31060

Sponsor information

Organisation

Hatay Mustafa Kemal University

Funder(s)

Funder type

University/education

Funder Name

Hatay Mustafa Kemal University

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated and/or analysed during the current study will be available upon request from the corresponding author (please contact Dr Senem Urfalı via senemurfali@gmail.com). The data include anonymised individual participant data (IPD) related to demographics, intervention details, opioid consumption, VAS scores, and hemodynamic parameters. Data will become available after publication of the study results and will be accessible for a period of 5 years. Access will be granted for academic purposes following approval of a written proposal. Participant consent for data sharing was obtained as part of the informed consent process. All data will be anonymised to protect patient confidentiality and comply with ethical guidelines.

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
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[Results article](#)

27/12/2025

06/01/2026

Yes

No