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Ultrasound-guided chest wall nerve blocks to reduce pain after minimally invasive coronary bypass surgery

Submission date
14/02/2026

Recruitment status
No longer recruiting

Registration date
16/02/2026

Overall study status
Completed

Last Edited
09/06/2026

Condition category
Signs and Symptoms

[_] Prospectively registered
[_] Protocol
[X] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Coronary artery disease is one of the leading causes of death worldwide. Some patients require coronary artery bypass surgery to improve blood flow to the heart. In recent years, minimally invasive coronary artery bypass surgery (such as MIDCAB and MICS-CABG) has become more common. These procedures are performed through a small incision in the chest instead of opening the breastbone, which usually leads to less surgical trauma and faster recovery. However, despite being less invasive, patients often experience significant chest pain after surgery. Poor pain control can make it difficult to breathe deeply, cough effectively, or mobilize early. This may increase the risk of lung complications, delay recovery, and increase the need for opioid pain medications.
Ultrasound-guided chest wall nerve blocks are regional anesthesia techniques that numb specific nerves supplying the chest wall. These techniques may reduce pain and decrease the need for opioid medications. This study aims to compare two different ultrasound-guided chest wall nerve block techniques with standard pain treatment to determine which method provides better pain relief and supports faster recovery after minimally invasive coronary artery bypass surgery.

Who can participate?
Adults aged 18 years or older who are scheduled to undergo minimally invasive coronary artery bypass surgery (MIDCAB or MICS-CABG) and who are able to provide written informed consent can participate.

What does the study involve?
Participants are randomly assigned (by chance) to one of three groups:
- Combined interpectoral–pectoserratus plane block
- Combined deep–superficial serratus anterior plane blocks
- Standard postoperative pain treatment without a regional nerve block

The nerve blocks are performed using ultrasound guidance after surgery by experienced anesthesiologists. Ultrasound allows visualization of muscles and surrounding structures to

improve accuracy and safety.
All participants receive standard pain medication after surgery. If pain levels become high, additional rescue pain medication is provided according to hospital protocol.

Pain intensity is measured using a Visual Analogue Scale (VAS), where patients rate their pain on a scale from 0 (no pain) to 100 (worst possible pain). Pain is assessed at 6, 12, 24, and 48 hours after removal of the breathing tube.
Recovery quality is measured using a validated questionnaire called QoR-40 before surgery and on the first and second days after surgery. This questionnaire evaluates comfort, emotional well-being, physical independence, and pain.

Patients are monitored in the intensive care unit (ICU) and later on the hospital ward until discharge. The study also records:
- Time until first additional pain medication is needed
- Total amount of rescue pain medication used
- Time to extubation
- ICU and total hospital length of stay
- Postoperative complications such as lung problems or heart rhythm disturbances
- Any side effects related to nerve blocks or pain medications

No additional visits beyond routine hospital care are required.

What are the possible benefits and risks of participating?
Possible benefits include improved pain control and reduced need for opioid medications. Better pain control may help patients breathe more comfortably, mobilize earlier, and potentially reduce the length of ICU and hospital stay.

Risks related to ultrasound-guided nerve blocks are uncommon but may include:
-Bruising or bleeding at the injection site
-Infection
-Incomplete pain relief
-Temporary numbness
-Local anesthetic toxicity (rare)
-Very rarely, accidental puncture of the lining of the lung (pneumothorax)

Ultrasound guidance is used to minimize these risks. All procedures are performed by experienced anesthesiologists, and patients are closely monitored.
Standard pain medications, including opioids, may cause side effects such as nausea, vomiting, drowsiness, or breathing suppression. These are managed according to hospital protocols.

Where is the study run from?
Department of Cardiovascular Surgery, University of Health Sciences, Gulhane Training and Research Hospital, Ankara, Turkey.

When is the study starting and how long is it expected to run for?
July 2023 to November 2025.

Who is funding the study?
Investigator initiated and funded; no external funding (institutional resources of Gulhane Training and Research Hospital), Turkey.

Who is the main contact?
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Study information

Scientific Title
Adults undergoing minimally invasive coronary artery bypass surgery (MIDCAB/MICSCABG): combined interpectoral–pectoserratus plane block versus combined deep–superficial serratus

anterior plane block versus standard analgesic management for postoperative pain (VAS) and recovery quality (QoR40): a singlecentre randomised controlled trial

Acronym
MICSBLOCK

Study objectives
-To compare postoperative pain intensity after minimally invasive coronary artery bypass surgery among:
(a) combined interpectoral–pectoserratus plane block, (b) combined deep–superficial serratus anterior plane block, and (c) standard analgesic management.
-To compare postoperative rescue analgesic requirement and total analgesic consumption among groups.
-To compare quality of recovery using QoR40.
-To compare postoperative respiratory outcomes/complications and other postoperative complications.
-To compare ICU length of stay and total hospital length of stay.
-To assess blockrelated and analgesiarelated adverse events.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 20/06/2023, Prospective Clinical Research and Scientific Research Ethics Committee of the University of Health Sciences (Gülhane Külliyesi-Sağlık Bilimleri Üniversitesi (University of Health Sciences), Etlik St., Emrah district, Etlik, Keçiören, Ankara, 06018, Türkiye; +903123046135; gulhane.baek@sbu.edu.tr), ref: 2023-223 (Ref. no: 46418926)

Primary study design
Interventional

Allocation
Randomized controlled trial

Masking
Open (masking not used)

Control
Active

Assignment
Parallel

Purpose
Treatment

Study type(s)

Health condition(s) or problem(s) studied
Postoperative pain and recovery after minimally invasive coronary artery bypass surgery (MIDCAB/MICSCABG) for coronary artery disease

Interventions
This is a prospective, singlecentre, randomised, parallelgroup clinical trial (retrospectively registered; recruitment completed). Adult patients undergoing MIDCAB or MICSCABG are randomised 1:1:1 using a predefined randomisation list generated by an investigator not involved in enrolment or outcome assessment.

Three groups are compared:
Group P (combined interpectoral–pectoserratus plane block): ultrasoundguided block performed on the left anterior chest wall after surgery. Local anaesthetic: 0.25% bupivacaine; 15 mL injected between pectoralis major and pectoralis minor muscles (interpectoral plane) plus 15 mL injected between pectoralis minor and serratus anterior (pectoserratus plane).
Group S (combined deep–superficial serratus anterior plane blocks): ultrasoundguided blocks on the left anterior chest wall at approximately the 4th–5th rib level. Local anaesthetic: total 30 mL of 0.25% bupivacaine administered across superficial (between latissimus dorsi and serratus anterior) and deep (between serratus anterior and ribs/external intercostals) planes.
Control group: standard postoperative analgesic management without regional plane block.

All patients receive paracetamol 1 g IV every 8 hours postoperatively. Rescue analgesia is given if VAS >40: tramadol 100 mg IV; if pain persists despite this, dexketoprofen 50 mg is administered (tramadol dosing interval ≥4 hours).

Outcomes are assessed during the hospital stay. Pain intensity is measured using VAS at 6, 12, 24, and 48 hours after extubation. Quality of recovery is assessed using the QoR40 questionnaire preoperatively and on postoperative days 1 and 2. Patients are followed until discharge and postoperative complications and adverse events are recorded.

Intervention Type
Procedure/Surgery

Primary outcome(s)
1. Postoperative pain intensity measured using a Visual Analogue Scale (VAS; 0–100 scale, where 0 = no pain and 100 = worst imaginable pain) at 6 , 12, 24, and 48 hours after extubation

Key secondary outcome(s)
1. Quality of recovery measured using QoR40 measured using the Quality of Recovery-40 (QoR40) questionnaire at preoperative baseline, postoperative day 1 (24 h), and 2 (48 h)

2. Time to first rescue analgesia measured using data collected from patient records in minutes from extubation to first rescue dose at one time point

3. Total rescue analgesic consumption measured using data collected from patient records in milligrams during the first and second 24 hours postextubation at one time point

4. Extubation time measured using data collected from patient records in minutes on the postoperative time until extubation at one time point

5. ICU length of stay measured using data collected from patient records in days on the postoperative ICU duration at one time point

6. Hospital length of stay measured using data collected from patient records in days on the postoperative hospital admission duration at one time point

7. Incidence of postoperative complications, including Atelectasis, pneumonia, newonset atrial fibrillation, and other recorded complications measured using data collected from patient records at during hospital stay

8. Blockrelated and analgesiarelated adverse events, including Hematoma, infection at injection site, pneumothorax/pleural injury, allergic reactions, opioid-related adverse effects (nausea, vomiting, respiratory depression) measured using data collected from patient records at during ICU/hospital stay until discharge

Completion date
23/11/2025

Eligibility

Key inclusion criteria
1. Age ≥18 years
2. Scheduled for minimally invasive coronary artery bypass surgery (MIDCAB or MICSCABG)
3. Provided informed consent

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 Years

Upper age limit
75 Years

Sex
All

Total final enrolment
192

Key exclusion criteria
1. Known allergy to local anaesthetics
2. Chronic analgesic use
3. Coagulopathy
4. Infection at injection site
5. Peripheral neuropathy
6. Thoracic deformities

Date of first enrolment
03/07/2023

Date of final enrolment

16/11/2025

Locations

Countries of recruitment
Türkiye

Study participating centre
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Sponsor information

Organisation
Gülhane Askerî Tıp Akademisi

ROR
https://ror.org/00c8t7d47

Funder(s)

Funder type

Funder Name
Gulhane Training and Research Hospital

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study will be available upon request from Alperen Kutay Yıldırım, drayildirim@yahoo.com. The datasets used and/or analyzed during the current study are not publicly available due to ethical restrictions and patient privacy considerations. However, they are available on reasonable request, subject to

approval by the Institutional Education Planning Coordination Unit, Prospective Clinical Research and Scientific Research Ethics Committee of the University of Health Sciences, and the hospital administration.

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		08/06/2026	09/06/2026	Yes	No
Participant information sheet			16/02/2026	No	Yes
Statistical Analysis Plan			16/02/2026	No	No