Supplementary material 1. Search strategy for MEDLINE via PubMed. It is modified for other databases.

1. "thoracic surgery"[mh] OR "thoracic surgical procedures"[mh:noexp] OR "pulmonary surgical procedures"[mh:noexp] OR pneumonectomy[mh] OR thoracoplasty[mh] OR thoracotomy[mh] OR thoracostomy[mh]
2. thorac*[tiab] OR thorax*[tiab] OR pulmonary[tiab] OR chest*[tiab] OR lung*[tiab]
3. surger*[tiab] OR surgical*[tiab] OR operati*[tiab] OR procedure*[tiab] OR resecti*[tiab] OR OR dissecti*[tiab] OR reconstructi*[tiab]
4. 2 AND 3
5. thoracotomy*[tiab] OR postthoracotomy[tiab] OR "post-thoracotomy"[tiab] OR lobectom*[tiab] OR bilobectom*[tiab] OR segmentectom*[tiab] OR metastasectom*[tiab] OR wedge[tiab]
6. 1 OR 4 OR 5
7. "analgesia, epidural"[mh] OR "anesthesia, epidural"[mh] OR "injections, epidural"[mh]
8. epidural*[tiab] OR extradural*[tiab] OR peridural*[tiab] OR neuraxial*[tiab]
9. 7 OR 8
10. preemptive*[tiab] OR "pre-emptive"[tiab] OR preincision*[tiab] OR "pre-incision"[tiab] OR "pre-incisional"[tiab] OR preoperative*[tiab] OR "pre-operative"[tiab] OR "pre-operatively"[tiab] OR presurgical[tiab] OR "pre-surgical"[tiab] OR before[tiab] OR "prior to"[tiab]
11. 9 AND 10
12. 6 AND 11
13. (randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[tiab] OR drug therapy[sh] OR randomly[tiab] OR trial[tiab] OR groups[tiab]) NOT (animals[mh] NOT humans[mh])

14. 12 AND 13

Supplementary material 2. Sources for literature search.

Electronic database

Medline (PubMed)

https://www.ncbi.nlm.nih.gov/pubmed

Embase

https://www.embase.com

CENTRAL (Cochrane Central Register of Controlled Trials)

https://www.cochranelibrary.com/central

CINAHL (Cumulative Index to Nursing and Allied Health Literature)

https://health.ebsco.com/products/the-cinahl-database

SCOPUS

https://www.scopus.com/search/form.uri

Web of Science

https://mjl.clarivate.com/search-results

LILACS (Literature in Latin America and the Caribbean Health Sciences Literature)

http://bases.bireme.br/cgi-bin/wxislind.exe/iah/online/?IsisScript=iah

/iah.xis&base=LILACS&lang=i

WPRIM(Western Pacific Region Index Medicu

http://wprim.org

IMEMR (Index Medicus for the Eastern Mediterranean Region)

http://applications.emro.who.int/library/Databases/wxis.exe/Library/Databases/iah/?IsisS

cript=iah/iah.xis&lang=I&base=imemr

AIM (African Index Medicus)

http://indexmedicus.afro.who.int/aim/opac_css/?database=biblo

IndMed (Indian Medlars Centre)

http://medind.nic.in/medindcf/medinda.shtml

KoreaMed

https://koreamed.org

DOAJ (Directory of Open Access Journals)

https://doaj.org

OpenGrey

http://www.opengrey.eu

Google Scholar

https://scholar.google.co.kr

Conference abstracts

American Society of Anesthesiologists

http://www.asaabstracts.com/strands/asaabstracts/search.htm

Euroanaesthesia

https://www.esahq.org/resources/resources/abstract-books

International Anesthesia Research Society

https://iars.org/pastannualmeetings/

Society of Cardiovascular Anesthesiologists

https://www.scahq.org/Education/Meetings-and-Events/Accepted-Abstracts

Canadian Anesthesiologists' Society

https://www.cas.ca/en/meetings-events/events-archive

American Academy of Pain Medicine

https://painmed.org/annual-meeting/past-meeting-archive

KoreAnesthesia

http://www.anesthesia.or.kr/event/event02.html

Clinical trial registries

ClinicalTrials

https://clinicaltrials.gov/

ICTRP (International Clinical Trials Registry Platform)

http://apps.who.int/trialsearch/Default.aspx

ISRCTN (International Standard Randomised Controlled Trials Number)

http://www.isrctn.com/

ANZCTR (Australian New Zealand Clinical Trials Registry)

http://www.anzctr.org.au

ChiCTR (Chinese Clinical Trial Registry)

http://www.chictr.org.cn/enIndex.aspx

CRIS (Clinical Research Information Service in South Korea)

https://cris.nih.go.kr

CTRI (Clinical Trials Registry-India)

http://ctri.nic.in

DRKS (German Clinical Trials Register)

https://www.drks.de

HKUCTR (University of Hong Kong Clinical Trials Registry)

http://www.hkuctr.com

IRCT (Iranian Registry of Clinical Trials)

http://www.irct.ir/

NTR (Netherlands Trial Register)

https://www.trialregister.nl

PACTR (Pan African Clinical Trials Registry)

https://pactr.samrc.ac.za/Search.aspx

RPCEC (Cuban Public Registry of Clinical Trials)

http://registroclinico.sld.cu

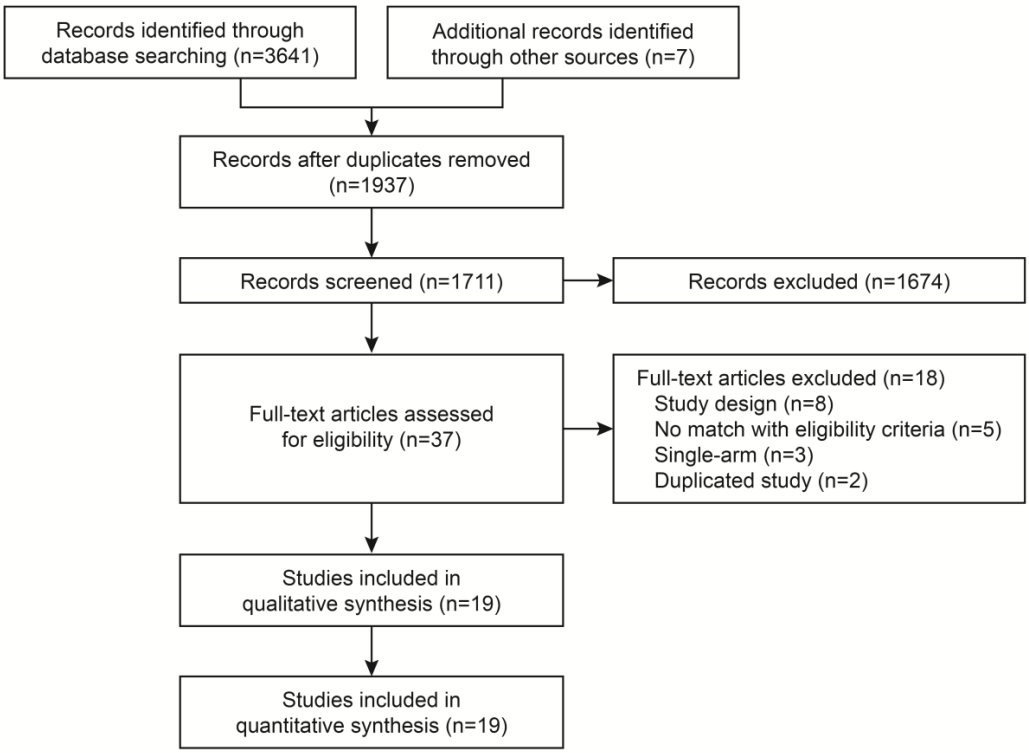
SANCTR (South African National Clinical Trial Register)

http://www.sanctr.gov.za

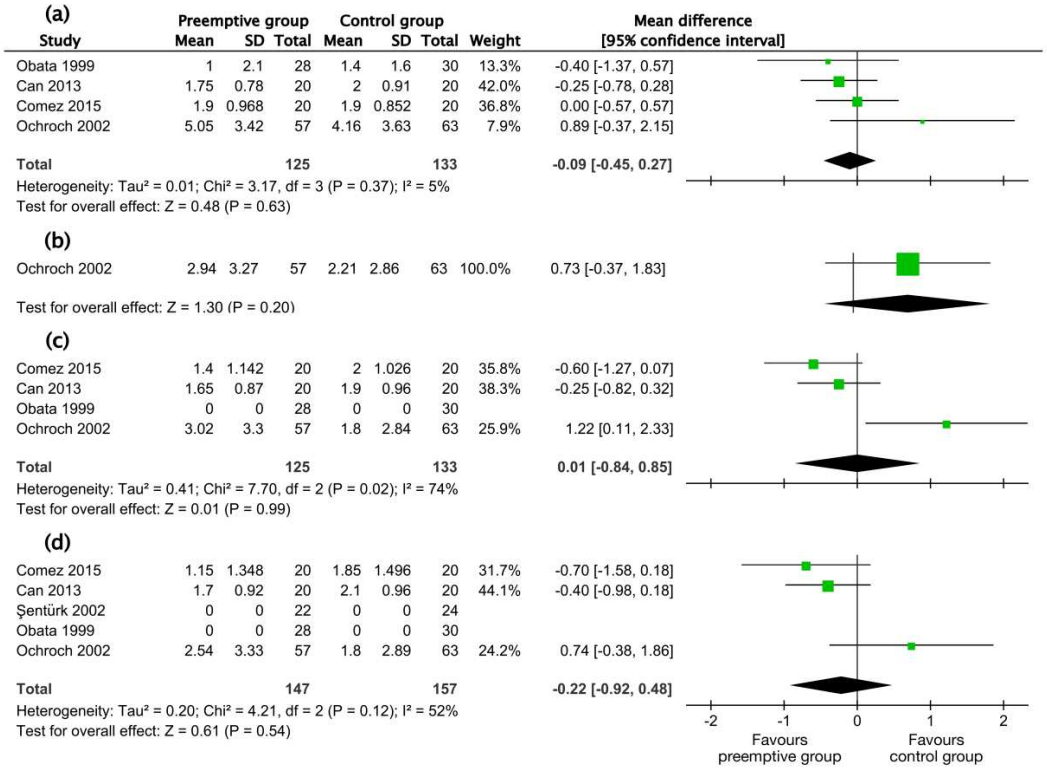
UMIN-CTR (University Hospital Medical Information Network-Clinical Trilas Registry in Japan)

https://www.umin.ac.jp/ctr

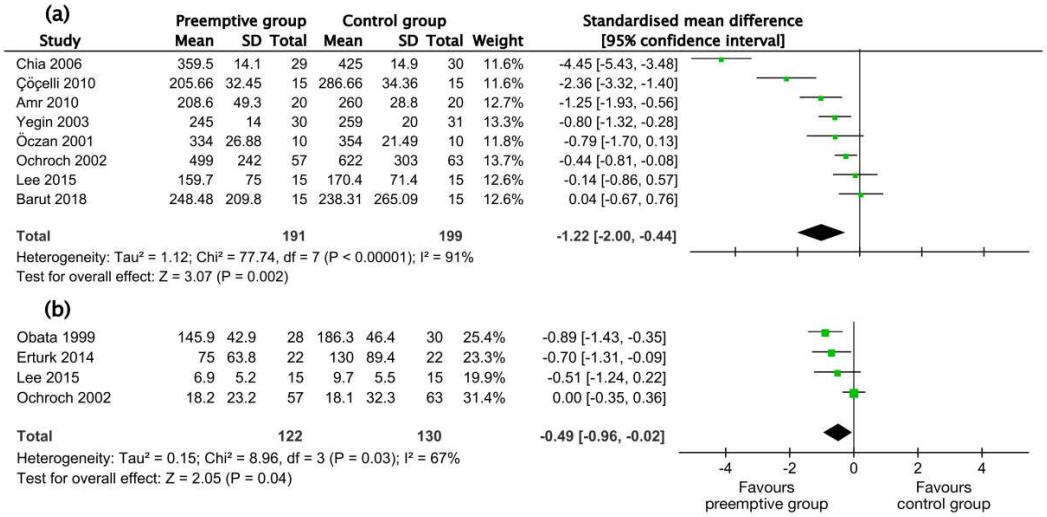
Supplementary material 3. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram.



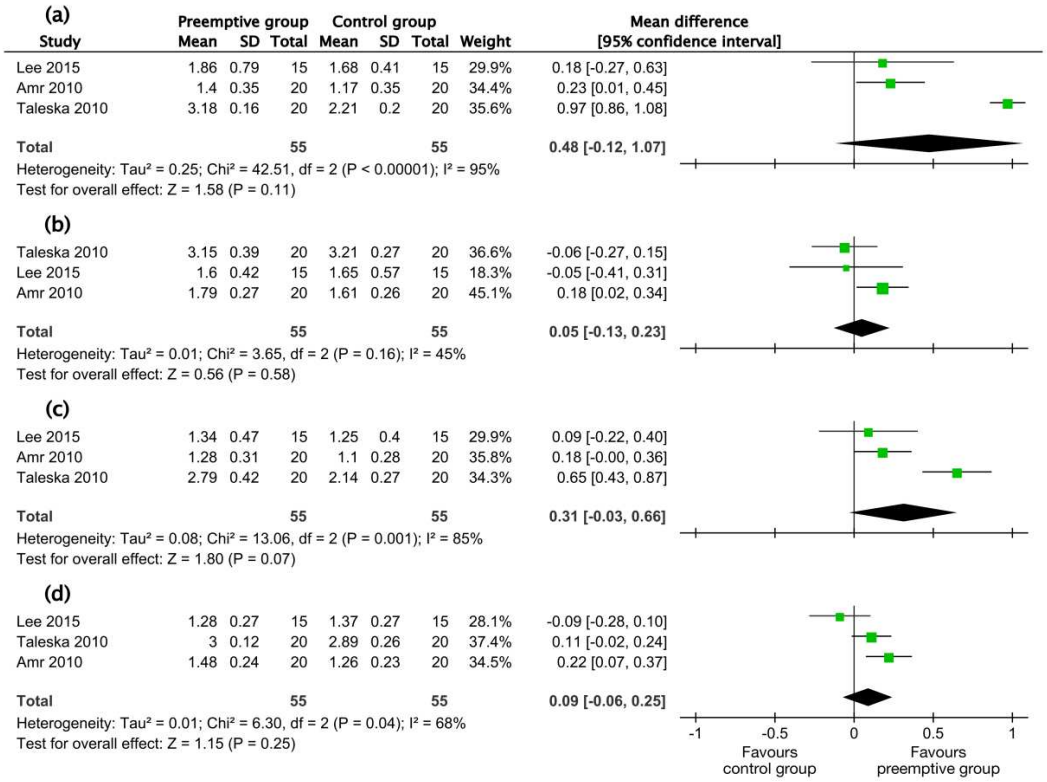
Supplementary material 4. Forest plots for the pain intensity 1 (a), 2 (b), 3 (c), and 6 (d) months after surgery. Data are combined with random-effects meta-analyses using the inverse variance method. SD, standard deviation.



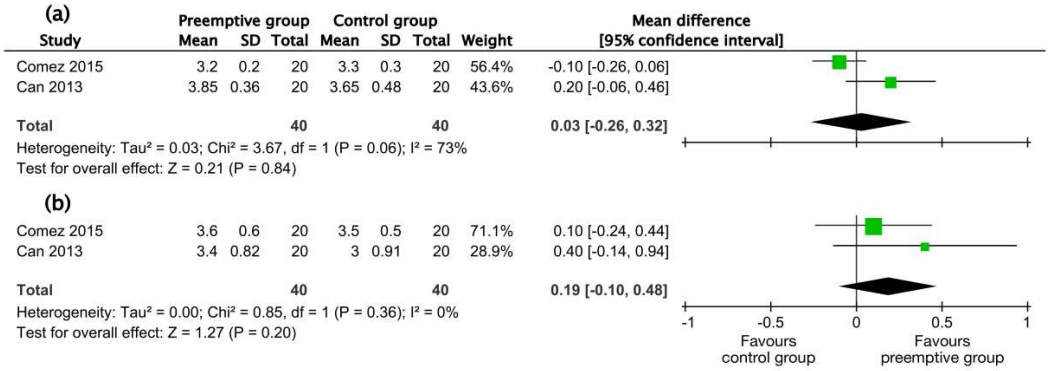
Supplementary material 5. Forest plots for the postoperative epidural (a) and systemic (b) analgesic consumption. Data are combined with random-effects meta-analyses using the inverse variance method. SD, standard deviation.



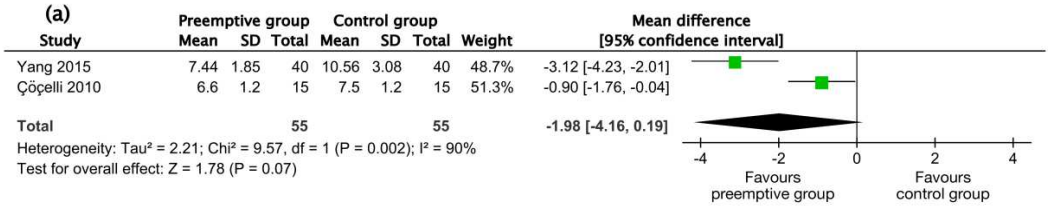
Supplementary material 6. Forest plots for the forced vital capacity (liter) 24 (a) and 48 (b) h after surgery and forced expiratory volume in 1 s (liter) 24 (c) and 48 (d) h after surgery. Data are combined with random-effects meta-analyses using the inverse variance method. SD, standard deviation.



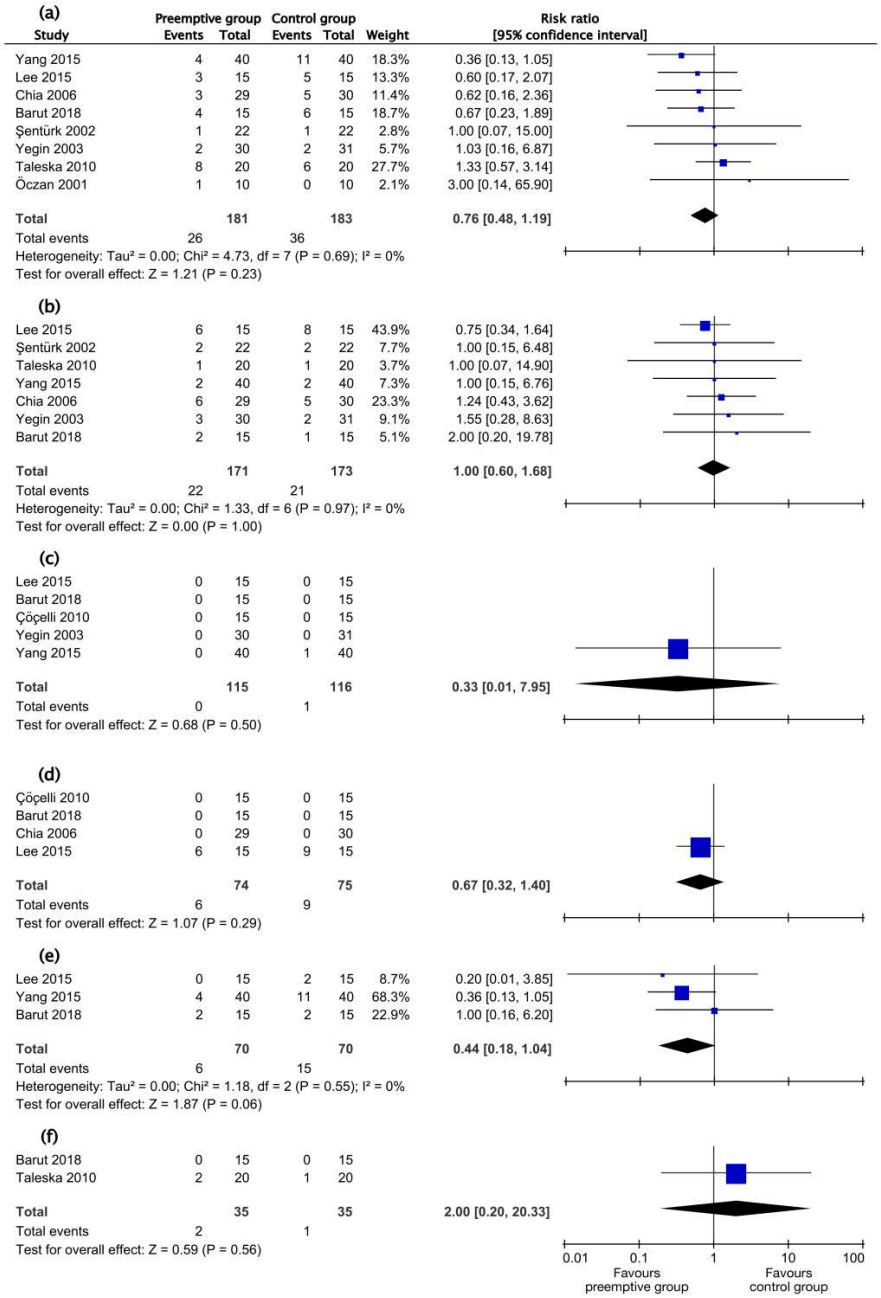
Supplementary material 7. Forest plots for the patient satisfaction with pain management at discharge (a) and 6 (b) months after surgery. Data are combined with random-effects meta-analyses using the inverse variance method. SD, standard deviation.



Supplementary material 8. Forest plot for the length of hospital stay (day). Data are combined with random-effects meta-analyses using the inverse variance method. SD, standard deviation.



Supplementary material 9. Forest plots for the postoperative nausea or vomiting (a), pruritus (b), respiratory depression (c), sedation (d), hypotension (e), and urinary retention (f). Data are combined with random-effects meta-analyses using the Mantel-Haenszel method.



Supplementary material 10. Funnel plots for the pain intensity at rest 0–4 (a, P=0.084 for Egger's test), 5–12 (b, P=0.024), 13–24 (c, P=0.590), and 25–48 (d, P=0.687) h after surgery, and during coughing 0–4 (e, P=0.150), 5–12 (f, P=0.535), 13–24 (g, P=0.306), and 25–48 (h, P=0.918) h after surgery.