PHARMACOLOGY

Opioid-Free versus Opioid-Sparing Anesthesia

Intraoperative teaching · CA-3

THE QUESTION

Where the evidence disagrees

Opioid-Free vs. Opioid-Sparing Anesthesia: A Comprehensive Evidence Review Scope and Framing This review examines the totality of evidence comparing opioid-free anesthesia (OFA) — defined as the absolute avoidance of systemic, neuraxial, or intracavitary opioids from induction through emergence — with opioid-sparing multimodal analgesia (OSA) and traditional opioid-based anesthesia (OBA). Best Practice & … The…

THE EVIDENCE

What each source contributes, and how strong it is

Study design first — a cohort and a randomised trial do not carry the same weight.

Design	Year	Journal	What it found
Meta-analysis	2019	Anaesthesia	Across 23 trials, pain at two hours was equivalent whether or not intraoperative
Cohort	2025	BMC anesthesiology	Expect higher processed EEG indices during opioid-free anaesthesia
Meta-analysis	2023	Journal of clinical anesthesia	Pooling 38 trials, opioid-free and opioid-based anaesthesia produced no clinically
Randomised trial	2021	Anesthesiology	A dexmedetomidine-based opioid-free technique was stopped early after five cases of
Meta-analysis	2025	Anesthesia and analgesia	In laparoscopic bariatric surgery, opioid-free anaesthesia reduced nausea and
Randomised trial	2024	British journal of anaesthesia	In day-case hip arthroplasty, opioid-free anaesthesia did not reduce 24-hour opioid

6 resolved citations behind this deck; every point above traces to one of them.

WHERE THE GUIDANCE SITS

What the guidelines and pooled evidence say

3 findings, each on the slide that follows.

ANAESTHESIA 2019

Across 23 trials, pain at two hours was equivalent whether or not intraoperative

Across 23 trials, pain at two hours was equivalent whether or not intraoperative opioid was given

JOURNAL OF CLINICAL ANESTHESIA 2023

Pooling 38 trials, opioid-free and opioid-based anaesthesia produced no clinically

Pooling 38 trials, opioid-free and opioid-based anaesthesia produced no clinically relevant difference in postoperative pain scores or opioid…

ANESTHESIA AND ANALGESIA 2025

In laparoscopic bariatric surgery, opioid-free anaesthesia reduced nausea and

In laparoscopic bariatric surgery, opioid-free anaesthesia reduced nausea and vomiting more than opioid-sparing anaesthesia

WHERE THE GUIDANCE SITS

Across 23 trials, pain at two hours was equivalent whether or not intraoperative

Meta-analysis · Anaesthesia

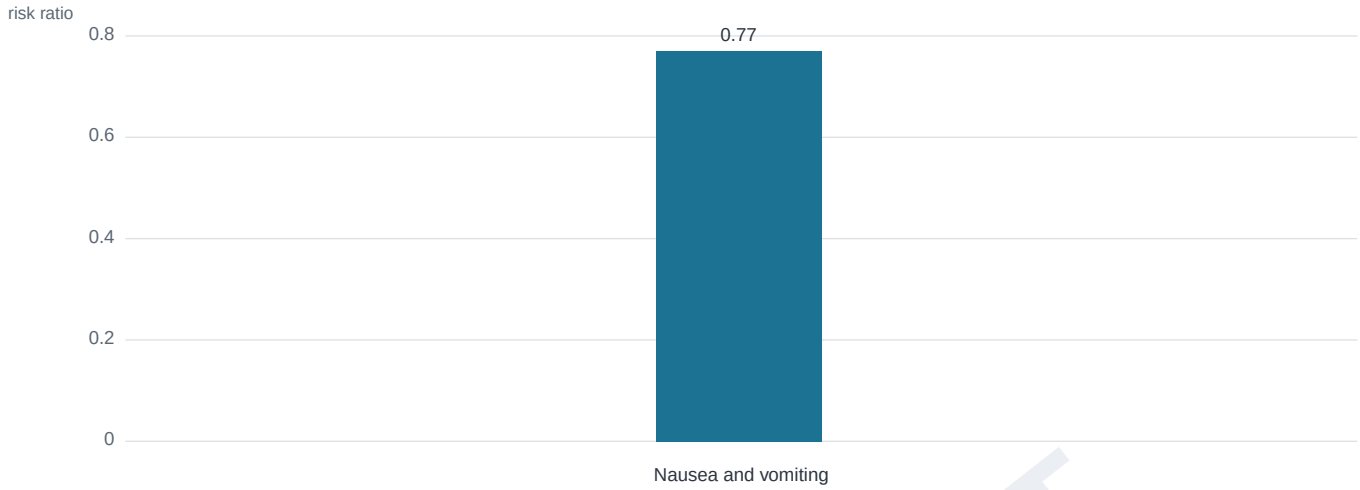
Across 23 trials, pain at two hours was equivalent whether or not intraoperative opioid was given, while postoperative nausea and vomiting was lower without it.

Analgesic Impact of Intra-Operative Opioids vs. Opioid-Free Anaesthesia: A Systematic Review and Meta-Analysis, Anaesthesia 2019 · PMID 30802933

THE NUMBERS

Omitting intraoperative opioid did not worsen pain

23 trials, 1,304 patients.



Pain at two hours was equivalent; the difference is in nausea, not analgesia.

Analgesic Impact of Intra-Operative Opioids vs. Opioid-Free Anaesthesia: A Systematic Review and Meta-Analysis, Anaesthesia 2019 · PMID 30802933

WHERE THE GUIDANCE SITS

Pooling 38 trials, opioid-free and opioid-based anaesthesia produced no clinically

Meta-analysis · Journal of clinical anesthesia

Pooling 38 trials, opioid-free and opioid-based anaesthesia produced no clinically relevant difference in postoperative pain scores or opioid consumption.

Opioid-Free Anesthesia: A Systematic Review and Meta-Analysis, Journal of clinical anesthesia 2023 · PMID 37515877

WHERE THE GUIDANCE SITS

In laparoscopic bariatric surgery, opioid-free anaesthesia reduced nausea and

Meta-analysis · Anesthesia and analgesia

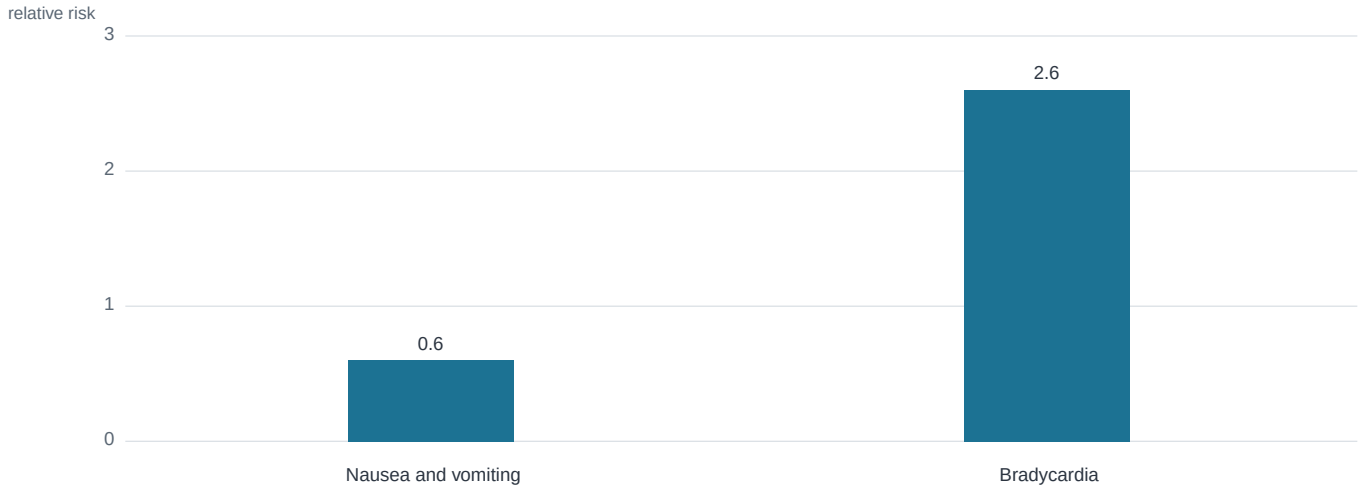
In laparoscopic bariatric surgery, opioid-free anaesthesia reduced nausea and vomiting more than opioid-sparing anaesthesia, but roughly doubled the risk of bradycardia with no difference in pain or opioid use.

Opioid-Sparing Anesthesia Versus Opioid-Free Anesthesia for the Prevention of Postoperative Nausea and Vomiting After Laparoscopic Bariatric Surgery: A Systematic Review and Network Meta-Analysis, Anesthesia and analgesia 2025 · PMID 38578868

THE NUMBERS

Opioid-free beats opioid-sparing on nausea, and costs bradycardia

15 trials, 1,310 bariatric patients.



A genuine antiemetic gain against a roughly 2.6-fold bradycardia risk — that is the trade, stated plainly.

Opioid-Sparing Anesthesia Versus Opioid-Free Anesthesia for the Prevention of Postoperative Nausea and Vomiting After Laparoscopic Bariatric Surgery: A Systematic Review and Network Meta-Analysis, Anesthesia and analgesia 2025 · PMID 38578868

WHAT THE TRIALS FOUND

Where randomised evidence moved the question

2 findings, each on the slide that follows.

ANESTHESIOLOGY 2021

A dexmedetomidine-based opioid-free technique was stopped early after five cases of

A dexmedetomidine-based opioid-free technique was stopped early after five cases of severe bradycardia

BRITISH JOURNAL OF ANAESTHESIA 2024

In day-case hip arthroplasty, opioid-free anaesthesia did not reduce 24-hour opioid

In day-case hip arthroplasty, opioid-free anaesthesia did not reduce 24-hour opioid consumption compared with opioid-sparing anaesthesia, with…

WHAT THE TRIALS FOUND

A dexmedetomidine-based opioid-free technique was stopped early after five cases of

Randomised trial · Anesthesiology

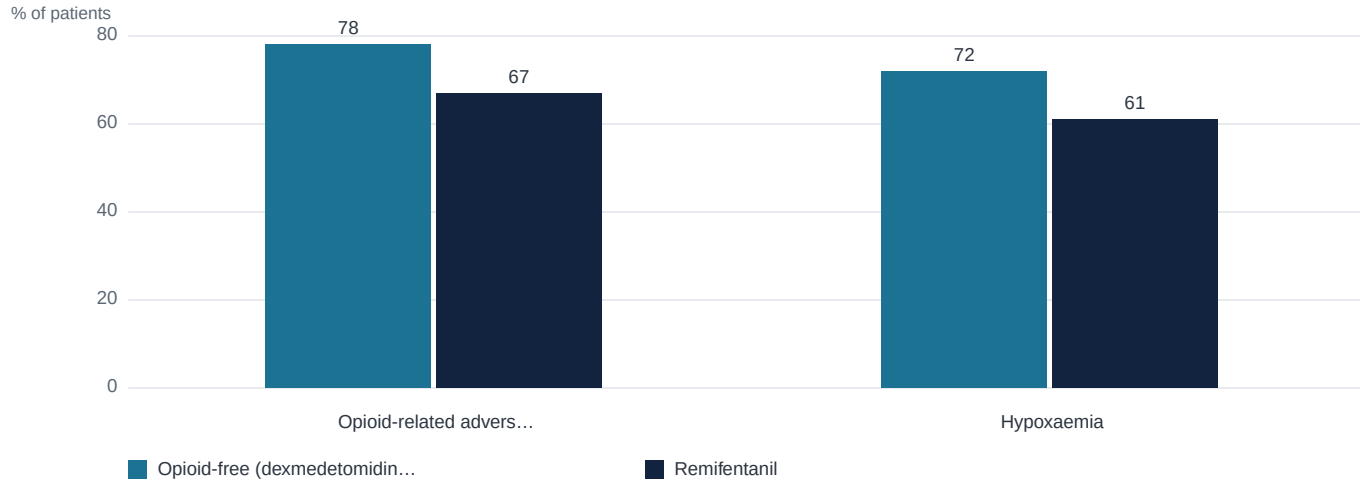
A dexmedetomidine-based opioid-free technique was stopped early after five cases of severe bradycardia, and increased opioid-related adverse events from 67% to 78%, driven by hypoxaemia.

Balanced Opioid-Free Anesthesia With Dexmedetomidine Versus Balanced Anesthesia With Remifentanil for Major or Intermediate Noncardiac Surgery, Anesthesiology 2021 · PMID 33630043

THE NUMBERS

Opioid-free with dexmedetomidine caused more harm, not less

312 patients; trial stopped early for severe bradycardia.



The composite the technique was designed to reduce went up, driven by hypoxaemia, and the trial was stopped early after five cases of severe bradycardia.

Balanced Opioid-Free Anesthesia With Dexmedetomidine Versus Balanced Anesthesia With Remifentanil for Major or Intermediate Noncardiac Surgery, Anesthesiology 2021 · PMID 33630043

WHAT THE TRIALS FOUND

In day-case hip arthroplasty, opioid-free anaesthesia did not reduce 24-hour opioid

Randomised trial · British journal of anaesthesia

In day-case hip arthroplasty, opioid-free anaesthesia did not reduce 24-hour opioid consumption compared with opioid-sparing anaesthesia, with similar pain scores and walking recovery.

Opioid-Free Versus Opioid-Sparing Anaesthesia in Ambulatory Total Hip Arthroplasty: A Randomised Controlled Trial, British journal of anaesthesia 2024 · PMID 38044236

IN PRACTICE

Expect higher processed EEG indices during opioid-free anaesthesia

Cohort · BMC anesthesiology

Expect higher processed EEG indices during opioid-free anaesthesia: patient state index and spectral edge frequency ran higher, and the alpha power typical of opioid-based technique was absent.

Anesthesia Depth Monitoring During Opioid Free Anesthesia - A Prospective Observational Study, BMC anesthesiology 2025 · PMID 39856547

IN THE ROOM

What this changes about the next case

Colour is the strength of the evidence behind each step, not the urgency.

1. **1**
   Across 23 trials, pain at two hours was equivalent whether or not intraoperative opioid was given, while postoperative nausea and vomiting was lower without it.
2. **2**
   Pooling 38 trials, opioid-free and opioid-based anaesthesia produced no clinically relevant difference in postoperative pain scores or opioid consumption.
3. **3**
   In laparoscopic bariatric surgery, opioid-free anaesthesia reduced nausea and vomiting more than opioid-sparing anaesthesia, but roughly doubled the risk of bradycardia with no difference in pain or opioid use.
4. **4**
   A dexmedetomidine-based opioid-free technique was stopped early after five cases of severe bradycardia, and increased opioid-related adverse events from 67% to 78%, driven by hypoxaemia.
5. **5**
   In day-case hip arthroplasty, opioid-free anaesthesia did not reduce 24-hour opioid consumption compared with opioid-sparing anaesthesia, with similar pain scores and walking recovery.

KEY TAKEAWAYS

What to carry into the next case

> **Across 23 trials, pain at two hours was equivalent whether or not intraoperative**
> Anaesthesia 2019

> **Expect higher processed EEG indices during opioid-free anaesthesia**
> BMC anesthesiology 2025

> **Pooling 38 trials, opioid-free and opioid-based anaesthesia produced no clinically**
> Journal of clinical anesthesia 2023

> **A dexmedetomidine-based opioid-free technique was stopped early after five cases of**
> Anesthesiology 2021

Across 23 trials, pain at two hours was equivalent whether or not intraoperative

QUESTIONS I'LL ASK YOU IN THE ROOM

1. How would you teach this to a CA-1 in two minutes?
2. Where does the evidence for this actually stop?
3. What would you do differently in a resource-limited setting?
4. Defend the alternative you decided against.

ORAL BOARDS STEM

> *A 41-year-old with chronic pain on buprenorphine presents for laparoscopic hysterectomy. A colleague suggests a fully opioid-free technique with dexmedetomidine and lidocaine.*

BOARD QUESTIONS

1. In the randomised trial of balanced dexmedetomidine-based opioid-free anaesthesia versus balanced remifentanil-based anaesthesia for major or intermediate noncardiac surgery, why was the trial stopped early, and what happened to the rate of opioid-related adverse events and what drove that change?

2. You are running a processed EEG monitor during an opioid-free anaesthetic. Describe how the displayed indices and the spectral pattern are expected to differ from what you see during an opioid-based technique.

3. In the network meta-analysis of laparoscopic bariatric surgery comparing opioid-free with opioid-sparing anaesthesia, state the benefit and the cost of going fully opioid-free, and what happened to pain and opioid use.

4. A resident reads the randomised trial of opioid-free anaesthesia in ambulatory total hip arthroplasty and concludes opioid-free anaesthesia has no benefit anywhere. State what that trial compared, what it found for opioid consumption, pain and recovery, and why the conclusion is broader than the evidence.

ANSWER KEY

1. The dexmedetomidine-based opioid-free technique was stopped early after five cases of severe bradycardia. Opioid-related adverse events rose from 67% to 78%, driven by hypoxaemia.

The opioid-free arm was stopped for severe bradycardia and still ended up with more opioid-related adverse events, 67% to 78%, mostly hypoxaemia.

Balanced Opioid-Free Anesthesia With Dexmedetomidine Versus Balanced Anesthesia With Remifentanil for Major or Intermediate Noncardiac Surgery, Anesthesiology 2021 · PMID 33630043

2. Expect the processed EEG indices to read higher during opioid-free anaesthesia: the patient state index and the spectral edge frequency both ran higher in this prospective observational study, and the alpha power typical of an opioid-based technique was absent.

A higher index and missing alpha power during opioid-free anaesthesia is what this technique looks like on the monitor, so read the number against the technique you are actually running.

Anesthesia Depth Monitoring During Opioid Free Anesthesia - A Prospective Observational Study, BMC anesthesiology 2025 · PMID 39856547

3. Opioid-free anaesthesia reduced nausea and vomiting more than opioid-sparing anaesthesia did, but it roughly doubled the risk of bradycardia, with no difference in pain or opioid use between the two approaches.

In bariatric patients the trade for going fully opioid-free is less nausea and vomiting against roughly double the bradycardia, with pain and opioid use unchanged.

Opioid-Sparing Anesthesia Versus Opioid-Free Anesthesia for the Prevention of Postoperative Nausea and Vomiting After Laparoscopic Bariatric Surgery: A Systematic Review and Network Meta-Analysis, Anesthesia and analgesia 2025 · PMID 38578868

4. The trial compared opioid-free anaesthesia with opioid-sparing anaesthesia in day-case hip arthroplasty and found opioid-free anaesthesia did not reduce 24-hour opioid consumption, with similar pain scores and similar walking recovery. It is a single randomised trial in one ambulatory operation, and the comparator was opioid-sparing anaesthesia rather than a conventional opioid-based technique, so it does not support a general claim about opioid-free anaesthesia in other settings.

This trial answers one question — opioid-free versus opioid-sparing in day-case hip arthroplasty — and the answer there was no difference in 24-hour opioid use, pain, or walking recovery.

Opioid-Free Versus Opioid-Sparing Anaesthesia in Ambulatory Total Hip Arthroplasty: A Randomised Controlled Trial, British journal of anaesthesia 2024 · PMID 38044236

Across 23 trials, pain at two hours was equivalent whether or not intraoperative

SOURCES

[1] Analgesic Impact of Intra-Operative Opioids vs. Opioid-Free Anaesthesia: A Systematic Review and Meta-Analysis, Anaesthesia 2019 · PMID 30802933

[2] Anesthesia Depth Monitoring During Opioid Free Anesthesia - A Prospective Observational Study, BMC anesthesiology 2025 · PMID 39856547

[3] Opioid-Free Anesthesia: A Systematic Review and Meta-Analysis, Journal of clinical anesthesia 2023 · PMID 37515877

[4] Balanced Opioid-Free Anesthesia With Dexmedetomidine Versus Balanced Anesthesia With Remifentanil for Major or Intermediate Noncardiac Surgery, Anesthesiology 2021 · PMID 33630043

[5] Opioid-Sparing Anesthesia Versus Opioid-Free Anesthesia for the Prevention of Postoperative Nausea and Vomiting After Laparoscopic Bariatric Surgery: A Systematic Review and Network Meta-Analysis, Anesthesia and analgesia 2025 · PMID 38578868

[6] Opioid-Free Versus Opioid-Sparing Anaesthesia in Ambulatory Total Hip Arthroplasty: A Randomised Controlled Trial, British journal of anaesthesia 2024 · PMID 38044236