PHARMACOLOGY

Perioperative Ketamine Infusion

Intraoperative teaching · CA-2

THE QUESTION

Where the evidence disagrees

This topic was selected because an evidence synthesis beats a textbook on it: the trials disagree, or the guidance has moved recently.

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
Guideline	2018	Regional anesthesia and pain medic	The ASRA/AAPM/ASA consensus guideline supports ketamine for acute pain as a
Meta-analysis	2018	The Cochrane database of systemati	Across 130 trials and 8,341 patients, perioperative ketamine cut 24-hour opioid
Randomised trial	2017	England)	In the PODCAST trial a single subanaesthetic dose of ketamine did not reduce
Cohort	2025	Anaesthesia	Ketamine's relationship with delirium is U-shaped
Meta-analysis	2022	Journal of clinical anesthesia	In patients already taking opioids, ketamine reduced cumulative opioid consumption
Randomised trial	2017	Pain	In opioid-dependent patients having lumbar fusion, intraoperative S-ketamine reduced

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.

REGIONAL ANESTHESIA AND PAIN MEDICINE 2018

The ASRA/AAPM/ASA consensus guideline supports ketamine for acute pain as a

The ASRA/AAPM/ASA consensus guideline supports ketamine for acute pain as a stand-alone treatment and as an adjunct to opioids, with…

THE COCHRANE DATABASE OF SYSTEMATIC REVIEWS 2018

Across 130 trials and 8,341 patients, perioperative ketamine cut 24-hour opioid

Across 130 trials and 8,341 patients, perioperative ketamine cut 24-hour opioid consumption by about 8 mg morphine equivalents — roughly 19% — with…

JOURNAL OF CLINICAL ANESTHESIA 2022

In patients already taking opioids, ketamine reduced cumulative opioid consumption

In patients already taking opioids, ketamine reduced cumulative opioid consumption by roughly 97 mg at 24 hours and lowered sedation

WHERE THE GUIDANCE SITS

The ASRA/AAPM/ASA consensus guideline supports ketamine for acute pain as a

Guideline · Regional anesthesia and pain medic

The ASRA/AAPM/ASA consensus guideline supports ketamine for acute pain as a stand-alone treatment and as an adjunct to opioids, with contraindications similar to those for chronic pain.

Consensus Guidelines on the Use of Intravenous Ketamine Infusions for Acute Pain Management From the American Society of Regional Anesthesia and Pain Medicine, the American Academy of Pain Medicine, and the American Society of Anesthesiologists, Regional anesthesia and pain medicine 2018 · PMID 29870457

WHERE THE GUIDANCE SITS

Across 130 trials and 8,341 patients, perioperative ketamine cut 24-hour opioid

Meta-analysis · The Cochrane database of systemati

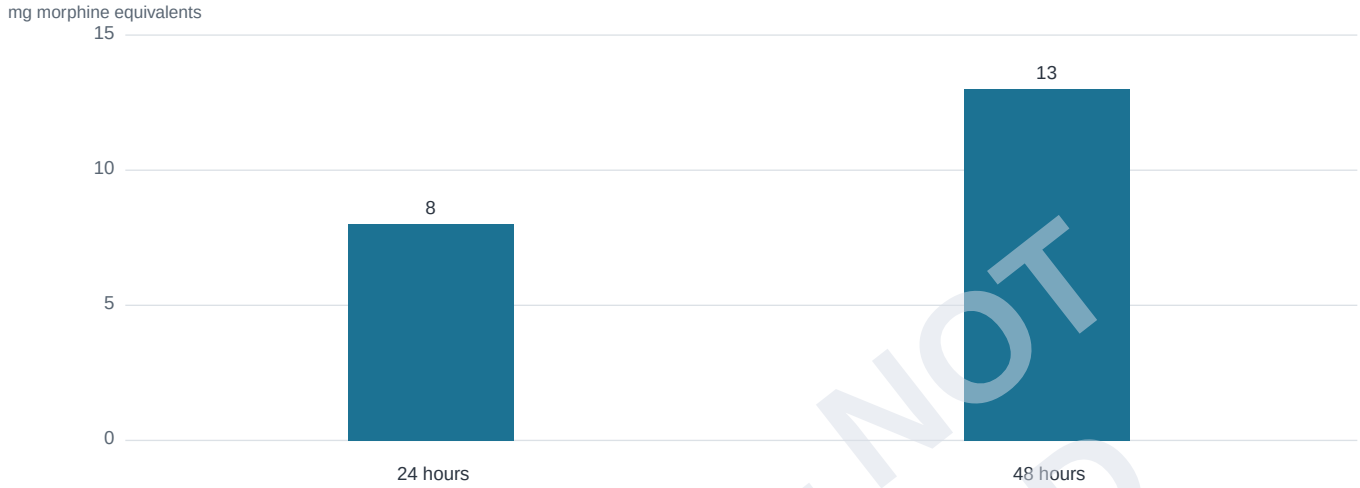
Across 130 trials and 8,341 patients, perioperative ketamine cut 24-hour opioid consumption by about 8 mg morphine equivalents — roughly 19% — with bolus doses mostly 0.25 to 1 mg and infusions 2 to 5 micrograms per kilogram per minute.

Perioperative Intravenous Ketamine for Acute Postoperative Pain in Adults, The Cochrane database of systematic reviews 2018 · PMID 30570761

THE NUMBERS

Ketamine's opioid-sparing effect is modest but consistent

130 trials, 8,341 patients.



About 19% less opioid at both time points — real, and smaller than the enthusiasm suggests.

Perioperative Intravenous Ketamine for Acute Postoperative Pain in Adults, The Cochrane database of systematic reviews 2018 · PMID 30570761

WHERE THE GUIDANCE SITS

In patients already taking opioids, ketamine reduced cumulative opioid consumption

Meta-analysis · Journal of clinical anesthesia

In patients already taking opioids, ketamine reduced cumulative opioid consumption by roughly 97 mg at 24 hours and lowered sedation, while the effect on pain intensity itself was small and low-certainty.

Perioperative Ketamine for Postoperative Pain Management in Patients With Preoperative Opioid Intake: A Systematic Review and Meta-Analysis, Journal of clinical anesthesia 2022 · PMID 35065394

WHAT THE TRIALS FOUND

Where randomised evidence moved the question

2 findings, each on the slide that follows.

ENGLAND) 2017

In the PODCAST trial a single subanaesthetic dose of ketamine did not reduce

In the PODCAST trial a single subanaesthetic dose of ketamine did not reduce delirium in older adults after major surgery (19.5% versus 19.8%) and…

PAIN 2017

In opioid-dependent patients having lumbar fusion, intraoperative S-ketamine reduced

In opioid-dependent patients having lumbar fusion, intraoperative S-ketamine reduced 24-hour morphine consumption from 121 mg to 79 mg and reduced…

WHAT THE TRIALS FOUND

In the PODCAST trial a single subanaesthetic dose of ketamine did not reduce

Randomised trial · England)

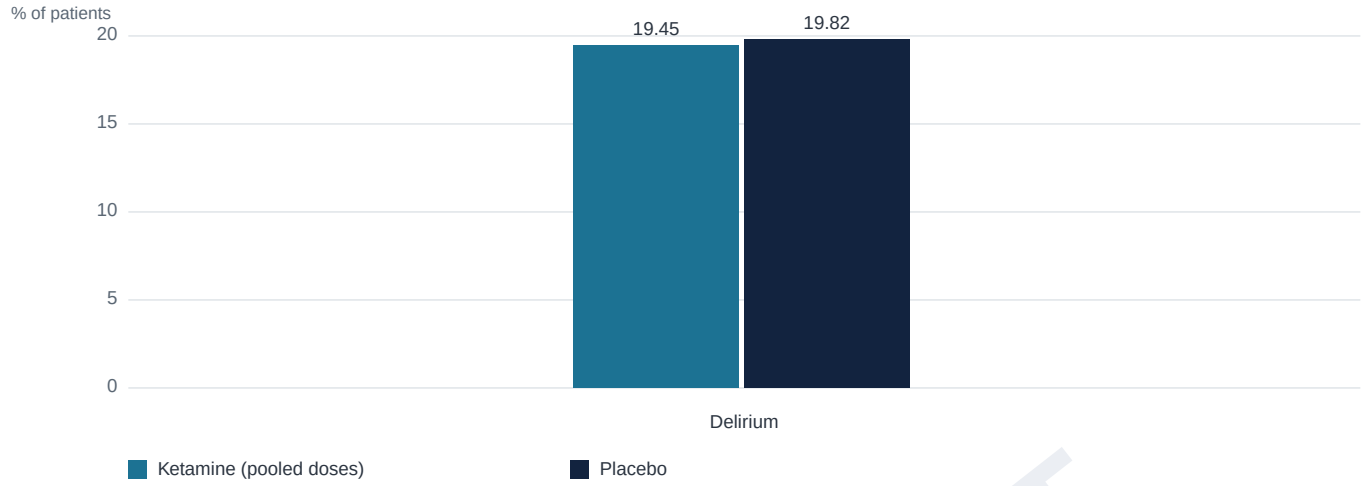
In the PODCAST trial a single subanaesthetic dose of ketamine did not reduce delirium in older adults after major surgery (19.5% versus 19.8%) and increased hallucinations and nightmares with rising dose.

Intraoperative Ketamine for Prevention of Postoperative Delirium or Pain After Major Surgery in Older Adults: An International, Multicentre, Double-Blind, Randomised Clinical Trial, Lancet (London, England) 2017 · PMID 28576285

THE NUMBERS

PODCAST: no delirium benefit, more hallucinations

672 patients over 60 after major surgery.



No difference in delirium, and hallucinations and nightmares rose with dose — this is a negative trial.

Intraoperative Ketamine for Prevention of Postoperative Delirium or Pain After Major Surgery in Older Adults: An International, Multicentre, Double-Blind, Randomised Clinical Trial, Lancet (London, England) 2017 · PMID 28576285

WHAT THE TRIALS FOUND

In opioid-dependent patients having lumbar fusion, intraoperative S-ketamine reduced

Randomised trial · Pain

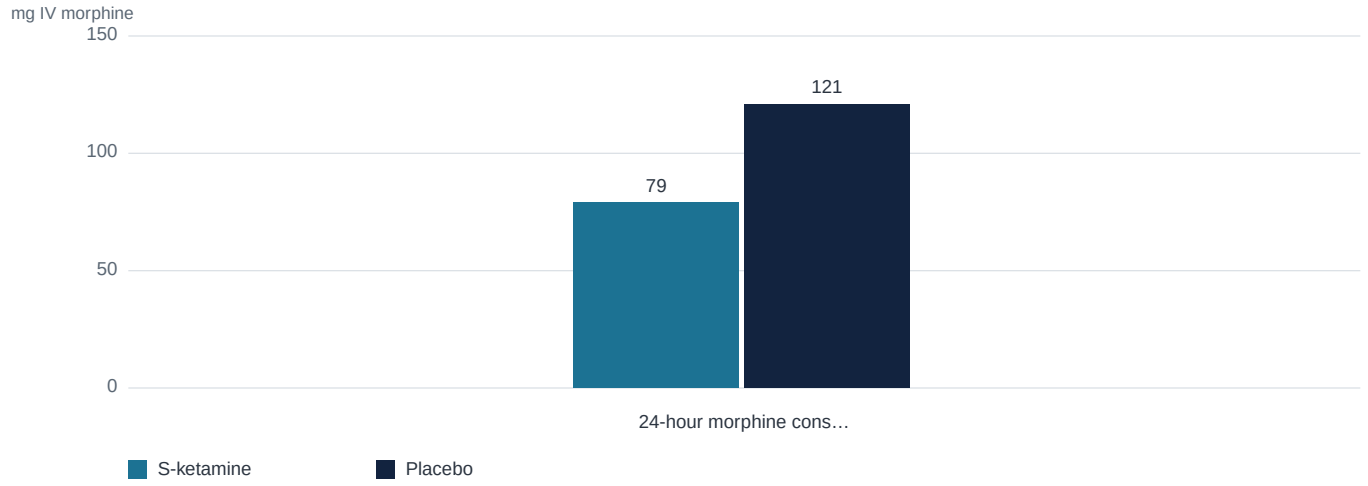
In opioid-dependent patients having lumbar fusion, intraoperative S-ketamine reduced 24-hour morphine consumption from 121 mg to 79 mg and reduced sedation, without more hallucinations or nightmares.

Intraoperative Ketamine Reduces Immediate Postoperative Opioid Consumption After Spinal Fusion Surgery in Chronic Pain Patients With Opioid Dependency: A Randomized, Blinded Trial, Pain 2017 · PMID 28067693

THE NUMBERS

In opioid-dependent patients the effect is larger

147 patients having lumbar spinal fusion.



Where tolerance is the problem, the opioid-sparing effect is worth having.

Intraoperative Ketamine Reduces Immediate Postoperative Opioid Consumption After Spinal Fusion Surgery in Chronic Pain Patients With Opioid Dependency: A Randomized, Blinded Trial, Pain 2017 · PMID 28067693

IN PRACTICE

Ketamine's relationship with delirium is U-shaped

Cohort · Anaesthesia

Ketamine's relationship with delirium is U-shaped: cumulative doses at or below 0.35 mg/kg were associated with less delirium, higher doses with none, and the minimum risk fell at 0.25 to 0.34 mg/kg.

Dose-Dependent Relationship Between Intra-Operative Ketamine Administration and Postoperative Delirium: A Retrospective Cohort Study, Anaesthesia 2025 · PMID 40619168

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**
   The ASRA/AAPM/ASA consensus guideline supports ketamine for acute pain as a stand-alone treatment and as an adjunct to opioids, with contraindications similar to those for chronic pain.
2. **2**
   Across 130 trials and 8,341 patients, perioperative ketamine cut 24-hour opioid consumption by about 8 mg morphine equivalents — roughly 19% — with bolus doses mostly 0.25 to 1 mg and infusions 2 to 5 micrograms per kilogram per minute.
3. **3**
   In patients already taking opioids, ketamine reduced cumulative opioid consumption by roughly 97 mg at 24 hours and lowered sedation, while the effect on pain intensity itself was small and low-certainty.
4. **4**
   In the PODCAST trial a single subanaesthetic dose of ketamine did not reduce delirium in older adults after major surgery (19.5% versus 19.8%) and increased hallucinations and nightmares with rising dose.
5. **5**
   In opioid-dependent patients having lumbar fusion, intraoperative S-ketamine reduced 24-hour morphine consumption from 121 mg to 79 mg and reduced sedation, without more hallucinations or nightmares.

KEY TAKEAWAYS

What to carry into the next case

> **The ASRA/AAPM/ASA consensus guideline supports ketamine for acute pain as a**
> Regional anesthesia and pain medicine 2018

> **Across 130 trials and 8,341 patients, perioperative ketamine cut 24-hour opioid**
> The Cochrane database of systematic reviews 2018

> **In the PODCAST trial a single subanaesthetic dose of ketamine did not reduce**
> England) 2017

> **Ketamine's relationship with delirium is U-shaped**
> Anaesthesia 2025

The ASRA/AAPM/ASA consensus guideline supports ketamine for acute pain as a

QUESTIONS I'LL ASK YOU IN THE ROOM

1. How does your plan change if the patient is not optimised?
2. What is the physiology behind what we just did?
3. Talk me through the trade-off you made there.
4. What would make you abandon this plan and do something else?

ORAL BOARDS STEM

> *A 48-year-old on high-dose oxycodone for chronic back pain presents for revision spinal surgery, and the resident proposes a low-dose ketamine infusion for the duration.*

BOARD QUESTIONS

1. The ASRA/AAPM/ASA consensus guideline addresses intravenous ketamine infusions for acute pain. In one or two sentences, state the two roles in which that guideline supports ketamine for acute pain, and how it characterizes ketamine's contraindications relative to those for chronic pain use.

2. A randomized, blinded trial gave intraoperative S-ketamine to opioid-dependent patients undergoing lumbar spinal fusion. State what happened in that trial to 24-hour morphine consumption (give both values), to sedation, and to hallucinations and nightmares.

3. In the PODCAST trial, older adults having major surgery received a single subanaesthetic dose of ketamine intraoperatively. State the trial's finding for postoperative delirium, giving both event rates, and state what happened to hallucinations and nightmares as the dose rose.

4. A systematic review and meta-analysis of perioperative ketamine in patients with preoperative opioid intake reported a large reduction in cumulative opioid consumption. A resident concludes from it that ketamine clearly makes these patients hurt less. Using only what that meta-analysis reported, state what it actually found for opioid consumption, sedation, and pain intensity, and comment on the certainty of the pain finding.

ANSWER KEY

1. The consensus guideline supports ketamine for acute pain both as a stand-alone treatment and as an adjunct to opioids, and it states that the contraindications are similar to those for chronic pain.

Ketamine is endorsed by that consensus document in both roles, stand-alone and opioid adjunct, and you screen for the same contraindications you would apply in the chronic pain setting.

Consensus Guidelines on the Use of Intravenous Ketamine Infusions for Acute Pain Management From the American Society of Regional Anesthesia and Pain Medicine, the American Academy of Pain Medicine, and the American Society of Anesthesiologists, Regional anesthesia and pain medicine 2018 · PMID 29870457

2. Intraoperative S-ketamine reduced 24-hour morphine consumption from 121 mg to 79 mg and reduced sedation, without an increase in hallucinations or nightmares.

In that opioid-dependent fusion population the trial showed a roughly 40 mg morphine reduction over 24 hours and less sedation, with no excess hallucinations or nightmares.

Intraoperative Ketamine Reduces Immediate Postoperative Opioid Consumption After Spinal Fusion Surgery in Chronic Pain Patients With Opioid Dependency: A Randomized, Blinded Trial, Pain 2017 · PMID 28067693

3. A single subanaesthetic dose of ketamine did not reduce delirium in older adults after major surgery, 19.5% versus 19.8%, and hallucinations and nightmares increased with rising dose.

PODCAST is the reason not to give ketamine for delirium prevention: no reduction in delirium at all, and more hallucinations and nightmares as the dose went up.

Intraoperative Ketamine for Prevention of Postoperative Delirium or Pain After Major Surgery in Older Adults: An International, Multicentre, Double-Blind, Randomised Clinical Trial, Lancet (London, England) 2017 · PMID 28576285

4. It found that ketamine reduced cumulative opioid consumption by roughly 97 mg at 24 hours and lowered sedation, but the effect on pain intensity itself was small and low-certainty, so the resident's conclusion overstates it: the robust signal is opioid sparing, not a demonstrated meaningful reduction in pain scores.

Opioid-sparing and less sedation are what this meta-analysis supports in opioid-tolerant patients; the effect on pain intensity itself was small and low-certainty, so do not promise the patient less pain on this evidence.

Perioperative Ketamine for Postoperative Pain Management in Patients With Preoperative Opioid Intake: A Systematic Review and Meta-Analysis, Journal of clinical anesthesia 2022 · PMID 35065394

The ASRA/AAPM/ASA consensus guideline supports ketamine for acute pain as a

SOURCES

[1] Consensus Guidelines on the Use of Intravenous Ketamine Infusions for Acute Pain Management From the American Society of Regional Anesthesia and Pain Medicine, the American Academy of Pain Medicine, and the American Society of Anesthesiologists, Regional anesthesia and pain medicine 2018 · PMID 29870457

[2] Perioperative Intravenous Ketamine for Acute Postoperative Pain in Adults, The Cochrane database of systematic reviews 2018 · PMID 30570761

[3] Intraoperative Ketamine for Prevention of Postoperative Delirium or Pain After Major Surgery in Older Adults: An International, Multicentre, Double-Blind, Randomised Clinical Trial, Lancet (London, England) 2017 · PMID 28576285

[4] Dose-Dependent Relationship Between Intra-Operative Ketamine Administration and Postoperative Delirium: A Retrospective Cohort Study, Anaesthesia 2025 · PMID 40619168

[5] Perioperative Ketamine for Postoperative Pain Management in Patients With Preoperative Opioid Intake: A Systematic Review and Meta-Analysis, Journal of clinical anesthesia 2022 · PMID 35065394

[6] Intraoperative Ketamine Reduces Immediate Postoperative Opioid Consumption After Spinal Fusion Surgery in Chronic Pain Patients With Opioid Dependency: A Randomized, Blinded Trial, Pain 2017 · PMID 28067693