

LAPAROSCOPIC CHOLECYSTECTOMY

SUMMARY RECOMMENDATIONS

Notes on PROSPECT recommendations

PROSPECT provides clinicians with supporting arguments for and against the use of various interventions in postoperative pain based on published evidence and expert opinion. Clinicians must make judgements based upon the clinical circumstances and local regulations. At all times, local prescribing information for the drugs referred to must be consulted.

Pain after laparoscopic cholecystectomy and aims of the PROSPECT review

Laparoscopic cholecystectomy is the gold standard for gallbladder removal due to its minimally invasive nature and improved patient outcomes ([Rosero and Joshi 2017](#)). However, significant postoperative pain may affect patient comfort and recovery.

The aim of this systematic review ([Bourgeois 2024](#)) was to develop updated PROSPECT recommendations for postoperative pain management after laparoscopic cholecystectomy, based on evidence published since the previous PROSPECT recommendations ([Kehlet 2005](#); [Barazanchi 2018](#)). These recommendations aim to optimise pain relief, reduce the incidence of adverse events and enhance patient recovery and satisfaction.

The unique PROSPECT methodology is described at <https://esraeurope.org/prospect-methodology/>. This systematic review was conducted according to the published methodology ([Joshi 2019](#)). The process of formulating the recommendations involved critical assessment of the available literature and careful balancing of the benefits and adverse effects of each intervention in the clinical context. PROSPECT methodology has been updated now for future reviews ([Joshi 2023](#)).

This systematic review included randomised controlled trials (RCTs) and systematic reviews published in the English language from August 2017 to December 2022, and assessing the effect of analgesic, anaesthetic or surgical interventions on postoperative pain after laparoscopic cholecystectomy.

This review is registered on PROSPERO: CRD42023387991.

Summary of recommendations and key evidence

Summary of recommendations and key evidence for pain management in patients undergoing laparoscopic cholecystectomy

Systemic analgesia

Paracetamol and NSAIDs or COX-2-selective inhibitors are recommended as part of basic multimodal analgesia, and should be administered before or during the surgical procedure and continued up to 72 h postoperatively, if there are no contraindications

- Basic analgesia is recommended according to the PROSPECT approach ([Joshi 2019](#))
- Additional procedure-specific evidence from a meta-analysis also supported this approach ([Huang 2017](#))

IV dexamethasone is recommended

- Previous studies support its use ([Barazanchi 2018](#); [Fukami 2009](#); [Sistla 2009](#); [Sánchez-Rodríguez 2010](#); [Lim 2011](#); [Murphy 2011](#); [Ryu 2013](#); [Lee 2017](#)) although no new positive trials were identified in the update ([Gul 2020](#); [Nazemroaya 2022](#))
- IV dexamethasone is part of the standard prophylaxis of PONV in laparoscopic cholecystectomy ([Fukami 2009](#); [Sistla 2009](#); [Sánchez-Rodríguez 2010](#); [Murphy 2011](#); [Lee 2017](#))

Gabapentinoids are recommended when basic analgesia is not possible

- Gabapentinoids might be used if basic analgesia is not an option, such as in patients with hypersensitivity or contraindications to NSAIDs, but their use requires caution due to sedation or dizziness
- Despite positive analgesic effects, routine administration of gabapentinoids is not recommended due to the risk of side effects, especially over-sedation, dizziness and visual disturbance, which can affect postoperative recovery as laparoscopic cholecystectomy is primarily performed on day care basis ([Verret 2020](#); [Deljou 2018](#))

Opioids should only be used as rescue analgesics if other interventions are insufficient due to their potential side effects and the impact on patient comfort and recovery

- Opioids are potent analgesics that can provide immediate and effective pain relief
- However, they have a range of side effects, including nausea and vomiting, constipation and ileus, dizziness and respiratory depression. These side effects can ultimately delay recovery and even adversely affect patient comfort

Regional techniques

Port-site wound infiltration or intraperitoneal LA installation are recommended^a

- Port site LA wound infiltration is recommended with long-acting LA, ideally administered before incision, although no studies were found comparing LA infiltration before or after incision. The concentration of LA solution seems to be of less importance ([Kaushal-Deep 2018](#); [Thakur 2019](#); [Liang 2020](#))
- Intraperitoneal LA instillation may offer an additional benefit above basic analgesia and LA infiltration ([Das 2017](#); [Yong 2017](#); [Beder El Baz 2018](#); [Bhatia 2018](#); [Rahimzadeh 2018](#); [Stannard 2018](#); [Topno 2018](#); [Putta 2019](#); [Thakur 2019](#); [Manan 2020](#); [Arabzadeh 2021](#); [Sandhya 2021](#); [Vijayaraghavalu 2021](#); [Nikoubakht 2022](#)). No conclusions could be made regarding the optimal method and timing for intraperitoneal LA instillation. However, based on one study showing significant analgesic benefit, low concentration, high-volume LA is recommended ([Bindra 2017](#))
- Two studies compared intraperitoneal LA with port site infiltration, finding no relevant difference in postoperative pain ([Kaushal-Deep 2018](#); [Kiany 2022](#))
- Combining both techniques is NOT recommended despite a potential additive analgesic effect, as this might result in high doses of LA being administered with the risk of systemic absorption and LA toxicity

ESP block and TAP block are recommended as second-line^b regional techniques

- RCTs and meta-analyses showed positive analgesic effects of ESP block ([Tulgar 2018](#); [Aksu 2019](#); [Koo 2020](#); [Verma 2020](#); [Canitez 2021](#); [Daghmouri 2021](#); [Sethi 2021](#); [Vrsajkov 2021](#); [Yildiz 2021](#); [Sifaki 2022](#)) and TAP block ([Koo 2020](#); [Ribeiro 2019](#); [Arik 2020](#); [Wang 2021](#); [Emile 2022](#); [Lee 2022](#); [Ozciftci 2022](#); [Suseela 2018](#); [Goel 2021](#); [Vindal 2021](#); [Grape 2021](#))
- Given the increased risk of systemic toxicity with TAP and ESP, these blocks are recommended as second line options. With TAP and ESP blocks a significant level of expertise is required whilst simpler and equally effective techniques such as wound infiltration are possible. In addition, large variations in methods of administration and performance of the ESP blocks were noted

The choice of regional technique depends on many important clinical factors: experience of the anaesthetist, patient factors and expected level of postoperative pain, and the type of hospitalisation (outpatient vs. in patient care)

Surgical techniques

Various techniques are advised to minimise postoperative pain. These include:

- low-pressure pneumoperitoneum (<12mmHg) ([Goel 2019](#); [Raval 2020](#); [Morey 2021](#); [Kim 2022](#); [Ortenzi 2022](#))

- three-port technique ([Hajibandeh 2021](#); [Shah 2021](#); [Nip 2022](#))
- removal of the gallbladder through the umbilical port ([Li 2018](#); [Hajong 2019](#); [Mongelli 2020](#); [Jain 2021](#); [Kulkarni 2022](#))

However, the preferred technique should be left to the surgeon's experience

At the end of surgery, it is beneficial to perform local saline irrigation ([Barazanchi 2018](#); [Chung 2017](#)) and to ensure sufficient aspiration of the remaining pneumoperitoneum ([Kim 2022](#); [Abuelzein 2023](#))

- a. When regional techniques are combined, care should be taken not to exceed the threshold dose for systemic toxicity of local anaesthetics
- b. In specific situations (for example, redo surgery, chronic opioid users or patients with chronic pain, high pain responders) these techniques can be useful and provide effective analgesia.

COX, cyclooxygenase; ESP, erector spinae plane; IV, intravenous; LA, local anaesthetic; NSAIDs, nonsteroidal anti-inflammatory drugs; PONV, postoperative nausea and vomiting; TAP, transversus abdominis plane.

Interventions that are NOT recommended

Analgesic interventions that are not recommended for pain management in patients undergoing laparoscopic cholecystectomy.

Intervention	Reasons for not recommending
Drugs	
IV lidocaine	Risk of side effects
OFA	Conflicting evidence and risk of side effects
Gabapentinoids	Risk of side effects
IV ketamine infusion	Risk of side effects
Duloxetine	Insufficient evidence
Nefopam	Lack of evidence
Clonidine	Inconsistent evidence
High-dose NMDA	Insufficient evidence
Lidocaine patch/nicotine patch	Lack of evidence
Esmolol	Lack of evidence
IV dexmedetomidine	Risk of side effects
Other	
Pulmonary recruitment manoeuvres	Lack of evidence
Extended intra-operative hyperventilation	Lack of evidence
Meditation/audio-visual education/ acupressure/foot massage/aroma oil/oral carbohydrate solution/deep anaesthesia	Insufficient evidence
Regional techniques	
Administration of intraperitoneal LA installation before surgery	Insufficient evidence
Intraperitoneal addition of dexmedetomidine or tramadol to the LA mixture	Insufficient evidence
Low concentration LA mixtures for intraperitoneal use	Insufficient evidence
Intraperitoneal fentanyl or ondansetron	Lack of evidence
Quadratus lumborum block	Conflicting evidence
Rectus sheath block	Insufficient evidence
Paravertebral block	Risk of side effects
Spinal or epidural anaesthesia	Risk of side effects
Surgical techniques	
Infra-umbilical incision	Lack of evidence
Single-port techniques and mini-port techniques	Lack of evidence
Routine drainage	Conflicting evidence
Low flow insufflation/NOTES	Insufficient evidence

IV, intravenous; LA, local anaesthetic; NMDA, N-methyl-D-aspartate; NOTES, natural orifice transluminal endoscopic surgery; OFA, opioid-free anaesthesia.

Overall PROSPECT recommendations table

Overall recommendations for procedure-specific pain management in patients undergoing laparoscopic cholecystectomy	
Pre-operative drugs	<ul style="list-style-type: none"> Pre-operative IV paracetamol and NSAIDs/COX-2-selective inhibitors are recommended
Intra-operative drugs	<ul style="list-style-type: none"> If not administered pre-operatively, IV paracetamol and NSAIDs/COX-2-selective inhibitors are recommended IV dexamethasone is recommended
Regional techniques	<ul style="list-style-type: none"> Port-site wound infiltration or intraperitoneal LA installation are recommended^a ESP block and TAP block are recommended as second-line^b regional techniques
Surgical techniques	<ul style="list-style-type: none"> 3-port laparoscopic cholecystectomy is recommended Low pressure peritoneum (<12 mmHg) is recommended Umbilical port extraction is recommended Active aspiration of the pneumoperitoneum is recommended Normal saline irrigation is recommended
Postoperative drugs	<ul style="list-style-type: none"> Paracetamol and NSAIDs/COX-2-selective inhibitors are recommended up to 72 h postoperatively Opioids as rescue are recommended Gabapentinoids are recommended when basic analgesia is not possible

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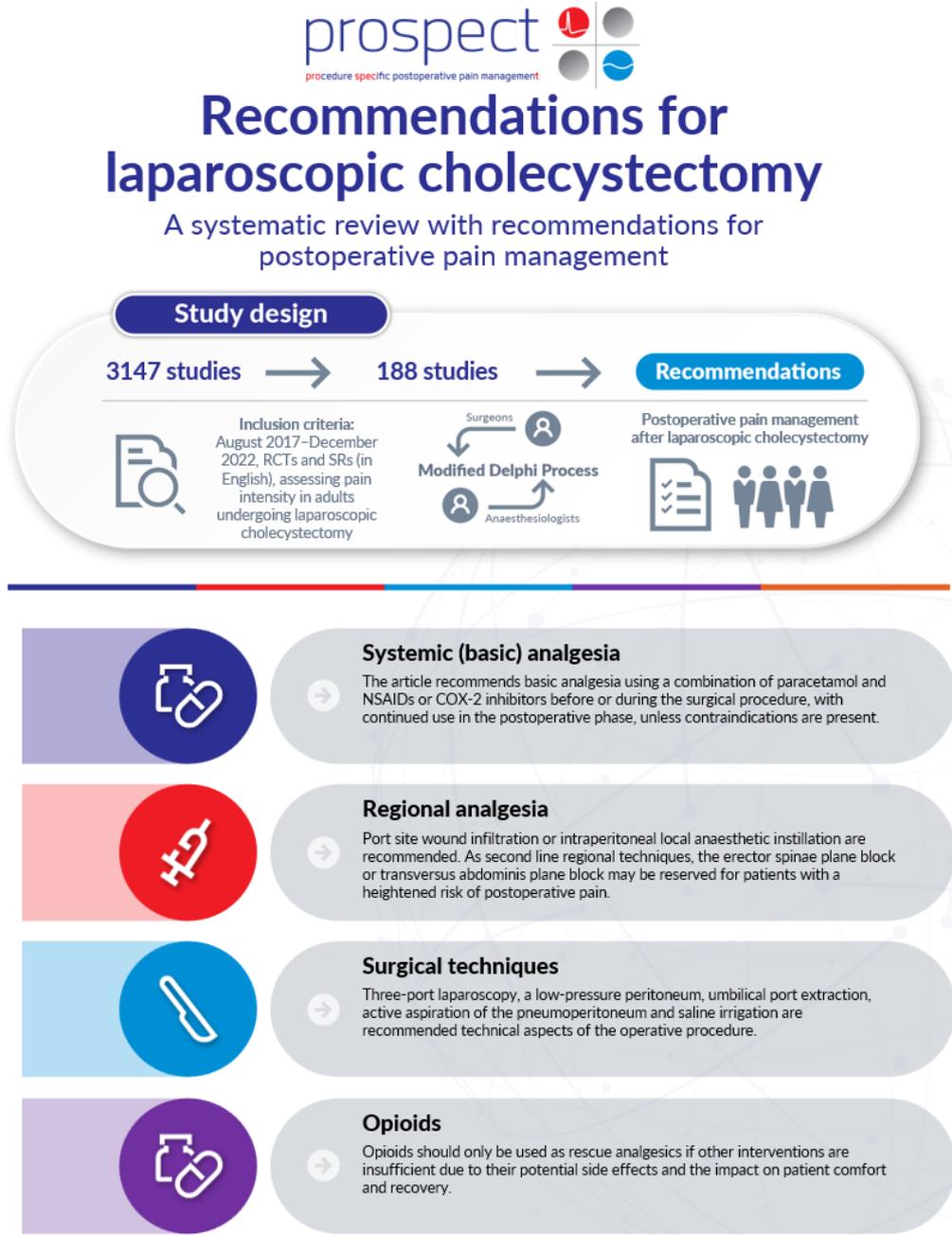
PROSPECT publication

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Pain management after laparoscopic cholecystectomy: A systematic review and procedure-specific postoperative pain management (PROSPECT) recommendations.

[Eur J Anaesthesiol August 12, 2024 | DOI: 10.1097/EJA.0000000000002047](#)

[PROSPECT recommendations for laparoscopic cholecystectomy – infographic](#)



Camille Bourgeois, et al. Pain management after laparoscopic cholecystectomy: A systematic review and procedure-specific postoperative pain management (PROSPECT) recommendations. Eur J Anaesthesiol 2024 | DOI: 10.1097/EJA.0000000000002047.
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