

## THORACOTOMY

### 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. GoRs of recommendation (GoR) are assigned according to the overall level of evidence (LoE) on which the recommendations are based, which is determined by the quality and source of evidence.

#### GoRs of recommendation (GoR) based on source and level of evidence (LoE): Summary table

An explanation of how study quality assessments are performed to determine the LoE and GoR can be found at the following link: <https://esraeurope.org/prospect-methodology/>

The AGREE II instrument ([Brouwers 2010](#)) is used internationally to assess the methodological rigour and transparency of practice guidelines. As far as possible, the methodology of the PROSPECT Thoracotomy review meets the requirements of 'Domain 3: Rigour of development' of the AGREE II instrument:

- Systematic methods were used to search for evidence.
- The criteria for selecting the evidence are clearly described.
- The strengths and limitations of the body of evidence are clearly described.
- The methods for formulating the recommendations are clearly described.
- The health benefits, side effects, and risks have been considered in formulating the recommendations.
- There is an explicit link between the recommendations and the supporting evidence.
- The guideline has been externally reviewed by experts prior to its publication. (The evidence and recommendations will be submitted for peer-review after publication on the PROSPECT website)
- A procedure for updating the guideline is provided. (Methodology is provided so that the systematic review can be updated as required)

## PRE-OPERATIVE SUMMARY RECOMMENDATIONS

### Pre-operative interventions that are recommended

Note: Unless otherwise stated, 'pre-operative' refers to interventions applied before surgical incision

Note: Analgesics should be administered at the appropriate time (pre- or intra-op) to provide sufficient analgesia in the early recovery period

<b>Strong opioid</b>	<ul style="list-style-type: none"> <li>If no regional anaesthetic technique is possible, systemic opioid and non-opioid analgesia is recommended as rescue analgesia</li> </ul>
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### Anaesthetic techniques and co-administered analgesics

<b>Regional anaesthesia</b>	<ul style="list-style-type: none"> <li>Paravertebral block with LA (bolus pre-operatively or at the end of surgery, followed by continuous infusion), as the first choice compared to thoracic epidural analgesia due to lower complications rate (GoR A)</li> <li>Thoracic epidural LA + strong opioid as a bolus before surgery (GoR A), continued as an infusion is also recommended, if PVB not used</li> </ul>
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### Pre-operative NOT recommended

#### Systemic analgesia – NOT recommended

Alpha-2-adrenergic receptor agonists	<ul style="list-style-type: none"> <li>Clonidine (GoR A)</li> <li>Dexmedetomidine (GoR D)</li> </ul>
Corticosteroid	GoR D
Conventional NSAIDs	GoR A
COX-2-selective inhibitors	GoR D
Ketamine	GoR D
Gabapentin/pregabalin	GoR D
Strong opioids	Despite GoR A evidence of effectiveness, spinal strong opioid single bolus is not recommended because of clinical safety concerns (respiratory depression)
Magnesium	<ul style="list-style-type: none"> <li>Spinal magnesium</li> <li>Epidural magnesium</li> </ul>

## Regional anaesthesia – NOT recommended

Lumbar epidural strong opioid	Lumbar epidural strong opioid is not recommended as the first choice of epidural technique based on evidence that the thoracic epidural route may provide superior analgesia to the lumbar epidural route (GoR A) (one additional study). However, there is procedure-specific evidence that lumbar epidural hydrophilic strong opioid reduces pain compared with systemic analgesia
Intercostal nerve block with LA	Intercostal nerve block with LA, as a single pre-operative injection (GoR D)
Intercostal clonidine	GoR D
Pre-operative LA injection	Pre-operative LA injection in the planned site of incision (GoR A)

## INTRA-OPERATIVE SUMMARY RECOMMENDATIONS

### Intra-operative interventions that are recommended

Note: Unless otherwise stated, 'intra-operative' refers to interventions applied after incision and before wound closure

Note: Analgesics should be administered at the appropriate time (pre- or intra-op) to provide sufficient analgesia in the early recovery period

### Anaesthetic techniques and co-administered analgesics

<b>Regional analgesia</b>	<ul style="list-style-type: none"> <li>PVB block with LA is recommended as the first choice for thoracic surgery due to a lower incidence of complications, compared to thoracic epidural (GoR A)</li> <li>Thoracic epidural infusion of LA + strong opioid, continuous infusion (GoR A)</li> </ul>
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### Intra-operative NOT recommended

#### Systemic analgesia – NOT recommended

Conventional NSAIDs	Conventional NSAIDs (GoR D) recommended if no contraindication
COX-2-selective inhibitors	COX-2-selective inhibitors (GoR D) recommended if no contraindication (both together)
Ketamine	GoR D
Gabapentin/pregabalin	GoR D

### Regional analgesia – NOT recommended

Lumbar epidural strong opioid	Lumbar epidural strong opioid is not recommended as the first choice of epidural technique based on evidence that the thoracic epidural route may provide superior analgesia to the lumbar epidural route (GoR A). However, there is procedure-specific evidence that lumbar epidural hydrophilic strong opioid reduces pain compared with systemic analgesia
Dextran	Addition of dextran to intercostal LA solution (GoR A)
Intercostal phenol	GoR D
Interpleural strong opioid	GoR D
Cryoanalgesia	Despite positive studies (GoR A), cryoanalgesia conveys a risk of nerve injury

### Analgesia for shoulder pain – NOT recommended

Phrenic nerve block	GoR D
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### Operative techniques – NOT recommended

The operative technique used should depend on factors other than pain (GoR D) (New evidence is available that video assisted surgery is less painful)
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## POSTOPERATIVE SUMMARY RECOMMENDATIONS

### Post-operative interventions that are recommended

Note: Unless otherwise stated, 'postoperative' refers to interventions applied at or after wound closure

Note: Analgesics should be administered at the appropriate time (pre- or intra-op) to provide sufficient analgesia in the early recovery period

### Anaesthetic techniques and co-administered analgesics

<b>Systemic analgesia</b>	<ul style="list-style-type: none"> <li>• Conventional NSAIDs, in combination with regional analgesia (GoR A)</li> <li>• COX-2-selective inhibitors, in combination with regional analgesia (GoR B)</li> <li>• Paracetamol, as part of a multi analgesic regimen (GoR D)</li> <li>• Intravenous PCA strong opioid, if regional analgesic techniques fail or are not possible (GoR D)</li> <li>• Weak opioids for moderate- (VAS&gt;30&lt;50 mm) or low- (VAS≤30 mm) intensity pain in the late postoperative period, only if conventional NSAIDs/COX-2-selective inhibitors plus paracetamol are insufficient or contra-indicated (GoR D)</li> </ul>
<b>Regional analgesia</b>	<ul style="list-style-type: none"> <li>• Paravertebral block with LA, continuous infusion (GoR A) as the first choice due to lower complications rate</li> <li>• Thoracic epidural LA + strong opioid, continuous infusion for 2-3 days (GoR A)</li> </ul>

### Postoperative NOT recommended

#### Systemic analgesia – NOT recommended

Alpha-2-adrenergic receptor antagonists	Clonidine/ dexmedetomidine (GoR D)
Ketamine	GoR D
Gabapentin/pregabalin	GoR D
Paracetamol	Paracetamol alone for high intensity pain (VAS≥50 mm) (GoR B)

### Regional analgesia – NOT recommended

Lumbar epidural strong opioid	Lumbar epidural strong opioid is not recommended as the first choice of epidural technique based on evidence that the thoracic epidural route may provide superior analgesia to the lumbar epidural route (GoR A). However, there is procedure-specific evidence that lumbar epidural hydrophilic strong opioid reduces pain compared with systemic analgesia
Thoracic epidural corticosteroid	GoR D
Interpleural LA	GoR A

### Alternative analgesic techniques – NOT recommended

Auricular acupuncture	GoR D
TENS	GoR D

### Analgesia for shoulder pain – NOT recommended

Suprascapular nerve block	GoR D
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### Analgesia for chest tube removal – NOT recommended

Ice pack	GoR A
Interpleural local anaesthetic	GoR A
Topical local anaesthetic	GoR D

## OVERALL PROSPECT RECOMMENDATIONS

Algorithm for the management of postoperative pain for Thoracotomy

