Procedure-specific practice for managing pain following primary total hip arthroplasty: recommendations on peripheral and neuraxial analgesia from the PROSPECT working group

prospect

procedure specific postoperative pain management

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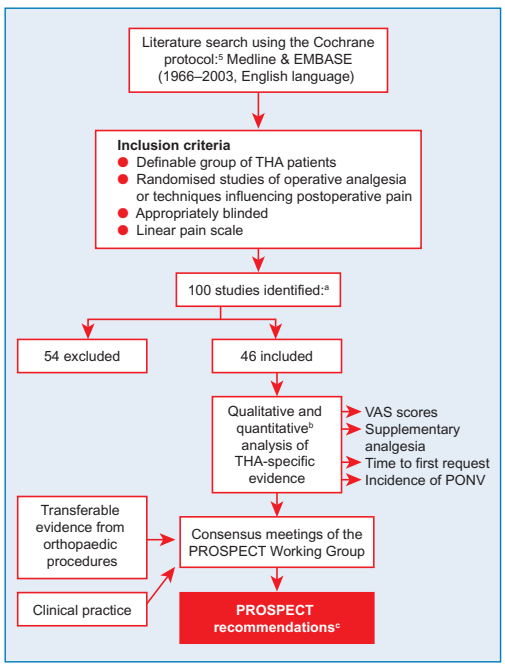
Background

- Clinical practice demonstrates that the management of postoperative pain frequently differs between centres, and therefore local policies may not always reflect best evidence-based practice.
- Four systematic reviews have looked at the effects of different interventions on postoperative pain, in mixed populations of patients undergoing total hip or total knee arthroplasty. These reviews examined lumbar epidural analgesia or spinal analgesia with systemic analgesia for postoperative pain,[1] the effectiveness of closed suction drains,[2] arthroplasties with or without cement,[3] and pre-operative education.[4] A systematic review of all total hip arthroplasty studies assessing the effect of interventions on postoperative pain using qualitative and quantitative analyses has not previously been performed.
- The PROSPECT (Procedure Specific Postoperative Pain Management) Working Group is an international board of anaesthesiologists and surgeons, convened to produce evidence-based, procedure-specific clinical recommendations for the management of postoperative pain in commonly performed surgical procedures.
- Procedure-specific recommendations are valuable, as pain characteristics, and the risk/benefit profiles of analgesics may vary significantly between different surgical procedures.

Study objective

- To provide the first procedure-specific systematic review of all primary total hip arthroplasty (THA) studies assessing the effect of analgesic interventions on postoperative pain using qualitative and quantitative analyses, and to provide procedure-specific recommendations.
- This poster reports the outcomes of the review for peripheral and neuraxial analgesia and presents overall recommendations for managing pain following THA.

Summary of review process



THA: total hip arthroplasty; VAS: visual analogue score; PONV: postoperative nausea and vomiting

[a]Reference lists are available on request; [b]The fixed effects model was used to analyse data unless heterogeneity was significant ($p \leq 0.1$), in which case a random effects model was used; [c]THA-specific, transferable and clinical practice evidence are reviewed by the PROSPECT Working Group at consensus meetings. Recommendations are graded A–D based on the level of evidence from the studies in accordance with guidelines from the Oxford Centre for Evidence-Based Medicine[6]

Peripheral and neuraxial analgesia outcomes: THA-specific evidence, transferable evidence and clinical practice

Epidural analgesia (Single agent, bolus or continuous infusion)

- Epidural analgesia was superior to placebo and systemic analgesia for reducing postoperative pain, (transferable evidence from clinical trials and meta-analyses) reducing the frequency of deep vein thrombosis and pulmonary embolism and reducing intra-operative and postoperative blood loss compared with general anaesthesia (THA-specific evidence).
- A combination of an epidural local anaesthetic (LA) plus opioid was superior to either drug alone for reducing postoperative pain scores (transferable evidence).
- Neuraxial and parenteral opioids were associated with a greater risk of side-effects compared with continuous plexus and peripheral neural blockades after major orthopaedic surgery (transferable evidence).
- In clinical practice, epidural analgesia is associated with a risk of urinary retention and neurological impairment. Therefore, patients should be assessed for this method of pain relief on an individual basis.

Spinal analgesia

- Combining strong opioid with LA was superior to LA alone for decreasing postoperative VAS scores, supplementary analgesia use, and the incidence of vomiting and increasing time to first analgesia request (THA-specific evidence):
  - meta-analysis demonstrated a highly significant advantage of combination treatment compared with LA alone for VAS scores for the 0–8 hour grouping (weighted mean difference [WMD] -23.20 [-29.81, -16.58], p<0.00001), the 8–16 hour grouping (WMD -9.91 [-13.90, -5.92], p<0.00001) but not for the 16–32 hour grouping (WMD -1.37 [-0.65, 3.40], p=0.18) and supplementary morphine consumption (WMD -22.57 mg [-27.83, -17.30], p<0.00001).
- Adding clonidine or morphine to LA was superior to LA alone for VAS scores, time to first request of analgesia and use of supplementary analgesia (THA-specific evidence).
- Spinal analgesia was superior to epidural analgesia for reducing postoperative pain scores and patient-controlled analgesia was superior to bolus doses on demand for reducing postoperative pain scores (THA-specific evidence).

Femoral/lumbar plexus block

- Posterior lumbar plexus block was superior to placebo for reducing postoperative pain scores and supplementary analgesia use (THA-specific evidence).
- Femoral block significantly reduced the time to first analgesia request (THA-specific evidence).
- 'Single shot' or continuous peripheral nerve block was significantly more effective than placebo for reducing the requirement for supplementary analgesia (transferable evidence).

PROSPECT recommendations

Pre-operative

- Pre-operative administration of peripheral and neuraxial analgesia is not recommended. In general, this type of analgesia, as an addition to that required for anaesthetic purposes, is not recommended for managing postoperative pain (grade D).

Intra-operative

- The choice of anaesthetic technique is based on the co-morbid state of the patient (grade D).
- Analgesia, other than that required for adequate anaesthesia, is recommended only if the analgesic agent requires time to take effect before the patient wakes (grade D).

Postoperative

The following recommendations are based on the choice of anaesthetic regimen employed. This, in turn, should be determined on a patient-specific basis according to comorbidity.

In patients undergoing general anaesthesia:

- Peripheral neural block techniques, such as the lumbar plexus block (grade A) and femoral nerve block (grade B) are recommended for the management of high-intensity postoperative pain following total hip arthroplasty because of their efficacy in reducing pain scores and supplementary analgesia requirements.
- Although the use of systemic analgesia alone has been shown to be effective, continuation of some form of regional analgesia following general anaesthesia is recommended over systemic opioids. This is because of the reduced risk of opioid-related adverse events (grade B) and the flexibility of duration of analgesia with regional approaches (grade D).
- In addition, based on the relative adverse event profiles of different regional techniques, PROSPECT recommends lumbar plexus blockade over epidural or spinal anaesthesia where the patient profile allows administration of a general anaesthetic (grade D).
- Continuous infusion, patient-controlled or 'on-demand' analgesia are recommended over a 'single shot' approach as they provide a greater duration of analgesia (grade D).
- All regional anaesthesia techniques have a recognised failure rate which must be considered when planning pain relief for hip surgery (grade B).

In patients undergoing neuraxial anaesthesia:

Continuation of spinal analgesia

- Bolus spinal morphine (0.1–0.2 mg) is recommended as it provides pain relief for up to 24 h (grade A), although comparative studies with placebo have not been conducted.
- The use of spinal morphine must be considered on an individual basis as it is associated with urinary retention and a higher incidence of side-effects than peripheral neural blocks (grade B).
- Clonidine and short-acting opioids are not recommended because of their shorter duration of effect compared with morphine at appropriate doses (grade D).
- Continuous spinal administration of morphine following total hip arthroplasty is not recommended due to safety concerns (grade D).

Continuation of epidural analgesia

- Postoperative epidural local anaesthetics and epidural morphine are recommended for effective reduction of postoperative pain scores (grade B), particularly in patients who are at an increased risk of deep vein thrombosis (grade A).
- Epidural local anaesthetics provide a less favourable risk/benefit profile compared with peripheral neural block. Therefore, postoperative epidurals are only recommended when the patient comorbidities and risk profile allow (grade B).
- Despite the analgesic benefits of epidural clonidine, it is not recommended following total hip arthroplasty because of the incidences of hypotension, sedation and bradycardia (grade D).

Systemic analgesia for high-intensity and then low-intensity pain is required as any of these blocks regress.

Overall PROSPECT recommendations

- The overall recommendations in Table 1 are categorised according to the different anaesthetic techniques used for total hip arthroplasty.
- The choice of anaesthetic technique should be primarily based on the anaesthetic risk profile of the patient rather than the management of their postoperative pain.
- However, based on postoperative pain outcomes, the continuation of some form of regional analgesia following general anaesthesia is recommended over the use of general anaesthesia alone.
- In addition, based on the relative adverse events profiles of different regional techniques, PROSPECT recommends lumbar plexus blockade over epidural or spinal anaesthesia.

References

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Table 1. Overall PROSPECT recommendations categorised according to the different anaesthetic techniques used for total hip arthroplasty

Therapy type / Timing		General anaesthesia (GA)		Central neuraxial anaesthesia	
		GA alone	**GA + peripheral neural block**	**Spinal**	**Epidural ± spinal**
Pre-operative		NR	Lumbar plexus block (LA)	NR	NR
Intra-operative		Strong long-acting opioids, if required.	Continue lumbar plexus block (LA) with GA.	Spinal LA (single shot) + morphine.	Epidural LA, ± spinal LA, ± opioid. Do not use clonidine.
		● Cemented prostheses are recommended over non-cemented prostheses for better long-term pain outcome. ● Surgical drains and wound infiltration are not recommended.			
Postop	High-intensity pain*	NSAIDs or COX-2 selective inhibitors (fixed interval), especially for dynamic pain, plus IV strong opioids by PCA or regular injection. Paracetamol if intolerant to NSAIDs or COX-2 selective inhibitors.	Continue lumbar plexus block by continuous infusion at low concentration (± PCRA) + NSAIDS or COX-2 selective inhibitors (fixed interval) ± rescue strong opioids IV.	Establish high-intensity pain management as the nerve block regresses, using NSAIDS or COX-2 selective inhibitors (fixed interval) ± rescue strong opioids IV.	Establish epidural infusion as the nerve block regresses, ± PCEA, + NSAIDs or COX-2 selective inhibitors (fixed interval) ± rescue strong opioids IV.
Postop	Medium- to low-intensity pain**	NSAIDs or COX-2 selective inhibitors with paracetamol, ± weak opioid. Add strong opioid for high-intensity mobilisation pain.	NSAIDs or COX-2 selective inhibitors with paracetamol, ± weak opioid. Add strong opioid for high-intensity mobilisation pain and at catheter withdrawal.	NSAIDs or COX-2 selective inhibitors with paracetamol, ± weak opioid. Add strong opioid for high-intensity mobilisation pain.	NSAIDs or COX-2 selective inhibitors with paracetamol and with or without weak opioid. Add strong opioid for high-intensity mobilisation pain and at catheter withdrawal.

*High intensity pain, VAS ≥50, on a scale of 1–100 **Medium to low intensity pain, VAS ≤50, on a scale of 1–100
IV: intravenous; LA: local anaesthetic; NR: not recommended; PCA: patient-controlled analgesia; PCEA: patient-controlled epidural analgesia; PCRA: patient-controlled regional analgesia

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