MAJOR ONCOLOGICAL BREAST SURGERY

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 judgments based upon the clinical circumstances and local regulations. At all times, local prescribing information for the drugs referred to must be consulted.

Pain after major oncological breast surgery

Major oncological breast surgery often causes significant postoperative pain on the first postoperative day (Gerbershagen 2013). Inadequate pain control may increase opioid use, delay recovery, and prolong hospitalisation (Joshi 2005). It may also contribute to chronic postsurgical pain, which affects nearly half of patients after major oncological breast surgery and may be moderate to severe (Wang 2020; Poleshuck 2006).

Aims and methods of the PROSPECT review

The PROSPECT Working Group's recommendations for postoperative pain management after oncological breast surgery were first published in 2020 (Jacobs 2020). This current systematic review (Desai 2026) updates those recommendations using the latest evidence for major oncological breast surgery to support high-quality pain management. These latest recommendations do not apply to minor procedures.

The PROSPECT group performed the systematic review and formulated the recommendations using the unique PROSPECT methodology, available at https://esraeurope.org/prospect-methodology/. This methodology was first published in Joshi 2019 and updated in Joshi 2023.

Literature databases (CENTRAL; Embase; MEDLINE; Scopus; and the Web of Science) were searched from 1 September 2019 to 31 November 2024 to identify randomised controlled trials (RCT), systematic reviews or meta-analyses (in English) of adult patients undergoing major oncological breast surgery. Included studies investigated perioperative analgesic, anaesthetic, or surgical interventions and reported pain scores in the first 72 h (primary outcome).

The following procedures were defined as major oncological breast surgery: conservative mastectomy; nipple-sparing mastectomy; skin-sparing mastectomy; total mastectomy; modified radical mastectomy and radical mastectomy with or without axillary node clearance; and immediate flap or implant breast reconstruction.

Minor oncological breast surgery procedures were not included: lumpectomy; wide local excision; segmentectomy; and quadrantectomy.

From the literature search, 176 RCTs and 8 systematic reviews met the inclusion criteria. Evidence was evaluated according to PROSPECT methodology, and interpreted in the context of standard multimodal analgesia (paracetamol with NSAIDs or COX-2 inhibitors). PROSPECT recommendations were based on the balance between clinical effectiveness, invasiveness and adverse effects of analgesic interventions.

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Summary of recommendations and key evidence

Summary of recommendations and key evidence for pain management in patients undergoing major oncological breast surgery
Systemic analgesia
Unless contraindicated, paracetamol and NSAIDs or COX-2-specific inhibitors should be administered in the pre- or intra-operative and postoperative period. • In accordance with PROSPECT methodology (Joshi 2023), RCTs representing basic analgesics (paracetamol, NSAIDs, COX-2 specific inhibitors) were not included in this updated review. These components are considered essential to all multimodal analgesic regimens.
IV dexamethasone should be administered in the pre- or intra-operative period. • Dexamethasone is recommended based on a favourable analgesic effect, with a decrease in pain scores at rest and on movement at 24 h, increase in the time to first analgesia, and a reduction in the opioid consumption at 24 h (Mitchell 2022; Waldron 2013; De Oliveira 2011). • Dexamethasone also decreases the incidence of postoperative nausea and vomiting (Gan 2025). • In the presence of peripheral nerve block, dexamethasone can increase the duration of sensory and analgesic blockade (Sehmbi 2021) and reduce the incidence of rebound pain on its resolution (Singh 2024). • The evidence does not indicate that dexamethasone delays wound healing or increases the risk of surgical site infection. • The literature does suggest that dexamethasone increases the blood glucose concentration in the first 24 h to a level which is not clinically relevant in most patients. Importantly, patients who have diabetes mellitus may not have an exaggerated response to dexamethasone relative to those who do not have diabetes mellitus.

Regional analgesia

A single-shot regional analgesic technique is recommended. Erector spinae plane block, interpectoral plane and pectoserratus plane block, superficial serratus anterior plane block, deep serratus anterior plane block, thoracic paravertebral block, and local infiltration analgesia are advocated and considered equivalent to each other.

- No single-shot regional analgesic technique was found to be superior to any other. They were therefore evaluated to be equivalent.
- Many of these regional analgesic modalities, such as interpectoral plane and pectoserratus plane block, can be performed by the anaesthetist or surgeon (Jindal 2023; Pondeenana 2023).
- Evidence indicates that some regional analgesic techniques are superior to local infiltration analgesia regarding analgesic efficacy, including erector spinae plane block (Puthenveettil 2022) and thoracic paravertebral block (Bansal 2012; Syal 2017).
- Local infiltration analgesia still leads to effective analgesia compared with control and, relative to other regional analgesic techniques, does not necessitate an additional invasive procedure and is technically simpler as well as more time efficient. Further, patients do not need to be repositioned and specialist equipment such as ultrasound is not required.
- Given this, the expert opinion of the PROSPECT Working Group is that single-shot local infiltration analgesia is overall equivalent to single-shot erector spinae plane block, interpectoral plane and pectoserratus plane block, superficial serratus anterior plane block, deep serratus anterior plane block and thoracic paravertebral block.

Single-shot local infiltration analgesia may be added to the single-shot regional analgesic technique.

- However, no trials have investigated the supplementation of single-shot regional analgesic techniques with single-shot local infiltration analgesia in major oncological breast surgery. It is the expert opinion of the PROSPECT Working Group that this practice may lead to an improvement in analgesic indices, if infiltrated in anatomical areas not anaesthetised by the regional analgesic technique, and is unlikely to result in harm.
- The cumulative dose of local anaesthetic given across both the single-shot regional analgesic technique and local infiltration analgesia should remain within the recommended total maximum dose to minimise the risk of local anaesthetic systemic toxicity.

Physiotherapy

Physiotherapy is recommended in the pre- and postoperative period.

• Evidence for physiotherapy was limited to one trial at high risk of bias (Beurskens 2007), which found shoulder physiotherapy in the pre-operative period to be superior to control in the first 24 h. Physiotherapy improved shoulder mobility and decreased arm and shoulder pain. • The expert opinion of the PROSPECT Working Group is that physiotherapy in the pre- and postoperative period, as part of a best practice statement, represents a low-risk intervention which may lead to benefit and is unlikely to result in harm. • In a meta-analysis and systematic review, exercise-based interventions, some of which were physiotherapeutic, were shown to improve muscle strength, increase the range of shoulder motion and reduce postoperative pain (Xue 2025).
Rescue analgesia
Opioids should be used as rescue analgesia in the postoperative period. • In accordance with PROSPECT methodology (Joshi 2023), RCTs investigating opioids were not included in this updated review.

COX, cyclooxygenase; IV, intravenous; NSAID, non-steroidal anti-inflammatory drug; RCT, randomised controlled trial.

Interventions that are NOT recommended

Analgesic interventions that are not recommended for pain management in patients undergoing major oncological breast surgery.

Intervention	Rationale for not recommending
Systemic analgesics	
Intravenous dexmedetomidine	Insufficient evidence
Intravenous ketamine	Inconsistent evidence for intraoperative period and lack of evidence in postoperative period
Intravenous lidocaine	Insufficient evidence
Intravenous magnesium	Inconsistent evidence
Intravenous nefopam	Lack of evidence
Oral duloxetine	Insufficient evidence
Oral gabapentin	Concerns related to side effects
Oral gabapentin and intravenous dexmedetomidine	Concerns related to side effects
Regional analgesic techniques	
Single shot intertransverse process block	Inconsistent evidence
Single shot PSP block	Insufficient evidence
Single shot rhomboid intercostal plane block	Insufficient evidence
Single shot stellate ganglion block	Lack of evidence
Single shot superficial parasternal intercostal plane block with IPP and PSP block	Lack of evidence
Single shot IPP and PSP block with superficial SAP block	Insufficient evidence
Single shot superficial parasternal intercostal plane block and deep SAP block	Insufficient evidence
Bupivacaine through surgical drain	Inconsistent evidence
Continuous IPP block	Insufficient evidence
Continuous IPP and PSP block	Insufficient evidence
Continuous superficial SAP block	Inconsistent evidence
Continuous wound catheter	Lack of evidence
Perineural adjuncts	
Perineural dexamethasone in ESP block	Inconsistent evidence and no comparison to intravenous dexamethasone
Perineural dexmedetomidine in ESP block	Inconsistent prolongation of analgesia and concerns related to side effects
Perineural ketamine in ESP block	Insufficient evidence and concerns related to side effects
Perineural magnesium in ESP block	Insufficient evidence
Perineural dexamethasone in IPP and PSP block	Inconsistent evidence, no evidence of prolongation of analgesia and no comparison to intravenous dexamethasone
Perineural dexmedetomidine in IPP and PSP block	Insufficient evidence and concerns related to side effects
Perineural ketorolac in IPP and PSP block	Insufficient evidence and concerns related to side effects

Perineural dexmedetomidine in superficial SAP block	Insufficient evidence and concerns related to side effects
Perineural ketamine in superficial SAP block	Insufficient evidence and concerns related to side effects
Perineural magnesium in superficial SAP block	Insufficient evidence
Perineural neostigmine in superficial SAP block	Lack of evidence and concerns related to side effects
Perineural tramadol in superficial SAP block	Insufficient evidence
Perineural ketamine in deep SAP block	Lack of evidence and concerns related to side effects
Perineural magnesium in deep SAP block	Insufficient evidence
Perineural morphine in deep SAP block	Insufficient evidence
Perineural neostigmine in deep SAP block	Lack of evidence and concerns related to side effects
Perineural clonidine in TPVB	Insufficient evidence and concerns related to side effects
Perineural dexmedetomidine in TPVB	Insufficient evidence and concerns related to side effects
Perineural fentanyl in TPVB	Insufficient evidence
Perineural fentanyl and naloxone in TPVB	Insufficient evidence
Perineural morphine in TPVB	Insufficient evidence
Surgical techniques	
Electrocautery vs low thermal tissue dissection	Lack of evidence
Electrosurgery vs low thermal tissue dissection	Lack of evidence
Hydrodissection with lidocaine	Insufficient evidence
Dissection vs preservation of intercostobrachial nerve	Lack of evidence
One surgical drain vs two surgical drains	Insufficient evidence
Surgical drain vs TissueGlu	Lack of evidence
Suture of skin flap	Lack of evidence
Topical bleomycin	Lack of evidence
Topical doxycycline	Lack of evidence
Complementary medicine therapies	
Arnica montana and bellis perennis	Lack of evidence
Aromatherapy, music therapy and aromatherapy with music therapy	Insufficient evidence
Transcutaneous electrical acupoint stimulation	Lack of evidence
Transcutaneous electrical nerve stimulation	Insufficient evidence
Hypnotherapy	Insufficient evidence

ESP, erector spinae plane; IPP, interpectoral plane; PSP, pectoserratus plane; SAP, serratus anterior plane; and TPVB, thoracic paravertebral block.

Overall PROSPECT recommendations table

Overall recommendations for procedure-specific pain management in patients undergoing major oncological breast surgery			
		Level of evidence	Strength of recommendation
Pre- and intra-operative	Paracetamol and conventional NSAIDs or COX-2 selective inhibitors	N/A	N/A
	Dexamethasone	High	Strong
	Regional analgesic techniques (all below are considered equivalent to each other)		
	• Single-shot erector spinae plane block	Moderate	Weak
	• Single-shot local infiltration analgesia	Moderate	Weak
	• Single-shot interpectoral plane and pectoserratus plane block	Moderate	Strong
	• Single-shot superficial serratus anterior plane block	Moderate	Strong
	• Single-shot deep serratus anterior plane block	Moderate	Strong
	• Single-shot thoracic paravertebral block	High	Strong
	• Single-shot local infiltration analgesia may be added to regional analgesic techniques	N/A	Best practice statement
	Physiotherapy	N/A	Best practice statement
Postoperative	Paracetamol and conventional NSAIDs or COX-2 selective inhibitors	N/A	N/A
	Opioids as rescue analgesia	N/A	N/A
	Physiotherapy	N/A	Best practice statement

COX, cyclooxygenase; NSAID, nonsteroidal anti-inflammatory drug.

PROSPECT publication

Desai N, Dirzu DS, Zolger D, Adansi DN, Van de Velde M and GP Joshi, on behalf of the PROSPECT Working Group of the European Society of Regional Anaesthesia and Pain Therapy (ESRA).

Pain management after major oncological breast surgery: an updated systematic review and procedure specific postoperative pain management (PROSPECT) recommendations.

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Infographic

PROSPECT recommendations for major oncological breast surgery – Infographic