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Case series
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Optimising Enhanced Recovery After Surgery for breast reduction: a case series incorporating morphine as an adjuvant in intertransverse process block

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Abstract

Breast reduction surgery is associated with significant postoperative pain, commonly managed with intravenous opioids, which can cause adverse effects such as nausea, vomiting, sedation, ileus, and respiratory depression. This case series evaluates postoperative pain outcomes within an Enhanced Recovery After Surgery (ERAS) protocol incorporating morphine as an adjuvant in intertransverse process blocks. This retrospective case series included four patients who underwent bilateral breast reduction surgery at a tertiary hospital and received preoperative bilateral intertransverse process blocks with 0.375% ropivacaine and 2 mg morphine each side, intraoperative multimodal analgesia (ketamine, dexamethasone, magnesium sulphate, paracetamol, fentanyl), and a protocolized postoperative pain management strategy. Pain scores, opioid consumption, complications, and hospital length of stay were analysed. All patients reported low postoperative pain scores (numerical rating scale 0–4). None required additional intravenous patient-controlled analgesia or rescue opioids at any time during hospital stay beyond the scheduled regimen. All patients were discharged

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within five days postoperatively. No opioid-related side effects were reported. Morphine as an adjuvant to intertransverse process blocks within the framework of a multimodal ERAS analgesia protocol may be associated with improved postoperative pain outcomes following breast reduction surgery.

Keywords: breast reduction, Enhanced Recovery After Surgery, morphine, paraspinal block

Introduction

Breast reduction surgery offers relief from the physical and psychological burdens of macromastia. Despite its functional and aesthetic benefits, this surgery is associated with moderate to severe postoperative pain, primarily due to extensive tissue resection and nerve disruption. Chronic pain following breast surgery has been reported in 20–28% of patients.[1,2] Preventing chronic pain is especially important, as this surgery is often performed in a young and productive population, where persistent pain can adversely affect quality of life and result in significant social and economic consequences.

Traditionally, perioperative pain management has frequently relied on heavy use of opioids, which carry significant risks, including nausea, vomiting, respiratory depression, sedation, constipation, and the potential for dependence. In recent years, there has been a paradigm shift toward opioid-sparing pain management strategies, particularly within the framework of Enhanced Recovery After Surgery (ERAS) protocols.[3]

The ERAS Society Guidelines consistently recommend regional anaesthesia as an integral part of ERAS pathways to optimise surgical outcomes. Incorporating these elements has been shown to reduce hospital length of stay, improve surgical outcomes, and enhance patient satisfaction.[4] Effective pain control is a core component of ERAS and is increasingly recognized as an independent factor contributing to ERAS success.[5]

Regional anaesthesia techniques such as erector spinae plane (ESP) block and intertransverse process (ITP) block have gained acceptance as an important component of ERAS protocols.[6] The target for the ESP block is the fascial plane between the erector spinae muscle and the underlying transverse process, allowing spread of local anaesthetic (LA) to the dorsal rami of the spinal nerves. However, involvement of the ventral rami is variable and less consistent. Variants such as the ITP and retro superior costotransverse ligament space block have

evolved to improve the extent of analgesia by targeting deeper fascial planes, thereby achieving more consistent ventral rami blockade.[7,8] Efficacy of these blocks is postulated to be via interfascial LA spread into the paravertebral and epidural spaces providing both somatic and visceral pain relief.

There is substantial evidence that adding a long-acting opioid, such as morphine, to central neuraxial blocks significantly prolongs postoperative analgesia, often lasting up to 24 hours or more.[9] The analgesic effect of morphine as an adjuvant in peripheral and paraspinal blocks has been attributed to multiple mechanisms, including direct activation of peripheral opioid receptors, central neuraxial effects following paravertebral or epidural spread, and systemic absorption.[10,11] Morphine has been described as an adjuvant in transversus abdominis plane, serratus anterior plane, and fascia iliaca blocks, with reported benefits including reduced postoperative analgesic consumption, lower pain scores, and prolonged time to first rescue analgesia.[12,13,14] However, despite these findings, its utilisation in paraspinal fascial plane blocks remains limited.

This case series evaluates the effectiveness of an ERAS protocol incorporating morphine in ITP blocks as an adjuvant in breast reduction surgery by assessing its impact on postoperative pain control, functional recovery, and overall patient satisfaction.

Case presentation

This retrospective case series was conducted at Hospital Kuala Lumpur and included four female patients who underwent bilateral breast reduction surgery for bilateral macromastia between December 2024 and March 2025. The primary indications for surgical intervention were chronic shoulder and back pain, along with significant psychosocial distress attributable to breast hypertrophy. Clinical examination confirmed bilateral macromastia in all cases. No significant diagnostic challenges were encountered. All cases were de-identified, and written informed consent was obtained for clinical care and publication of findings. Data from this series were compared with breast reduction surgeries performed at the same institution between January and November 2024 to contextualize outcomes and trends.

All patients underwent comprehensive preoperative optimisation, addressing comorbid conditions such as hypertension, diabetes mellitus, and anaemia where present. No contraindications to regional anaesthesia were identified, and none of the patients reported prior breast surgery or opioid dependence. Routine preoper-

ative investigations included laboratory evaluation and haemoglobin monitoring. All patients received bilateral ITP blocks on the day of surgery, utilising an ERAS protocol (Appendix A).

The ITP blocks were performed by trained regional anaesthesiologists with a minimum of 5 years' experience in ultrasound-guided regional anaesthesia. All procedures were conducted under ultrasound guidance in a sterile setting, with the patient sitting. After standard monitoring and aseptic skin preparation, a 6-13 MHz (Sonosite M-turbo, Sonosite Inc., Bothell, USA) high-frequency linear ultrasound probe was placed in the parasagittal orientation at either the T2/T3 or T3/T4 levels. Under real-time ultrasound imaging, the trapezius, rhomboid major, erector spinae muscle, and the transverse process of T2 to T4 were identified in a parasagittal view (Fig. 1). For the ITP block, upon reaching the fascial plane between ESP and transverse process, the needle was advanced deeper to access the intertransverse connective tissue posterior to the superior costotransverse ligament (Fig. 2). An echogenic, 21-G, Pajunk block needle, 80–110 mm (PAJUNK GmbH Medizintechnologie, Geisingen, Germany) was inserted in-plane under continuous ultrasound visualisation. Subsequently, a mixture of 20 ml of 0.375% ropivacaine mixed with adrenaline (1:100,000) and 2 mg morphine was injected on each side. The dose of morphine used in this series was extrapolated from established neuraxial practice, where epidural morphine doses in the

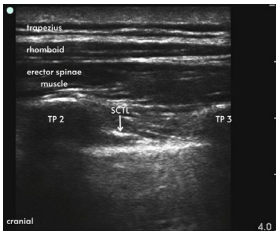

Fig. 1. Sonoanatomy of intertransverse process block. TP: transverse process; SCTL: superior costotransverse ligament

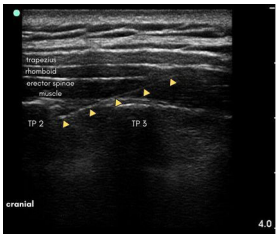

Fig. 2. Needling for intertransverse process block. The superior costotransverse ligament is not appreciable in this view due to an anechoic window created by the needle shaft. Yellow indicator: needle trajectory; TP: transverse process.

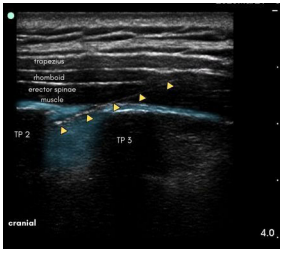

Fig. 3. Spread of local anaesthetic in intertransverse process block. The superior costotransverse ligament is not appreciable in this view due to an anechoic window created by the needle shaft. Yellow indicator: needle trajectory; TP: transverse process; blue: local anaesthetic

range of 2–5 mg, have been studied and shown to provide analgesic benefit with an acceptable safety profile.[15] The pattern of LA spread in the deep fascial plane between two adjacent transverse processes confirmed accurate deposition for the ITP block (Fig. 3). No technical difficulties were encountered and all blocks were completed without any incident.

Intraoperatively, patients received a single bolus dose of intravenous 0.1–0.3 mg/kg ketamine, 10 mmol magnesium sulphate, 16 mg dexamethasone, and 1 g paracetamol as part of multimodal analgesia. An additional 1 g of intravenous paracetamol was administered when surgery duration exceeded 6 hours. Administration of intravenous opioids, including agent selection and dosing, was left to the discretion of the attending anaesthetist. Postoperatively, patients were prescribed a standard oral analgesia regimen comprising paracetamol 1 g every 6 hours, tramadol 50 mg every 6 hours, celecoxib 200 mg every 12 hours, and rescue morphine 3–5 mg as clinically indicated. Patients were assessed postoperatively on pain scores at rest and during movement, opioid-related side effects, neurological deficits, haemodynamic parameters, patient satisfaction, functional recovery, and time to mobilisation. Postoperative mobilisation was assessed using an adapted Bedside Mobility Assessment Tool (BMAT) (Appendix B).

Given the potential for neuraxial spread of morphine following paraspinal injection, there is a theoretical risk of delayed respiratory depression. Patients were therefore monitored postoperatively for opioid-related adverse effects. Monitoring included regular assessment of respiratory rate, oxygen saturation using pulse oximetry, sedation level, and haemodynamic parameters. Postoperative monitoring for opioid-related adverse effects was continued for at least 24 hours, in accordance with protocols used following neuraxial morphine administration.

Case 1
A 32-year-old female with a body mass index (BMI) of 29 kg/m^2 and no known medical illness underwent breast reduction surgery for bilateral breast hyperplasia. She experienced significant physical discomfort preoperatively due to excessive breast weight.

Postoperatively, pain control was excellent, with pain scores between 0 and 1 throughout hospitalisation and clinic follow-up. Pain was adequately controlled with standard oral analgesic regimen, with no requirement of rescue syrup morphine. Her postoperative recovery was uneventful and she was highly satisfied with her analgesic management. The patient was discharged on postoperative day (POD) 5 and had a smooth recovery with no perioperative complications reported.

Case 2
A 35-year-old female with a BMI of 33 kg/m^2 and a history of childhood bronchial asthma underwent breast reduction surgery for bilateral breast hyperplasia to achieve symptomatic relief. She reported minimal postoperative pain, with pain scores ranging from 0 to 2 throughout her hospital stay and follow-up. Standard oral analgesic regimen was sufficient for pain management and no rescue syrup morphine was required. She remained haemodynamically stable postoperatively and was discharged on POD5. Her postoperative course was uneventful with no complications, and she achieved a satisfactory recovery.

Case 3
A 33-year-old female with a BMI of 33 kg/m^2 and no other medical illness underwent reduction mammoplasty for bilateral massive breast hyperplasia. Her pain scores ranged from 0 to 4 and her pain was managed effectively with standard oral analgesic regimen without the need for additional syrup morphine as rescue analgesia. She recovered well and was discharged on POD4. On POD10, she was readmitted due to left breast swelling to rule out left breast haematoma. Ultrasound showed no focal collection, and the patient was discharged well the next day. Her pain control remained adequate and she did not require any opioid escalation.

Case 4
A 37-year-old female with a BMI of 2 1 kg/m^2, no known medical illness, and a known non-steroidal anti-inflammatory drugs (NSAID) allergy underwent breast reduction surgery for bilateral breast hyperplasia. Her postoperative pain scores ranged from 0 to 4, and she managed to alleviate her pain effectively with standard oral analgesic regimen without requiring rescue syrup morphine. However, she experienced a post-operative haemoglobin drop, necessitating the transfusion of one pint of packed red blood cells. Despite this, she recovered well and was discharged on POD4. She continued to do well at follow-up and had no further complications.

Summary of results

Tables 1 and 2 summarise the findings related to perioperative analgesia and postoperative outcomes, including pain scores at various time intervals, levels of mobility based on the BMAT up to POD3, side effects associated with morphine use, and complications from the ITP block.

Pain outcomes were favourable in all 4 patients, who reported low pain scores (numerical rating scale 0–4) and did not require any supplementary strong opioid as rescue analgesia. All patients tolerated the interventions well, with no adverse effects related to the regional techniques or pharmacological adjuncts. No opioid-related side effects, including excessive sedation, respiratory depression or urinary retention were observed.

All patients were successfully discharged between POD4 and 5. Follow-up assessments were conducted within 1-week post-discharge to monitor wound healing, functional recovery, and pain score. All patients demonstrated satisfactory wound healing and functional recovery, with reported pain score of 0-4.

Discussion

Postoperative pain management is a critical aspect of breast reduction surgery since inadequate pain control can lead to delayed recovery, increased opioid consumption, and prolonged hospitalisation. Conventionally, intravenous opioids delivered via patient-controlled analgesia (PCA) served as the primary modality for postoperative analgesia.[16] Data from Hospital Kuala Lumpur in 2024 (Appendix C) revealed a wide variation in postoperative morphine requirements among breast reduction patients who did not receive any regional blocks, with cumulative morphine consumption ranging from 2 mg to 71 mg (median 12.5 mg; mean 18.78 mg). In contrast, morphine use in our case series was significantly lower: none of the patients required postoperative rescue use of morphine, and pain scores consistently remained ≤ 4 throughout the 4–5 days of their postoperative hospital stay. This observed difference suggests the potential benefit of incorporating morphine directly into the fascial plane block rather than relying solely on systemic administration.

Fascial plane blocks are increasingly utilized in breast surgery due to their efficacy and favourable safety profile. Anatomical studies support their mechanism of action: cadaveric studies demonstrated that injectate administered via the ITP block can extend medially into the paravertebral space and laterally along the ESP, contributing to multisegmental thoracic analgesia. This

Table 1. Summary of all patients on operation details, findings related to perioperative analgesia and postoperative outcomes

Case	Surgery duration	Breast tissue removed (kg)	Intraoperative analgesia	Rescue analgesia required	Adapted BMAT* at various time intervals	PO hospital stay duration (days)	Side effects (Yes/No)	Complications from ITP block (Yes/No)
1	7 hours	R: 1.6 L: 1.9	IV Fen 300 mcg (100 mcg at induction) IV Dex 16 mg IV Ket 30 mg IV Par 40 mg IV PCM 1g x 2 IV MgSO4 10 mmol	No	POD1: Level 4 AP POD2: Level 4 AP POD3: Level 4 AP	5	No	No
2	6 hours 20 minutes	R: 0.9 L: 0.9	IV Fen 100 mcg (at induction) IV Dex 16mg IV Ket 15mg IV PCM 1g x 2 IV MgSO4 10 mmol	No	POD1: Level 4 AP POD2: Level 4 AP POD3: Level 4 AP	5	No	No
3	4 hours 30 minutes	R: 1.0 L: 0.8	IV Fen 200mcg (100 mcg at induction) IV Dex 16 mg IV MgSO4 10 mmol	No	POD1: Level 4 AP POD2: Level 4 AP POD3: Level 4 AP	4	No	No
4	5 hours 11 minutes	R: 0.15 L: 0.16	IV Fen 125 mcg (100 mcg at induction) IV Dex 16 mg IV MgSO4 10 mmol IV Ket 10 mg IV PCM 1g	No	POD1: Level 3 AP POD2: Level 4 AP POD3: Level 4 AP	4	No	No

BMAT: Bedside Mobility Assessment Tool; PO: Postoperative; IV: Intravenous Fen: Fentanyl; Dex: Dexamethasone; Ket: Ketamine; Par: Parecoxib PCM: Paracetamol, MgSO4: Magnesium sulphate; AP: Assessment Points
*****See Appendix B

Table 2. Summary of postoperative pain scores (numerical rating scale) at different time intervals

Case	PS at recovery	PS POH12	PS POH24	PS POH48	PS POH72	PS at discharge	PS at Plastic Clinic follow-Up
1	Rest: 0 Movement: 0	Rest: 0 Movement: 1	Rest: 0 Movement: 1	Rest: 0 Movement: 1	Rest: 0 Movement: 1	Rest: 0 Movement: 0	Rest: 0 Movement: 0 (POD9)
2	Rest: 1 Movement: 2	Rest: 0 Movement: 1	Rest: 0 Movement: 2	Rest: 0 Movement: 0	Rest: 0 Movement: 1	Rest: 0 Movement: 0	Rest: 0 Movement: 0 (POD11)
3	Rest: 0 Movement: 1	Rest: 0 Movement: 1	Rest: 0 Movement: 4	Rest: 0 Movement: 1	Rest: 0 Movement: 1	Rest: 0 Movement: 1	Rest: 3 Movement: 4 (POD8)
4	Rest: 0 Movement: 1	Rest: 0 Movement: 1	Rest: 1 Movement: 2	Rest: 2 Movement: 4	Rest: 0 Movement: 1	Rest: 0 Movement: 1	Rest: 0 Movement: 0 (POD9)

PS: Pain score; POH: Postoperative hour; POD: Postoperative day

observation aligns with the hypothesis that fascial plane blocks provide analgesia through the spread of injectate into the thoracic paravertebral space, which likely accounts for its efficacy in breast surgery.[8,17] Clinical evidence also supports the utility of this technique. A prospective, randomized study by Aygun *et al.* demonstrated that a single-shot ITP block significantly decreased opioid consumption in breast cancer surgery.[18]

The concurrent use of adrenaline may reduce peak plasma levels of LA, which further enhances safety and may potentially contribute to longer-lasting analgesia. Previously published trial sequential analyses have demonstrated that the addition of adrenaline to LA in intrathecal or peripheral nerve blocks results in an analgesic prolongation of no more than 60 minutes.[19] Our observation could suggest a potential prolongation of analgesic effect due to the action of additional morphine, as the duration of analgesia in our series exceeds beyond the expected duration of both LA alone or LA with adrenaline mixture.

Paraspinal site of injection offers multiple potential routes through which morphine may exert its effect following LA mass dispersion. Diffusion into the paravertebral space permits access to neuraxial structures, leading to μ-opioid receptor activation within the dorsal horn and thus inhibiting nociceptive transmission. Peripherally, bulk flow of morphine within the ESP may exert analgesic effects by binding to opioid receptors expressed on adjacent spinal nerve, attenuating ascending nociceptive input.[17] This peripheral mechanism is predominantly relevant in inflammatory or post-surgical conditions, where opioid receptor expression on peripheral nerves may be upregulated.[20] In addition to those localized mechanisms, slow systemic absorption from the intertransverse process tissues into nearby vascular system enable supraspinal effects through interaction with opioid receptors in distant sites; the brainstem and thalamus, hence activating the descending inhibitory pathways.[11] These various mechanisms whereby morphine influences propagation of signals from multiple sites may explain the prolonged analgesia associated with paraspinal morphine administration.

Systemic administration of dexamethasone prolongs the duration of analgesia following peripheral nerve blocks when administered at intermediate (0.1–0.2 mg/kg) or high (> 0.2 mg/kg) doses.[21] A Cochrane review by Pehora revealed that prolongation of sensory block duration in patients receiving high-dose intravenous dexamethasone was only 7 hours.[22] While high-dose intravenous dexamethasone may contribute to extended analgesia following peripheral nerve blocks, the low pain scores observed in the present case series persisted beyond 24 hours postoperatively, which exceeds durations commonly reported in the literature for systemic dexamethasone alone. The prolonged analgesic effect observed may

therefore be partially attributable to the inclusion of morphine in the fascial plane block; however, this association warrants further investigation.

The overall analgesic management was excellent across the cohort, with successful tissue resection, rapid postoperative recovery, and no opioid-related side effects observed. All patients in our series recorded low pain scores on a numerical rating scale of 0–4 throughout hospitalisation and follow-up; none required rescue morphine. Patient-reported outcomes indicated high satisfaction with perioperative pain management. Despite the overall success of the ERAS protocol with morphine-enhanced ITP blocks, two patients in this case series experienced postoperative complications. Case 3 developed postoperative left breast swelling requiring readmission on POD10, while Case 4 experienced a postoperative haemoglobin drop that required a blood transfusion. While these complications were neither directly related the technique nor the medication utilized for pain management, they highlight the potential risks associated with breast reduction surgery and the need for careful postoperative monitoring. Notably, both patients continued to have adequate pain control despite their complications, reinforcing the efficacy of ITP blocks with morphine in breast reduction surgery.

Existing evidence, including systematic reviews, suggests that opioids used as an adjuvant in paravertebral or paraspinal blocks have a limited impact on postoperative analgesia, time to first rescue analgesia, and cumulative opioid consumption.[23] While our findings suggest that the addition of morphine may have contributed to prolonged analgesia, the intervention was delivered as part of a multimodal ERAS protocol. Consequently, the independent effect of morphine cannot be conclusively isolated. This represents an important limitation of our study and highlights the need for controlled trials comparing morphine-containing and morphine-free paraspinal blocks.

Another key limitation of this case series is the small sample size, which restricts the generalizability of the findings. In addition, the dose of morphine used in this study was extrapolated from established neuraxial practice. Therefore, the pharmacokinetics, tissue distribution, and safety profile of morphine in this context may differ from neuraxial administration, and the optimal dosing strategy remains to be established. Although the results suggest an association between the use of morphine as an adjuvant in ITP blocks and favourable postoperative pain outcomes in breast reduction surgery, definitive conclusions cannot be drawn. Larger randomised controlled trials are required to validate these findings and to evaluate longer-term outcomes, including chronic pain and functional recovery.

Conclusion

In this case series, the addition of morphine as an adjuvant to ITP blocks within the framework of a multimodal ERAS analgesia protocol may be associated with improved postoperative pain outcomes and minimal postoperative opioid requirements in patients undergoing breast reduction surgery. Patients experienced early mobilisation, fewer opioid-related side effects, and smoother overall recovery. However, larger prospective studies are required to validate these observations and to evaluate this approach as part of ERAS multimodal analgesia strategies for breast reduction surgery.

Declarations

Ethics approval and informed consent for publication
This retrospective case series was conducted in accordance with institutional policies and was approved by the National Medical Research Register (NMRR ID: NMRRID-25-03321-7RA).

Informed consent for publication
Written informed consent for publication was obtained from all patients for the clinical data and images contained in this case series.

Competing interests
None to declare.

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Appendix

A. ERAS protocol

Preoperative phase

Preoperative in the plastic clinic

- Operation decided
- Medical condition optimised (diabetes, hypertension, anaemia, etc.)
- Counselling regarding operation and rehabilitation
- Counselling regarding opioid use (indication, side effects, follow-up)
- Smoking and alcohol cessation
- Haemoglobin optimisation
- Reviewed by physiotherapist and dietician

Preoperative in the anaesthetic clinic

- Selected patient to have ERAS stamp on the anaesthetic referral form (easy identification)
- Preoperative assessment
- Counselling regarding anaesthesia (including peripheral nerve block, *i.e.*, bilateral paraspinal block preoperatively)

Admission

- ERAS stamp and checklist
- Notes and radiographs traced
- Plastic and anaesthetic review (consent)

Preoperative

- Fasting from solid food 6 hours before surgery
- Allow clear fluids until 2 hours before surgery
- Intravenous (IV) antibiotic to operating theatre (OT)
- Premedication (upon OT call)
    - o Tablet paracetamol 1g
    - o Capsule celecoxib 200 mg if no contraindications
- Bilateral intertransverse process blocks at T2/T3 or T3/T4
    - o 20 ml ropivacaine 0.375% + adrenaline 1:100,000 + morphine 2 mg per side

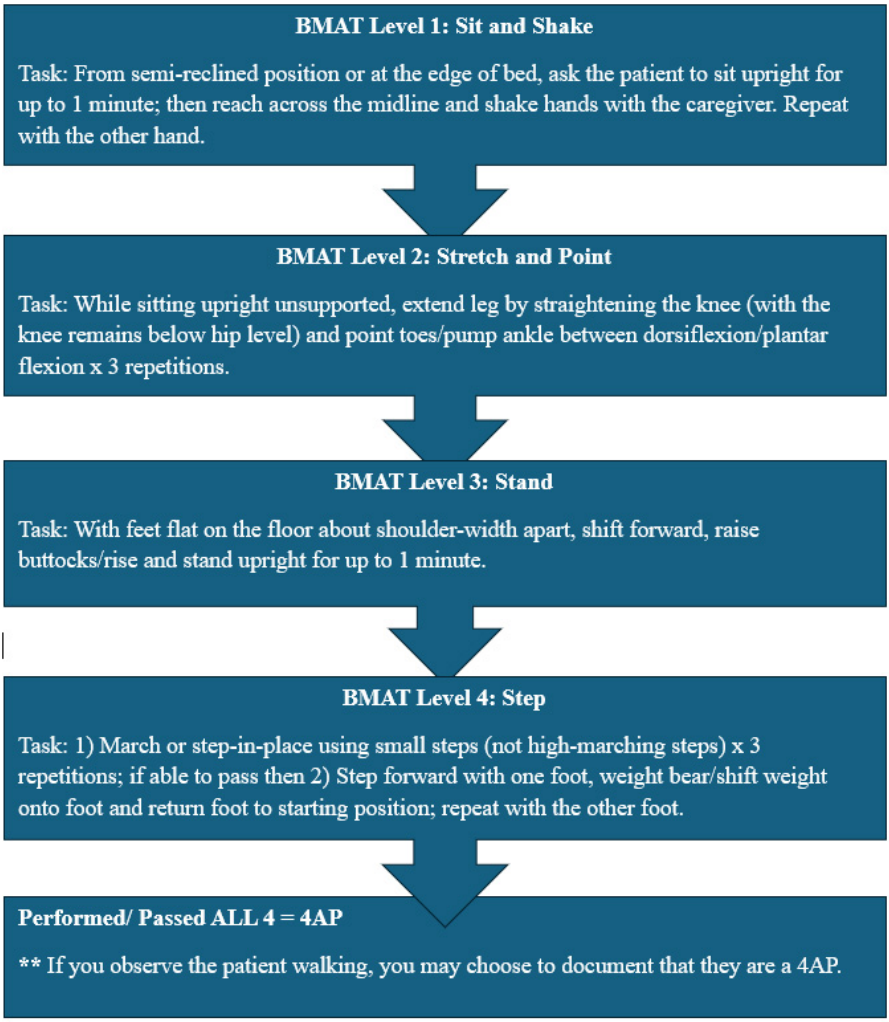
Intraoperative phase

- Balanced general anaesthesia, with preference to techniques which allow early recovery, reduces the incidence of postoperative nausea and vomiting,

delirium, and cognitive dysfunction
- Maintain normotensive, normothermia, and normovolemia
- Pain management
  - IV dexamethasone 16 mg (unless contraindicated)
    - » Contraindication of dexamethasone
      - Systemic fungal infection
      - Systemic infection unless being treated with specific anti-infectives
      - Stomach or duodenal ulcer
      - Administration of live vaccines
      - Epithelial herpes simplex keratitis (dendritic keratitis); Active infectious stages of vaccinia
      - Varicella, and many other viral diseases of the cornea and conjunctiva
      - Mycobacterial or fungal infection of the eyes
      - Glaucoma
      - Torn or ruptured posterior lens
      - Uncontrolled diabetes mellitus (capillary blood glucose > 12)
  - IV magnesium sulphate 40 mg/kg bolus given 20–30 min
  - IV opioid (preferably short acting, *e.g.*, fentanyl) boluses
  - IV ketamine 0.1–0.35 mg/kg bolus dose

Postoperative phase
- Pain assessment: Numerical rating scale of 0 = no pain, 10 = worst pain
- Multimodal analgesia regimen:
  - Tablet paracetamol 1 g QID
  - Capsule tramadol 50 mg QID up to 100mg QID
  - Capsule celecoxib 200 mg BID X 3/7
  - Rescue analgesia: Syrup morphine 3–5 mg PRN 3x/day x 2/7
- Early mobilisation and physiotherapy

B. Adapted Bedside Mobility Assessment Tool (BMAT)



Adapted from Boynton.[24]

C. Patient-controlled analgesia using morphine in breast reduction patients treated at the Department of Plastic & Reconstructive Surgery, Hospital Kuala Lumpur (2024)

No regional, paraspinal, or fascial plane nerve blocks were administered in these 18 cases. Postoperative analgesia was managed with systemic analgesics, including patient-controlled analgesia morphine.

Postoperative use of morphine:

- Mean: 18.78 mg (0.275mg/kg)
- Median: 12.5 mg (0.225mg/kg)
- Mode: 7 mg (0.21mg/kg)

Table 1. Patient-controlled analgesia using morphine in breast reduction patients

Case	Total days PCAM	Total PO morphine usage	PS on PCAM	PO nausea/vomiting	PO UR/days on CBD
1	2	4 mg (0.05 mg/kg)	Rest: 3 Movement: 6	No	CBD for 2 days
2	2	7 mg (0.086 mg/kg)	Rest: 0 Movement: 4	No	CBD for 2 days
3	2	13 mg (0.21 mg/kg)	Rest: 0 Movement: 2	No	CBD for 2 days
4	2	17 mg (0.29 mg/kg)	Rest: 0 Movement: 2	No	No urinary retention
5	2	18 mg (0.32 mg/kg)	Rest: 0 Movement: 3	No	CBD for 2 days
6	2	47 mg (0.67 mg/kg)	Rest: 0 Movement: 6	3 episodes of vomiting on POD1	CBD for 2 days
7	2	30 mg (0.5 mg/kg)	Rest: 0 Movement: 3	No	CBD for 2 days
8	2	12 mg (0.21 mg/kg)	Rest: 0 Movement: 6	No	CBD for 2 days
9	2	11 mg (0.16 mg/kg)	Rest: 0 Movement: 3	No	No urinary retention
10	2	2 mg (0.025 mg/kg)	Rest: 0 Movement: 3	No	CBD for 2 days
11	1	22 mg (0.36 mg/kg)	Rest: 0 Movement: 1	No	CBD for 1 day
12	2	20 mg (0.27 mg/kg)	Rest: 0 Movement: 5	3 episodes of vomiting on POD1	CBD for 2 days
13	3	71 mg (0.77 mg/kg)	Rest: 0 Movement: 8	No	CBD for 3 days
14	2	24 mg (0.32 mg/kg)	Rest: 0 Movement: 5	No	CBD for 2 days
15	2	11 mg (0.2 mg/kg)	Rest: 0 Movement: 4	No	CBD for 2 days
16	2	7 mg (0.1 mg/kg)	Rest: 0 Movement: 4	4 episodes of vomiting on POD1	CBD for 2 days
17	1	10 mg (0.17 mg/kg)	Rest: 0 Movement: 2	No	CBD for 1 days
18	2	12 mg (0.24 mg/kg)	Rest: 0 Movement: 4	No	CBD for 2 days

PCAM: Patient-controlled analgesia morphine; PO: Postoperative; PS: Pain score; UR: Urinary retention; CBD: Continuous bladder drainage; POD: postoperative day