Regional Anaesthesia in Enhanced Recovery After Surgery Pathways - A Quintessential Component

Abhijit S. Nair¹, Sandeep Diwan²
¹Department of Anaesthesia, Ibra Hospital, Ministry of Health-oman, Ibra, Sultanate of Oman.
²Department of Anaesthesia, Sancheti Hospital, Pune, Maharashtra, India.

Introduction:
Enhanced recovery after surgery (ERAS) is a multimodal, perioperative care pathway designed to achieve early recovery for patients undergoing major surgery. [1] Initially described by Henry Kehlet in 1995 for colonic surgeries, the enhanced recovery pathways have now evolved and are now validated for more than 30 different types of surgery which include but are not limited to emergency laparotomy, neonatal surgeries, and lower segment cesarean sections. [2] Not only is the patient benefited from this by having an enhanced recovery and early discharge from the hospital, the cost of treatment is reduced and also leads to more turnover of patients thereby reducing the waiting list of patients scheduled for various surgeries. [3]

Regional anaesthesia in ERAS pathways:
The role of anaesthesiologists¹ is important in the successful implementation of preoperative, intraoperative, and postoperative pathways. [4] The success of implementing ERAS pathways lies in three factors; evidence-based perioperative care, multimodal and multi-disciplinary teamwork, and continuous audit for improving patient care. [5] The use of multimodal, opioid-sparing analgesia is emphasized in ERAS pathways using a combination of medications to reduce unwanted adverse effects like constipation, ileus, postoperative nausea/vomiting thereby facilitating early recovery and discharge. [6] Poorly managed postoperative pain is one of the important risk factors for chronic postsurgical pain (CPSP). [7, 8]

As per the consensus statement for anaesthesia practice in patients undergoing gastrointestinal surgery, Feldheiser et al suggested multimodal analgesia (MMA), evidence-based and procedure-specific analgesic regimens that should be tailored with care and supported by evidence, intending to achieve optimal analgesia with minimal side effects. The goal is to achieve ERAS milestones such as early mobilization and oral feeding. [9] MMA constitutes the use of more than one analgesic modality which could be pharmacological, interventional, or adjunctive non-pharmacological techniques include acupuncture, music therapy, transcutaneous electrical nerve stimulation, and hypnosis. An important aim of MMA is the lesser use of opioids to avoid the undesirable side effects associated with its use. [10]

The two main pillars of MMA are pharmacological agents and regional anaesthesia (RA). The list of pharmacological agents is extensive. They are acetaminophen, dexamethasone, NSAIDs, IV lidocaine, α2 agonists like clonidine and dexmedetomidine, magnesium sulphate, nefopam, esmolol, gabapentinoids, N-methyl-d-aspartate (NMDA) receptor antagonist like ketamine. [11-13] Adding RA helps in reducing perioperative use of opioids, reduced surgical stress response, reduced postoperative nausea/vomiting (PONV), early return of bowel function due to lesser opioid use, facilitates early mobilization, reduces thromboembolic events, and leads to lesser incidence of delirium in the postoperative period. [14] [Figure 1] Table 1 depicts the various RA techniques which can be implemented for different types of surgeries.
Available evidence regarding implementation of RA in ERAS:
RA includes a central neuraxial block (spinal anaesthesia, epidural anaesthesia), paraspinal and plexus blocks, peripheral nerve blocks, and the fascial plane blocks. Thoracic epidural analgesia (TEA) is considered the gold standard analgesic modality for thoracic, abdominal, and pelvic surgeries provided it is open. Although ERAS society does not recommend TEA for minimal access surgeries, it can be individualized based on the discretion of the clinician and patient profile. The advantages of TEA are lesser opioid use, early recovery of bowel function, better glycemic control, and attenuation of the surgical stress response. On the contrary, several studies which evaluated incorporating TEA as a component on MMA for laparoscopic colorectal surgeries and thoracic surgeries did not find any additional benefit of TEA. [15-17] In a dose ranging from 200-300 μg, a single dose of intrathecal morphine (ITM) has been found superior to MMA including systemic opioids in patients undergoing colonic surgeries, hepato-pancreatic-biliary

Table 1: depicts various regional anaesthesia techniques which can be used for various surgeries as a part of enhanced recovery pathway

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category of surgery</th>
<th>Various regional anaesthesia techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head and neck surgeries</td>
<td>Supraorbital and supratrochlear nerve block, sphenopalatine ganglion block, infraorbital nerve block, mandibular nerve block, mental nerve block, superficial cervical plexus block, glossopharyngeal nerve block</td>
</tr>
<tr>
<td>2</td>
<td>Breast surgeries</td>
<td>Paravertebral block, thoracic epidural, pectoral nerve blocks (PECS 1 and 2), serratus anterior plane block, erector spinae plane block, rhomboid intercostal block</td>
</tr>
<tr>
<td>3</td>
<td>Thoracic surgeries</td>
<td>Paravertebral block, thoracic epidural, serratus anterior plane block, erector spinae plane block, parasternal blocks</td>
</tr>
<tr>
<td>4</td>
<td>Abdominal surgeries</td>
<td>Thoracic epidural, paravertebral block, erector spinae plane block, transversus abdominis plane block, quadratus lumborum block, rectus sheath block</td>
</tr>
<tr>
<td>5</td>
<td>Upper limb surgeries</td>
<td>Brachial plexus block- approach as indicated, individual nerve block as indicated</td>
</tr>
<tr>
<td>6</td>
<td>Lower limb surgeries including arthroplasties</td>
<td>Lumbar epidural, femoral nerve block, sciatic nerve block, 3-in-1 block, fascia iliaca compartment block, adductor canal block, iPACK block, quadratus lumborum block, lumbar erector spinae plane block, lumbosacral plexus block</td>
</tr>
<tr>
<td>7</td>
<td>Spine surgeries</td>
<td>Erector spinae plane block, thoracolumbar interfascial plane block</td>
</tr>
</tbody>
</table>
surgeries, and surgeries for gynecological malignancies. [18-20] The level of recommendation is high for use of lumbar epidural catheters as part of MMA in patients undergoing hip and knee arthroplasties. [21-24] Several researchers advocate the use of adductor canal block (ACB), IPACK (Infiltration between the Popliteal artery and Capsule of the Knee) block, continuous femoral nerve catheters along with MMA to facilitate early mobilization and faster recovery after arthroplasties. Although to date there is no article describing the role of RA in ERAS for arthroscopic surgeries, this area can be explored in the future to facilitate enhanced recovery after knee and shoulder arthroscopic repairs. In a meta-analysis by Edwards et al, the authors concluded that ACB preserves quadriceps function better than a femoral nerve block in patients undergoing ACL reconstruction with comparable analgesia. [25] Similarly for shoulder arthroscopic surgeries, adding an interscalene block, superior trunk block, or a high thoracic erector spinae plane block could provide opioid-sparing analgesia and also [26,27] many published research articles have investigated the efficacy of fascial plane blocks like transverse abdominis plane (TAP) block, rectus sheath block, quadratus lumborum block (QLB), paravertebral block (PVB) as a component of the ERAS pathway. The results reveal that not only the blocks are safe and effective, but they also are opioid-sparing and facilitate early recovery and mobilization. [2-33] Studies have demonstrated that a continuous TAP infusion is non-inferior to continuous TEA in patients undergoing colorectal surgeries. Single-shot TAP block was found to provide improved postoperative analgesia after LSCS which was although lesser compared to ITM, but had lesser side effects when compared to ITM. [34, 35] Fields et al used liposomal bupivacaine for TAP blocks in patients undergoing colorectal surgeries in the ERAS program and found that there was reduced opioid use and lesser hospital stay. [36] These blocks should be used as a component of the ERAS pathway based on the skills and resources available. These blocks could be single-shot or in the form of continuous infusion via indwelling catheters. A lumbar erector spinae plane block (ESPB) is slowly gaining popularity as an analgesic modality for upper and lower abdominal surgeries like cholecystectomy, hiatus hernia repair. Although the block appears safe and effective, the available literature is in the form of case reports and series. To date, there is no well-designed RCT that has explored the premise in an ERAS pathway. [37, 38] ESPB at various levels have been successfully employed and provided opioid-sparing analgesia after spine surgeries also. [39,40] RA techniques like pectoral nerve blocks (PECS 1/2), thoracic PVB, thoracic ESPB, serratus anterior plane block (SAPB) have been established as excellent, opioid-sparing interventions as a part of MMA for breast surgeries which have been attested by several RCTs and review articles. [41-46] Not only do RA techniques provide opioid-sparing analgesia, reduced incidence of PONV, the propensity of post-mastectomy pain is also reduced if acute post-surgical pain is managed effectively. [47,48]

To conclude, ERAS society strongly advocates the use of opioid-sparing MMA for any surgery and RA is an important component of MMA. Based on feasibility, expertise, and indication, some RA techniques should be offered to all the patients undergoing surgery to facilitate faster recovery, early ambulation, and discharge from the hospital. At present many centers are applying pathways laid by ERAS society in practice but still are defaulting in applying one important component i.e., documentation and audit. We suggest implementation, documentation, and continuous audit of all ERAS pathways for understanding the lacunae and thus improvise in the future.
Conflict of interest: Nil  Source of support: None

References

22. Blocks such as iPACK and adductor canal block are preferred over femoral and sciatic nerve blocks after TKA as they do not interfere with early ambulation which is desirable after TKA.


