ABSTRACT

Enhanced recovery after surgery is a concept put forward by Henrik Kehlet in 1997 for colorectal surgery & presented a protocol. Since then, it is adopted for various surgical procedures in many developed countries. Obstetricians & obstetric anaesthesiologists are also following the same line. In 2020 Society for obstetric anaesthesia & perinatology (SOAP) USA published a consensus statement on “early recovery after caesarean section”, presenting the pathways. Is it possible to adopt it fully in our country? Do we need to modify here & there? We are trying to find out the answers.

Keywords: Caesarean section; early recovery; obstetricians; anaesthesiologists; perinatology.

1. INTRODUCTION

It is in 1997 that Henric Kehlet presented a protocol of “Enhanced recovery after surgery” for colorectal surgery & soon it gained popularity. Since then, it is adopted for various surgical procedures in many developed countries [1]. The
outcome is encouraging in terms of reduced hospital stay, early recovery, reduced readmissions & complications, thereby reducing the total expenditure effectively [2,3]. This led to increased patient satisfaction. The protocols may vary according to surgical procedure & institution, but the basic principle remains the same involving a continuum of pre, intra, & postoperative care protocols. Lately many European countries & United States have started trolling this less travelled path, obviously the reason being increasingly mounting pressure of maternity services [4]. Last year 2020, society for obstetric anaesthesia & perinatology (SOAP) has come up with an evidence-based protocol for ERAC (enhanced recovery after caesarean delivery). This consensus statement has focused on anaesthesia related & perioperative evidence-based recommendations as components of an enhanced recovery pathway [5].

2. WHAT IS THE NEED?

These are young mothers. They take care of new-born. Return to normal physiological function & early discharge have shown to be more satisfying to the mother. The most important is reduction in the cost involved [6]. According to “National centre for health statistics,” USA percent of all deliveries by caesarean section are 31.7% with 1,186,397 sections performed every year. In India c section rate as per NFHS-4 (national family health survey) 2015-16 at population level seem to be 17.2%. According to FOGSI (federation of obstetric & gynaecological societies of India) there is vast discrepancy between urban & rural, private & public sector [7].

3. INDIA BIRTH RATE & UNITED NATIONS PROJECTIONS THROUGH THE YEAR 2100

The current birth rate for India in 2021 is 17.377 births per 1000 people, a 1.22% decline from 2020. The birth rate for India in 2020 was 17.592 births per 1000 people, a 1.2% decline from 2019 [8]. The birth rate for India in 2019 was 17.806 births per 1000 people, a 1.19% decline from 2018. The birth rate for India in 2018 was 18.020 births per 1000 people, a 1.68% decline from 2017. If we consider above figures, then a large number of women undergo caesarean section every year [9].

4. WHAT ARE THE COMPONENTS TAKEN INTO CONSIDERATION, WHERE ANAESTHESIOLOGIST CAN PLAY A VITAL ROLE?

1. Preoperative
2. Intraoperative
3. Postoperative

The anaesthesiologist as a perioperative physician can help to implement ERAC protocol as a continuum of care.

4.1 Preoperative

4.1.1 The fasting

4.1.1.1 The most important from anaesthetic point of view

- Limit the fasting interval
- Solids, 8 hours before delivery & CLEAR fluids 2 hours before delivery.

Aim is to reduce most dreaded aspiration risk.

According to ASA guidelines, light meal like milk can be ingested up to 6 hours. Full meals or fried & fatty food need 2 hours extra [10].

Clear fluid includes nonparticulate carbohydrates up to 45gm. It has the advantage of preventing hypovolemia, hypoglycaemia, metabolic stress & ketosis. It must be modified in a diabetic mother.

Studies in non-labouring women scheduled to undergo a caesarean delivery suggest that gastric emptying is not decreased compared to their non-pregnant counterpart.

Therefore, carbohydrate loading with nonparticulate liquids (e.g., clear apple juice) up to 2 hours before scheduled caesarean delivery is recommended. It also takes care of thirst & hunger thereby reducing anxiety [11].

We can suggest many permutations & combinations according to local practices.

4.1.2 Haemoglobin optimization

According to ACOG guidelines & also local protocol where haemoglobinopathies like sickle cell & thalassaemia are common.

Anaemia in pregnancy prevalence in India is among the highest in the world [3].
a. Pregnancy is associated with increased blood volume and dilutional anaemia
b. Caesarean delivery is associated with blood loss that is higher than most abdominal surgeries.
c. Prenatal anaemia is a strong predictor of severe postpartum anaemia

4.1.3 Patient education

4.1.3.1 Lactation, breast feeding preparation & education

For II, III, & IV we can work in collaboration with the department of obstetric & run an antenatal anaesthesia clinic & educate the patient from anaesthetic point of view. It is a good idea to keep an “antenatal anaesthesia card”. It will be a ready reckoner for baseline vitals & variations: Baseline laboratory investigations, others like ECG. Any associated co morbidities & risk factors/allergies. Keeping track of medications prescribed/receiving/ any change or addition needed. Previous anaesthetic/surgical exposure/hospital admissions [12,13].

Airway assessment: Spine examination. Follow up of antenatal advice given. Counselling for labour analgesia. Fasting instructions with explanation of why & when

4.2 Intra Operative

This domain is under the control of anaesthesiologists & here we can contribute the most for ERAC.

4.2.1 Prevent spinal hypotension

The hypotension is because of reduction on afterload. Hypotension can induce intraoperative nausea & vomiting & also hamper utero placental blood flow. This can be optimally managed with prophylactic use of vaspressors. Phenylephrine or noradrenaline prophylactic infusion is indicated. In our institute & most of the Indian subcontinent small boluses of mephenteramine & ephedrine aliquots of 3mg are routinely used without any adverse effect. We are also routinely following of right to left uterine displacement. This is done along with co-loading of 1 litre of ringer lactate. Preloading not advocated.

4.2.2 Maintain normothermia

Hypothermia is a very common occurrence & the incidence is >60% under spinal anaesthesia [6]. It is due to inhibition of vasomotor & shivering response under spinal anaesthesia. Also, there is redistribution of heat from core to peripheral tissue. Perioperative hypothermia is one of the causes of delayed discharge from post anaesthesia care unit. Active warming should be started right from preoperative period, in form of warm intra venous fluids, forced air warming, maintaining the temperature of operation theatre at 230c. It will help in reducing surgical site infection risk, coagulopathy & blood loss. it also will improve umbilical artery pH & APGAR score. There is one study showing the benefits of active warming in preventing post-operative hypothermia & shivering. Warming has additional thermal comfort maintaining normothermia & maternal bonding with the new-born [14].

4.2.3 Optimal use of uterotonics:

These drugs are of vital importance to prevent uterine atony & post-partum haemorrhage. Use lowest possible dose to avoid the side effects.

4.2.4 Prophylactic antibiotic

Preincision administration improves prophylaxis effectivity. It has no adverse effect to foetus. Cefazoline 2 gram is recommended. It can be supplemented with addition of azithromycin if there is premature rupture of membranes. The choice of antibiotic can vary according to institutional protocol & availability in our setups. Any infectious complication is responsible for readmission & increased hospital stay.

4.2.5 Intra &post-operative nausea & vomiting prophylaxis

One of the major issues for early discharge.

Have a multi modal approach. Combine two antiemetics with different mechanism of action for prophylaxis.

- 5HT3 antagonist (e.g., ondansetron 4 mg)
- Glucocorticoid (e.g., dexamethasone 4 mg)
- D2 receptors antagonist (e.g., metoclopramide 10 mg)

Metoclopramide is effective intra operative, where as dexamethasone is for post-operative use because of delayed onset of action.
Prophylactic vasopressor infusion & avoiding exteriorization of uterus reduces incidence of both intra & post-operative nausea & vomiting. Same is true with saline irrigation. Uterine exteriorization & saline irrigation hamper the bowel motility & may be an additive factor for post-operative pain [15].

Intrathecal narcotics augment surgical anaesthesia. They also reduce intraoperative nausea & vomiting by reducing the dose of local anaesthetic & thereby reducing intraoperative hypotension which helps in reducing intraoperative vomiting [16].

4.2.6 Multimodal analgesia

Neuraxial anaesthesia with opioids is a gold standard for c section. A plethora of opioids are available (morphine, hydromorphone, fentanyl, buprenorphine, nalbuphine) so also nonopioids like clonidine & dexmedetomidine. All these drugs give excellent surgical anaesthesia with augmenting duration of extended post-operative analgesia.

In our institute we are using buprenorphine 60 mcg with reasonable extension of analgesia >12 hrs post operatively.

Nonopioid analgesia is started in OR unless contraindicated. The dictum is to start the nonopioid before the onset of pain preferably after the delivery of baby.

a. Ketorolac 15–30 mg IV after peritoneum closed
b. APAP (acetaminophen) IV after delivery or orally, per os before or after delivery.

c. In our institute we are using paracetamol per rectal (less bioavailability) with good results.

d. Consider local anaesthetic wound infiltration or regional blocks such as TAP or QLB if neuraxial opioid is not administered, if multimodal cannot be initiated or if there is possibility of intense post-operative pain.

4.2.7 Breast feeding & maternal bonding

The Association of Women's Health, Obstetric and Neonatal Nurses supports skin-to-skin contact to promote lactation and breastfeeding. It can be termed as natural caesarean delivery & anaesthesiologist as important team member is one of the helping hands to the mother.

4.2.8 Intravenous fluid optimization:

Goal directed fluid management is the mainstay ERAS though not well established in this set of population.

Spinal hypotension is preferably managed by vasopressors.

Limit fluid administration to less than 3 litres for an uncomplicated case. This is taking into consideration oxytocin administration & resultant water retention, post-operative intravascular fluid shifts & hyponatremia.

At the same time early recognition & preparedness to manage PPH is of utmost importance to quick conversion of protocol.

4.2.9 Delayed cord clamping: 30-60 sec after birth

This domain though not under the jurisdiction of anaesthesiologist, unless contraindicated is beneficial to babies especially preterm preventing anaemia, improved iron stores & less risk of necrotizing enterocolitis & intraventricular haemorrhage though there is small increased risk of neonatal jaundice.

In case of maternal instability or neonatal resuscitation it may not be followed.

Water can be given 60 min after caesarean & normal diet can be introduced after 4 hours as can be tolerated.

Early oral intake is not associated with increased rates of gastrointestinal complications or risk for PONV in the non-obstetric and obstetric population. A meta-analysis, including 11 studies found that early oral intake after caesarean delivery enhances the return of bowel function and does not increase the risk of postoperative complications.

This is something new to us & we are not conversant with domain. Traditionally, oral intake has been delayed after abdominal surgery until the return of bowel function is confirmed by bowel sounds or passage of flatus or stools. This is contrary to the current evidence indicating that early oral intake promotes the return of bowel
function and early ambulation, decreases the risk of sepsis, reduces the time to breastfeeding, and shortens the length of stay.

4.3 Early Mobilization

Early mobilization decreases:
- Insulin resistance
- Muscle atrophy
- Hypoxia
- Venous thromboembolism
- Length of stay

This is the area where collaboration of two teams, i.e., obstetric and anaesthesia is needed as the patient is out of post anaesthesia care unit after about 1-2 hrs to obstetric ward.

Next two domains III & IV are under the control of obstetric ward staff.

4.4 Promotion of Resting Period

It can be achieved by promoting clustered activity to ensure sufficient rest to the parturient. Rest plays vital role in recovery.

4.5 Early removal of catheter

Remember the dose of local anaesthetic & opioid can delay the removal.

4.6 Venous Thromboembolism (VTE) Prophylaxis

Pregnancy itself is a hypercoagulative state & c section doubles the risk of VTE as compared to normal vaginal delivery. In otherwise uncomplicated patient the risk is very low & measures like early mobilization suffice though ACOG recommends mechanical thromboprophylaxis to all.

4.7 Anaemia Correction

Special attention to be given to the parturient who has bled intraoperatively.

4.8 Attention to the Breast Feeding

This should be joint venture of obstetrician paediatrician & the nursing staff.

4.9 Multimodal Analgesia

The principle is same as discussed in intraoperative goal with the same aim if reducing opioid intake & hastening recovery. Our experience with intrathecal buprenorphine & paracetamol IV, PO, or PR is satisfactory.

4.10 The Glycaemic Control

It is crucial for wound healing & control of infection. As per guidelines we try to maintain blood sugar <180-200mg%. Our practice is to schedule the case first on the list & monitor maternal & neonatal blood sugar post operatively.

4.11 Return of bowel function

Can be targeted with opioid restriction, encouraging mobilization & judicious use of bowel medications if needed. With all the aforementioned factors early discharge can be targeted. Facilitating early discharge ideally starts with establishing patient-oriented goals preoperatively, like neonatal care planning, lactation education, and contraception planning. Patient and support person education strategies in addition to patient self-empowerment for active participation in their health care are needed. This element is beyond the scope of anaesthesiologist & needs multi-pronged approach. The crux of the matter is efficient perioperative management. By aiming rapid return to normal physiology, we can target early discharge, thereby cutting the cost with reduction of burden on heavy obstetric units. The added advantage is maternal satisfaction & better bonding of mother with the child. The NICE guideline (National Institute for Health & Care Excellence) discharge after 24 hrs to an uncomplicated afebrile parturient after c section [17]. Our routine practice is to discharge the patient on 4th or 5th day post operative. In India rural urban gap is wide. At one end of the spectrum facilities are at par with the developed nations, & at the other end even basic infrastructure is lacking [18-22].

5. Conclusion

- Most of the suggestions about anaesthetic management can be implemented with whatever the resources available to us, rather we were following it even before.
- With strict adherence to suggested anaesthetic protocol we may be able to reduce the hospital stay by a day or so. We need to work on it to have evidence.
- The barriers for full implementation are because of our socioeconomic structure&
developing configuration of our nation with vast population.

- The published data towards achieving fifth millennium development goal is encouraging.
- The message is adapt the guidelines wherever possible with some local modifications to give benefit to the patient to have a good yield.

CONSENT
It is not applicable.

ETHICAL APPROVAL
Ethical clearance taken from institutional ethics committee and preserved by author(s).

COMPETING INTERESTS
Authors have declared that no competing interests exist.

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