ISA
Indian Society of Anaesthesiologists
Delhi Branch
Eternal Vigilance

ISA Delhi YUVACON 2024

ISA DELHI

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President (ISA Delhi Branch message)

Dear Friends

Greetings

Thank you for making Yuvacon 2024 a true success by actively participating i thank you each individual & all the institutions who have actively participated in sports, cultural activities & academic activities making it memorable & successfull.

Now we have to gear up for annual ISA Delhi confence. I request participation from various institutions as your involvement will add to the success of these events. Your support and commitment are key to turning this dream into a reality.

The first four monthly meeting at Akash Hospital Dwarka, Rajeev Gandhi Super Speciality, Tahirpur, AIIMS, VMMC & SJH, New Delhi were well attended.

Best Wishes to all.

Long live ISA.

Dr. Lokesh Kashyap
Professor and Head
Department of Anesthesiology, Pain Medicine and Critical Care
AIIMS, New Delhi

Vice President (ISA Delhi Branch message)

Respected Delhi ISAains,
Warm Greetings.

The March month of 2024 was very rejuvenating as we celebrate Colorful festival of Holi. Monthly clinical meet in Safdarjung Hospital & VMMC was excellent, along with academic program, Holi was also celebrated in the clinical meet. Our annual event "YUVACON 2024" was organized on 6th and 7th of April 2024 at Maulana Azad Medical College (MAMC). Yuvacon 2024 was huge success, well attended by more than 400 delegates with amazing participation of young anesthesiologists. Annual sports meet held on 31st march 2024 at AIIMS Gymkhana. Yuvacon is inspiring for resident doctors of Delhi NCR and other nearby states to participate in various academic and cultural activities.

ISA Delhi has launched "ISA Delhi academic series", which has been coordinated by Dr. Nishkarsh Gupta, G C south zone. Last two webinars had been huge success as more than hundred anesthesiologists including PGs, senior faculty and Consultants participated in both webinars.

Next monthly ISA Clinical meet will be on 26 April 2024 at Maulana Azad Medical College. I request all to attend these clinical meetings in large numbers.

Best Wishes to all.

Long live ISA.

Dr. Arvind Arya
Vice President Delhi ISA

Honorary Secretary (ISA Delhi Branch message)

Dear Delhi ISAians,

Greetings from ISA Delhi Headquarters,

Month of march marks a period of transition in which spirits are filled with hope and whispers of spring awaken dormant landscapes. It's indeed a time to embrace change, celebrate growth and breath in air filled with energy of new possibilities.

ISA Delhi wishes all its members and a very happy Holi and Dulhendi. May all the negativity burn in the bonfire and we all spread happiness along with vibrant shades of Dulhendi. .

ISA Delhi Yuvacon 2024 flagged off with a very encouraging and vivacious sports meet at AIIMS Gymkhana on 31st March 2024. This year Mini Marathon was the new attraction and almost thirty YUVA ISAians participated in marathon with a zeal. It was inaugurated by Dr. Girish Tyagi, Registrar DMC. Positivity in the air and loud cheers on the courts speak volumes about ISA Delhi sports meet.

ISA Delhi feels proud in informing all its members that " ISA Delhi Academic Series" flagged off with a boom on 13th March 2024. We are thankful to all esteemed faculties who joined to bless around 150 delegates for online session.

I congratulate ISA Delhi Central Zone and Department of Anaesthesiology VMMC and Safdarjung Hospital under headship of Dr Sujata Chaudhury for organising 4th CME cum monthly clinical meeting. Everything was simply perfect, warm hospitality, versatile topics of presentation, amazing quiz , mouthwatering snacking and holi celebration in the end was perfect icing on the cake.

I once again invite you all for ISA Delhi Yuvacon 2024 on 6th and 7th April 2024 at Maulana Azad Medical College. I take an opportunity to request my seniors and teachers to keep showering blessings on us with your ideas so as improvise functioning of Delhi Branch and urge YUVA ISAians to participate in branch activities with same zeal.

Dr Amit Kohli
Honorary Secretary
ISA Delhi

Honorary Treasurer (ISA Delhi Branch message)

Dear ISA Delhi members,

Greetings from the treasurer's desk.

A big shout out to all the fellow ISAians for turning the ISA Delhi YUVACON 2024 into a stupendous success. ISA Delhi has finally set its sail on the transformative journey fueled by your enthusiasm and active participation. The ISA Delhi YUVACON 2024 is still receiving many accolades from all over India and we are setting the grounds for ISA Delhi ISACON 2024, set to flag off on 27th September 2024. Please keep the spirits high and participate in the forthcoming ISA Delhi activities in massive numbers.

We have already launched ISA Delhi branch YouTube channel where you can revisit the recorded version of newly launched academic series and soon coming up with other social media platforms as well. Keep a watch and please maximize your engagementThank you all for being valuable members of ISA Delhi.

Long live ISA.
Jai Hind.
With regards,

Abhijit Kumar

Dr. Abhijit Kumar
Honorary treasurer, ISA Delhi.

Editor (ISA Delhi Branch message)

Dear ISA Delhi Members, Greetings!

It is with immense pleasure that we present to you the 4th issue of our monthly newsletter.

The newsletter contains recent advances, unknown topics, current opinions, relevant but less practiced guidelines, historical aspects with current relevance, sections of long case questions, quiz and crosswords.

We extend an invitation to all hospitals to submit case reports, review articles and studies for potential inclusion in the newsletter. We encourage all members to keep the articles coming, contributing to the richness of our community. Active participation from all members is encouraged to enrich the diversity and depth of our community's content.

In our pursuit for academic excellence, we welcome constructive criticism for improvement.

Long Live ISA! Long Live ISA Delhi!

Dr. Puneet Khanna
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Fourth Monthly Clinical Meet

The fourth monthly clinical meet of Delhi state chapter of ISA was held at VMMC and Safdarjung Hospital on Friday, 22nd March 2024. Dr. Santvana Kohli and Dr. Bhavya Krishna were the coordinators of the meet. The meet began with a welcome address by Dr. Sujata Choudhary, HOD, Department of Anaesthesia and Intensive care, VMMC and Safdarjung Hospital. The meet was attended by ISA National and Delhi ISA executive members, senior faculty members across Delhi, Dr Jayshree Sood, Dr Sharmila Ahuja, Dr Ashok Saxena, Dr Bimla Sharma. This occasion was also graced by Dr Vandana Talwar, Medical Superintendent, Safdarjung hospital, Dr Geetika Khanna, Principal VMMC and Dr P S Bhatia, Additional MS, Safdarjung Hospital. All dignitaries were invited for lamp lighting and Saraswati Vandana. President ISA Delhi, Dr. Lokesh Kashyap, Honorary Secretary ISA Delhi, Dr. Amit Kohli, and Editor-in-Chief, Indian Journal of Anaesthesia Dr. Rakesh Garg addressed the gathering. Dr. Amit Kohli shared information about the upcoming YUVACON 2024 (held on 6th and 7th April 2024), as well as future ISA activities. Academic sessions were followed by a quiz for the audience and release of the ISA newsletter by the ISA Delhi executive committee and editorial board members. Senior faculty members Dr Jayshree Sood, Dr Sharmila Ahuja, Dr Ashok Saxena, Dr Bimla Sharma, ex HODs Department of Anaesthesia and Intensive care, VMMC and Safdarjung Hospital, Dr Suniti Kale and Dr G Usha were felicitated. Dr. Kavita Sharma, Director Professor, Department of Anaesthesia and Intensive care, VMMC and Safdarjung Hospital proposed vote of thanks and presented a self-composed poem. The deliberations ended with Holi celebration and high tea.

Session 1: CME (Predictors of Outcome in ICU)

Presenter: Dr. Shruti Jain

Summary: Patient outcome in ICU is dependent on disease severity, which may be quantified by several outcome predictors. There are various scores in place, which include Injury Scoring systems (Glasgow Coma Scale and Injury Severity Scale), first day scores (APACHE, SAPS and mortality probability models), repetitive scores (MODS, SOFA and logistic organ dysfunction score) as well as nutritional scores (NRS 2002, mNUTRIC score and Subjective Global Assessment).

Session 2: Ultrasound assessment of Quadriceps thickness as on outcome predictor in critically ill patients.

Presenter: Dr. Sham Antony

Moderators: Dr. Saurav Mitra Mustafi, Dr. Vandana Talwar

Summary: Skeletal muscle wasting in critically ill patients has an incidence of 46%, which has a negative impact on patient outcome. This was a prospective observational study in 100 ICU patients, where ultrasound guided quadriceps muscle thickness was quantified. It was found that quadriceps femoris muscle is an easily accessible landmark in immobile patients, featuring well-defined fascial coverings that aid in the identification of muscle mass.

Session 3: Anaesthetic challenges in the management of a case of bronchial transection following blunt trauma chest.

Presenter: Dr. Deeksha Singh

Moderators: Dr. Ira Balakrishnan, Dr. Virendra Kumar

Summary: This was an interesting case of a 30 year old female, who presented to casualty with complaints of chest pain and breathlessness following blunt trauma chest. Her oxygen saturation on room air was only 82%, with hyperresonant percussion note and decreased air entry on the right side of chest. Imaging confirmed the diagnosis of right sided bronchial transection. Following immediate ICD placement, a right posterolateral thoracotomy with bronchial sleeve repair was planned, under GA with one lung ventilation. Low oxygen levels during surgery warranted the use of cross table differential ventilation using suction catheter for the oxygen insufflation of the lung post-transected segment. The patient was subsequently successfully weaned off the ventilator and discharged from hospital.

Session 4: Burden of palliative care on the caregivers and its impact on the quality of life of cancer patients.

Presenter: Dr. Oshien Bhanu

Moderators: Dr. Madhu Dayal

Summary: Family members or friends of cancer patients often assume the role of primary caregivers, facing substantial burdens that can lead to depressive symptoms, impacting their own and the patient's quality of life. Our study aimed to gauge the burden of cancer patients on their caregivers, using various assessment tools, and examine its link to patient outcomes. One hundred and seventy participants from a palliative pain clinic were surveyed, utilising questionnaires to assess caregiver burden and patient quality of life. Results revealed moderate to severe burden among caregivers, correlating negatively with patient quality of life.

Fourth Monthly Clinical Meet

Session 5: Acute Toluene Intoxication: Presentation and Management.
Presenter: Dr. Gursharan Singh
Moderators: Dr. Priyanka H. Chhabra, Dr. Santvana Kohli
Summary: This was an unique case of a young female, with alleged history of frequent whitener sniffing and consumption, who presented to casualty in an unconscious state, with generalised muscle weakness and severe metabolic acidosis and dyselectrolytemia. A diagnosis of toluene intoxication was made, and after management of ABC, she was admitted to ICU, where she received aggressive fluid resuscitation, potassium and bicarbonate replacement. She was discharged from ICU after 4 days with complete recovery. Toluene intoxication is characterised by a fruit odour in breath, severe neurological compromise, distal renal tubular acidosis (hallmark) with metabolic acidosis and dyselectrolytemia and acute kidney injury.

Author:
Dr. Nishkarsh Gupta
AIIMS, New Delhi

Sports Day: Yuvacon 2024

On the 31st of March 2024, the sports day of Yuvacon left a profound impression on all who participated and successfully organized the event. It was a grand celebration, providing an opportunity for everyone to engage in activities beneficial to their physical well-being. Various sports, including a mini marathon, badminton, table tennis, carrom, and chess, were held for men, women, and mixed categories.

The day commenced with a 3-kilometer mini marathon from JLN Auditorium to AIIMS Gymkhana, beginning at 7:20 AM. Dr. Girish Tyagi hoisted the flag for this event, marking its inauguration with the dropping of a white cloth. This addition to the program served as an invigorating warm-up for the subsequent games. Coordinators ensured that participants remained hydrated and nourished throughout the day, offering a healthy breakfast and lunch, along with refreshments such as butter milk, glucose water, juice, biscuits, and fruit.

Expanding upon the festivities, a vibrant atmosphere filled the air as participants showcased their athleticism and sportsmanship in each event. Notably, the badminton and table tennis matches were particularly intense, with spectators cheering on their favorite players from the sidelines. Participants enthusiastically competed in various categories of games , with professional referees ensuring fair play. Additionally, the strategic maneuvers and intense focus displayed during the chess and carrom competitions captivated the audience's attention.

In recognition of their outstanding performances, special awards were presented to the top performers in each category, motivating participants to strive for excellence. Dr. Munisha, Dr Lokesh and Dr. Rajiv Gupta graced the occasion, presenting bouquets and certificates to participants and referees, adding to the event's prestige. Furthermore, participants expressed their gratitude towards the organizing committee for their meticulous planning and seamless execution, ensuring a memorable experience for all involved.

As the day drew to a close, a sense of camaraderie and accomplishment permeated the atmosphere, with participants reflecting on the day's triumphs and forging lasting bonds with fellow enthusiasts. Indeed, the sports day served as a testament to the spirit of unity and healthy competition fostered within the Yuvacon community.
Though it spanned only a single day, the sports day brought immense joy and cherished memories,. Looking ahead, anticipation for next year's sports meet has already begun to build, with participants eagerly awaiting another opportunity to showcase their skills and create unforgettable memories together.

Sports Event: Yuvacon 2024 Winners

Mini Marathon

Winners – MEN (CUP + MEDAL)	Winners – WOMEN (CUP + MEDAL)
1st- Dr Saravanan (GOLD)	1st – Dr Niharika Das (GOLD)
2nd - Dr Vishal (SILVER)	2nd – Dr Harsha S Suvarna (SILVER)
3Rd – Dr Vimaljeet (BRONZE)	3rd – Dr Gajalakshmi (BRONZE)

Badminton

Events	Winner (CUP + GOLD)	Runner-up (CUP+ SILVER)
MEN SINGLES	Dr Adhip Ayyagari	Dr Dileep Kumar
MEN DOUBLES	Dr Vinay Kain and Dr Purandar	Dr R Mahesh and Dr Sunil Joe
WOMEN SINGLES	Dr Ashima Thakur	Dr Trisha Singh
WOMEN DOUBLES	Dr Trisha Singh and Dr Ashima Thakur	Dr Padma and Dr Kirti Mehra
MIXED DOUBLES	Dr Dileep Kumar and Dr Trisha Singh	Dr Adhip Ayyagari and Dr Kirti Mehra

Table Tennis

Events	Winner (CUP+ GOLD)	Runner-up (CUP+ SILVER)
MEN SINGLES	Dr Surender	Dr Abhishek
MEN DOUBLES	Dr Pranjal and Dr Prashant	Dr Vinay Kain and Dr Surender
WOMEN SINGLES	Dr Vaishali	Dr Trisha Singh
WOMEN DOUBLES	Dr Vaishali and Dr Trisha Singh	Dr Munisha Agarwal and Dr Mithil
MIXED DOUBLES	Dr Pranjal and Dr Darshna	Dr Prashant and Dr Mithil

Sports Event: Yuvacon 2024 Winners

Carrom

Events	Winner (CUP+ GOLD)	Runner-up (CUP+ SILVER)
MEN SINGLES	Dr Prateek Maurya	Dr Saravanan
MEN DOUBLES	Dr Prateek Maurya and Dr Saravanan	Dr Bharath and Dr Rupesh Gopalakrishnan
WOMEN SINGLES	Dr Bhumika Sharma	Dr Meena K S
MIXED DOUBLES	Dr Meena K S and Dr Vipin M	Dr Prateek Maurya and Dr Trisha Singh

Chess

WINNER	Dr Bharath
RUNNER-UP	Dr Rupesh Gopalakrishnan

Author
Dr Nitesh Goel
Senior consultant Anesthesia
Rajiv Gandhi Cancer Institute

Awake Spine Surgery

Introduction

The use of spinal anaesthesia for lumbar disc herniation was first described by Ditzler et al, in 19591.But even after decades, lumbar spine surgery is usually performed under general anesthesia (GA). Major reasons of anaesthesiologist's preference for GA over regional anaesthesia (RA) is secured airway prior to placing patient in prone position, fear of complications requiring to turn patient again on back and patient preference for sleep during surgery instead of remaining awake2. However, over the last decade a new interest has been developed for the use of RA in this type of surgery owing to major improvements in anaesthetic procedures, surgical techniques and rehabilitation protocols. Although awake spine surgeries (ASPS)with the help of RA is a relatively new concept with limited supporting evidence, it may prove to be highly effective in reducing post-operative hospital stays, in-hospital complications and cost of surgery while at the same time expediting recovery and rehabilitation3. Appropriate patient selection with a meticulous perioperative planning and execution is the key for successful outcomes. Before selecting any patient for awake spine surgery, it is essential toaddress the following concerns.

Is the case appropriate for awake spine surgery?

1) Surgery Related Factors

ASPS should preferably involve experienced surgeon and can be utilized in spinal decompression and fusion surgeries with moderate stenosis involving
a) maximum of two vertebral levels
b) minimally invasive or endoscopic technique
c) neural feedback and d)with limited surgical time (not more than 2-3 hours)

In patients with radiological evidence of facet cysts awake spinal interventions should be avoided due to the high risk of CSF leaks. Cauda equina syndrome should be ruled out in patients with herniated discs before awake decompression.

2) Patient Related Factors

There are certain relative contraindications to regional anaesthesia for awake spine surgery. The patient should not have a history of
a) anxiety

b) sleep apnea
c) conditions compromising the airway
d) poorly controlled pulmonary disease (baseline room air oxygen saturation < 95%) e) poorly controlled cardiac disease f) high risk for aspiration g) body mass index > 30 kg/m2 h) bleeding disorders or coagulopathies i)intracranial hypertension j) failed back syndrome k)radiological demonstration of arachnoiditis or severe spinal stenosis4. Patients with preexisting cardiac disease are not universally excluded due to the importance of the awake technique in this patient population.

What is your preoperative plan?

Proper patient counseling and preemptive analgesia are paramount for ASPS. Patient should be explained in detail about the various advantages of ASPS and simultaneously should be assured of remaining comfortable and pain free throughout the procedure.

Pre-emptive analgesia can be given if surgery is being done under regional nerve block or local infiltration. It generally involves preoperative administration of non-opioid agents in order to reduce narcotics consumption. Commonly used non-opioids analgesics are gabapentinoids, acetaminophen, dexamethasone and NSAIDs5.

Preemptive analgesia plan may include a multimodal analgesia regimen using dexamethasone (0.2mg /kg) IV in 100 ml normal saline over a period of thirty minutes and a combination of paracetamol 1g IV and NSAIDs such as ketorolac 30 mg IV before performing regional anaesthesia.

Recent placebo-controlled trials have shown opioid sparing effects with a single dose of peri operative dexamethasone (0.11-0.2mg/kg). It has shown to decrease 24-hour VAS score as compared to drug being given intraoperatively. Literature shows combination of NSAIDS and acetaminophen is more effective than either drug alone in reducing pain scores and opioid consumption and improves patient satisfaction.

What would be your intraoperative plan and would you consider regional or neuraxial anaesthesia for the patient?

There are various regional anaesthesia techniques which can be considered for

spine surgeries. This includes fascial plane blocks, local infiltration and neuraxial anaesthesia. (Fig 1) Thoracolumbar interfascial plane (TLIP) and Erector spinae plane block (ESP) are interfascial plane blocks which target the dorsal rami and are beneficial in minimally invasive spine (MIS) surgeries. There are a variety of choices for central neuraxial block with or without targeted nerve block. Spinal anesthesia is a rationale choice for MIS and open spinal surgeries like laminectomies and transforaminal lumbar interbody fusion (TLIF) surgeries. At our institution subarachnoid block (SAB) is often used, together with intravenous dexmedetomidine infusion for sedation. In the operating room, procedure is performed over shifting trolley. Patients receive spinal anaesthesia one or two level above the intended level of surgery , using 12.5–15 mg of hyperbaric bupivacaine with 25 mcg of fentanyl. We target to achieve dense block up to the level of T8-T10. High levels of motor block is poorly tolerated due to lack of abdominal muscle strength and inability to breathe deeply against increased abdominal pressure. Due to these reasons, surgery higher than T10 is not recommended under neuraxial anesthesia.

Our sedation protocol includes midazolam 1mg iv and fentanyl 20-30mcg IV before prone position and intravenous dexmedetomidine infusion(0.5-0.7mcg/kg/hr) after proning. Long acting benzodiazepines or opioids are avoided , in order to promote a rapid recovery.

Sekerak et al retrospectively evaluated effectiveness of SAB, SAB combined with TLIP block and GA in one hundred and eleven patients who underwent one - or two-level minimally TLIF surgery. They concluded SAB+TLIP in TLIF surgery resulted in decreased stay in postoperative care unit, lower pain scores, fewer opioid doses and reduce average length of stay compared to GA or SAB alone6.

Christopher et al in a case series of eight patients performed ultrasound guided TLIP block at L3 laterally on side of procedure with 25 ml of 0.5% ropivacaine. Extent of sensory loss observed was between T12-L5 dermatomes. Single 2 cm port inserted 3cm lateral to midline on side of lesion for transforaminal approach. None of the patients required additional analgesia during surgery and remained comfortable for twenty four hours postoperatively and discharged after one day of surgery7.

Duger et al studied anesthetic and analgesic effects of SAB, epidural or combined spinal epidural(CSE) block performed at L2-L3 intervertebral space in sixty six

patients undergoing lumbar laminectomy at L4-L5 level. SAB group received 0.1mg of morphine ,epidural group received 2 mg morphine and CSE group received 0.05mg of morphine into intrathecal space and 2mg morphine into epidural space. They observed SAB, epidural anaesthesia(EA) and CSE techniques are adequate and effective anesthesia methods for lumbar laminectomy operations. EA and CSE techniques were found to be more effective than SAB for postoperative analgesia with fewer side effects8.

Positioning Protocol:

After spinal anesthesia, patient is placed in supine position for 10 min and then log-rolled to prone position on Jackson's table (Fig 2). The patient permitted to self-position his torso and head according to their comfort. Adequate support for headrest with face foam or pillow is provided.(Fig 3)

Airway Management:

Nasal cannula is applied to spontaneously breathing patient for oxygen delivery. Supraglottic airway device and videolaryngoscope is kept ready in case transition to GA or emergent airway management is required.

Postoperative Analgesia:

Every effort is made to maximize non-opioid analgesia in order to prevent opioid-related adverse events such as nausea/vomiting, ileus, constipation, pruritis and respiratory depression. Our patients receive paracetamol 1gm IV six hourly and ketorolac 30 mg IV twice a day. Patients who are already taking gabapentinoids continue them in the postoperative periods. However, these are not routinely prescribed due to concerns of over sedation and respiratory depression.

Neurologic Assessment:

Assessment of the lower extremity strength and sensation remains a priority. It is important to compare these findings with baseline preoperative documented in the patient records. Neurological examination may not be possible in the immediate postoperative period due to effects of SAB and must be assessed afterwards.

Mobilization:

Under the supervision of the physiotherapist patient should mobilize with assistance shortly after returning from the PACU once patient has recovered from

effects of SAB. A patient should be instructed to roll onto his/her side, bring the legs down the side of the bed while simultaneously raising the torso up using the arms; this method decreases pain by limiting the amount of twisting/ bending.

Our Experience:

In the last two years from March 2022- March 2024, thirty patients were operated for single level transforaminal lumbar interbody fusion (TLIF) surgery under spinal anaesthesia. All surgeries remained uneventful except three patients two of which required GA before proning for surgery due to inadequate effect and one female patient needed ketamine boluses because of pain on instrumentation during surgery. Sixteen patients were discharged on same day, twelve patients on post op day 1 and two on post op day 2.

Awake spinal surgeries is a promising technique which can be highly effective to reducing post operative stay, expediting recovery and decrease the cost of surgery. This can be a part of enhanced recovery of surgery (ERAS) protocol which may be implemented for better patient care. Patient counseling, optimal regional anesthesia techniques along with careful sedation are of prime importance for conduct of awake spine surgeries. Good quality randomized, prospective and multi-centre trials with are required to demonstrate safety, efficacy and cost-effectiveness of this technique.

References:

1. Ditzler JW, Dumke PR, Harrington JJ, Fox JD. Should spinal anesthesia be used in surgery for herniated intervertebral disk. Anesth Analg. 1959;38(2):118e124.
2. Baenziger B, Nadi N, Doerig R, Proemmel P, Gahl B. Regional Versus General Anesthesia: Effect of Anesthetic Techniques on Clinical Outcome in Lumbar Spine Surgery: A Prospective Randomized Controlled Trial
3. Debono B, Corniola MV, Pietton R, Sabatier P, Hamel O, Tessitore E. Benefits of Enhanced Recovery after Surgery for fusion in degenerative spine surgery: impact on outcome, length of stay, and patient satisfaction. Neurosurg Focus. 2019;46(4):E6. https://doi.org/10.3171/2019.1.FOCUS18669.
4. Fiani, B., Reardon, T., Selvage, J., Dahan, A., El-Farra, M.H., Endres, P., Taka, T., Suliman, Y., Rose, A., 2021. Awake spine surgery: an eye-opening movement. Surg. Neurol. Int. 12, 222. https://doi.org/10.25259/SNI_153_2021.
5. Rivkin, A., Rivkin, M.A., 2014. Perioperative nonopioid agents for pain control in spinal surgery. Am. J. Health Syst. Pharm. 71 (21), 1845–1857. https://doi.org/10.2146/ ajhp130688.

6. Sekerak R, Mostafa E, Morris MT, et al. Comparative out-come analysis of spinal anesthesia versus general anesthesia in lumbar fusion surgery. J Clin Orthop Trauma 2020;13: 122-6.
7. Christopher S, Gopal TV, Vardhan V. Thoracolumbar interfascial plane block, way forward for awake endoscopic laminectomies. Indian J Anaesth 2020;64:436-7.
8. Düger C, Gürsoy S, Karadađ O, Kol IÖ, Kaygusuz K, Özal H, et al. Anesthetic and analgesic effects in patients undergoing a lumbar laminectomy of spinal, epidural or a combined spinal- epidural block with the addition of morphine. J Clin Neurosci 2012; 19: 406-410
9. De Biase, G., Bechtle, P., Leone, B., Quinones-Hinojosa, A., Abode-Iyamah, K., 2021. Awake minimally invasive transforaminal lumbar interbody fusion with a pedicle- based retraction system. Clin. Neurol. Neurosurg. 200, 106313 https://doi.org/ 10.1016/j.clineuro.2020.106313. Epub 2020

10. Strayer, A., 2005. Lumbar spine: common pathology and interventions. J. Neurosci. Nurs. 37 (4), 181–193.

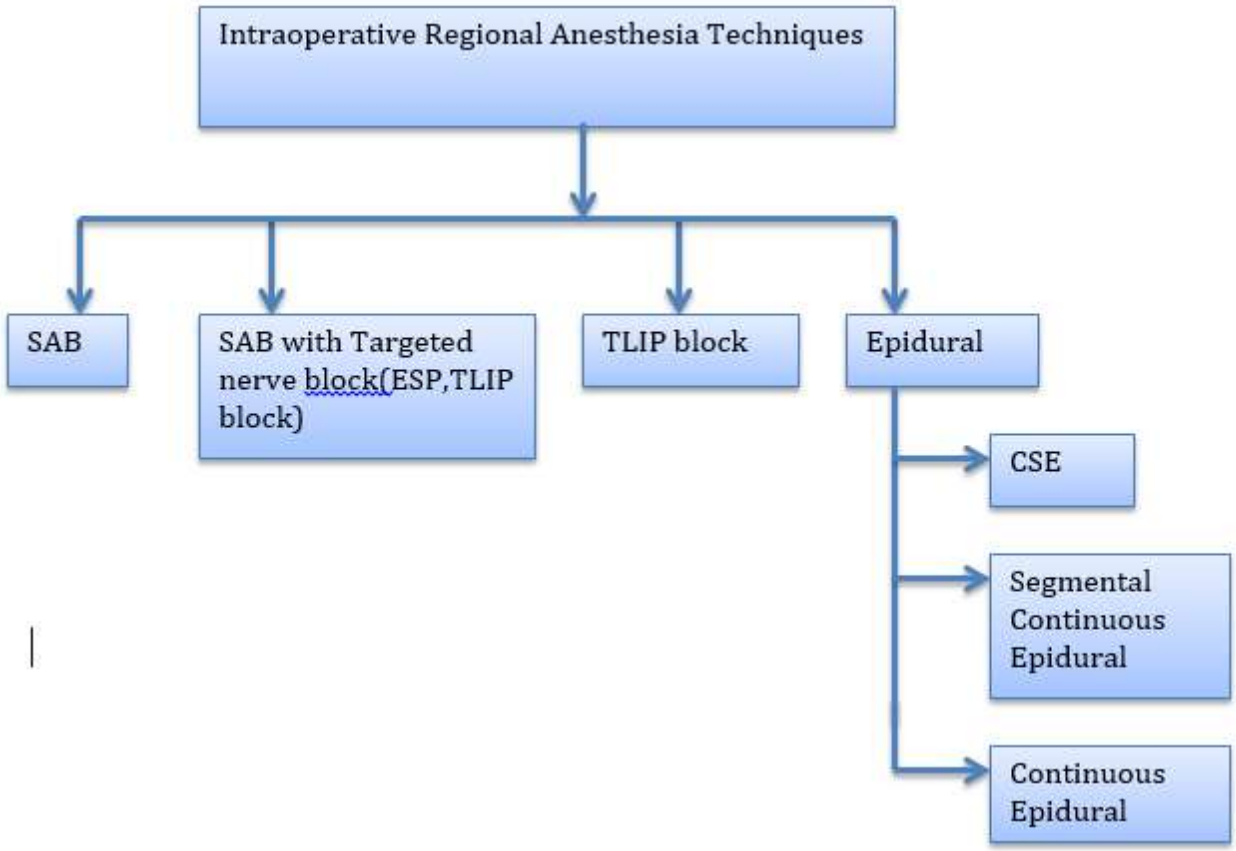

Fig: 1 SAB-Subarachnoid block, ESP-Erector spinae plane block, T LIP-Thoracolumbar interfascial plane block, CSE -Combined spinal epidural

Fig: 2 Jackson's Spine table

Fig: 3 Patient in prone position during awake spine surgery

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Sex, Pain and Guts

This is not a review for the latest Guy Ritchie blockbuster. What it is, instead, is a short review of the state of the art at the intersection of gender, pain, and microbiome.

There is ample evidence for the difference in pain perception between men and women. Differences in pain perception (tolerance & threshold) between adult men and women are greatest for electrical and pressure stimuli. In contrast, heat pain thresholds are highly variable between the genders. Interestingly, the literature suggests that this difference starts manifesting after the age of 12 years, when pubertal changes start, and the associated hormonal shifts happen.

Studies have shown that the microbiome of individuals residing in the same household, having the same diet differ from each other. Gender plays an important role in this difference. Sex differences are noted in the composition of, and diversity of the gut microbiota with clear effects of gonadectomy and hormone replacement on relative abundance of gut bacterial taxa, and microbial derived products such as bile acids. Oral contraceptive pills containing progesterone are known to affect pain perception directly, and cause changes to the host microbiota. Oral contraceptive pills are known to increase the density of Erysipelatoclostridium and increased plasma Lipopolysaccharide binding protein (LBP). LBP is known have a role in controlling inflammatory response by binding Lipopolysaccharide (a component of gram negative bacterial cell wall) and modulating cytokine release.

The general pathway of pain sensation is regulated by the peripheral nervous system, which senses the variations of sensory perceptions in the peripheral organs and conveys this information to the brain through the nerves and ganglia situated outside of the spinal cord. In turn, CNS processes the information and allows perception of pain. Among the factors that regulate pain pathways, the gut microbiota and its related metabolites have been recently recognized to play critical roles.

Gut bacteria are known to produce short chain fatty acid (SCFAs) such as acetate, butyrate, and propionate via anaerobic fermentation, which play a key role in maintaining intestinal epithelial barrier integrity, and in modulating the intestinal and peripheral immune system.
There is ongoing work on the interaction between the brain, gut and microbiota termed the microbiota-gut-brain axis. It is believed that this axis is bidirectional. The central nervous system modulates the microbiota via the autonomic nervous system and the hypothalamic-pituitary-adrenal axis primarily by changes in the intestinal motility.

In the other direction, microbes may indirectly (through activation of the immune system) or directly (through neurons' direct detection of microbial components and metabolites) cause activation and/or sensitization of host sensory neurons relaying pain largely

through the use of microbial-derived intermediates, including pathogen-associated molecular patterns (PAMPs) and short-chain fatty acids (SCFAs).

While there is abundant literature on the association of different pain conditions with specific microbiome compositions, associations is not causation. Microbiome alterations could be caused by the disease, or alternatively, both microbiome alterations and the disease could be driven by a third factor such as dit, or genetics.

Animal models play an important role in shining a light on such associations, and sometimes proving causation. For example, Prevotella capri, a bacteria found in humans with arthritis induced joint inflammation in a mouse model. Whether such examples will have any clinical applications remains to be seen.

While it is still early days in this dynamic corner of medicine, it is exciting nonetheless. The hope is that in the coming years we will have clarity on the intricate relationship between the gut, its bacterial inhabitants and our body. With better understanding could come clinical applications to mitigate and or even cure pain conditions in the near future.

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Sugammadex: The Price of Progress in Anaesthesia Management

Introduction

In the realm of anaesthesia and perioperative care, one drug has garnered significant attention and debate: sugammadex. Marketed as novel neuromuscular reversal agent, sugammadex has promised to revolutionize the management of neuromuscular blockade (NMB) reversal, offering rapid and reliable reversal with potentially fewer side effects compared to traditional reversal agents (RA) like neostigmine. However, the widespread adoption of sugammadex has raised questions about its cost-effectiveness and financial implications for healthcare institutions. In this article, we explore the questions: Is sugammadex worth the investment?

More than 400 million patients receive neuromuscular blocking agents annually. In the perioperative setting, up to 30–50% of patients receiving neuromuscular blocking agents experience postoperative residual NMB. Residual NMB is associated with an increased risk of postoperative respiratory complications, prolonged post-anaesthesia care unit (PACU) length of stay, and postoperative intensive care unit (ICU) admission. Sugammadex is a cyclodextrin-based molecule designed to encapsulate steroidal neuromuscular blocking agents such as rocuronium and vecuronium, reversing their effects by preventing them from binding to acetylcholine receptors. Its ability to provide swift reversal with minimal risk of residual paralysis has made it an attractive option for anaesthesia providers seeking to optimize patient outcomes.

Clinical efficacy & safety profile

Numerous studies have demonstrated superior efficacy of sugammadex compared to conventional RA. Its rapid onset of action allows for prompt reversal of NMB, reducing the risk of postoperative residual paralysis and associated complications. Moreover, sugammadex has been shown to provide more predictable and complate reversal, leading to shorter recovery time with improved patient satisfaction. These clinical benefits translate into tangible advantages for both patients and healthcare providers, including reduced postoperative complications and enhanced operating room efficiency.

In addition, sugammadex boasts a favourable safety profile compared to traditional RA. Unlike acetylcholinesterase inhibitors such as neostigmine, which can cause bradycardia, bronchospasm, and other cholinergic side effects, sugammadex is well-tolerated and rarely associated with adverse reactions. Its mechanism of action is selective and specific, minimising the risk of off-target effects and allergic reactions. As a result, sugammadex has become a preferred choice for NMB reversal in patients with

a history of adverse reactions to acetylcholinesterase inhibitors or contraindications to their use.

Cost consideration

Despite its clinical advantages, the high cost of sugammadex has raised concerns about its cost-effectiveness and financial impact on health care institutions. As one of the most expensive drugs in anaesthesia practice, the acquisition cost of sugammadex can significantly impact institutional budgets, especially in settings with limited resources. Healthcare administrators and policymakers must weigh the potential clinical benefits of sugammadex against its financial implications, considering factors such as frequency of use, patient population characteristics, and overall budget constraints.

Cost-Effectiveness Analysis

Several cost-effectiveness studies have attempted to evaluate the economic value of sugammadex compared to traditional reversal agents. Wachtendorf et al analysed 79,474 adult surgical patients who received neuromuscular blocking agents and reversal from two academic healthcare networks between 2016 and 2021 to calculate differences in direct costs. Based on their analysis, administration of sugammadex versus neostigmine was associated with lower direct costs (–1.3% lower costs; 95% confidence interval [CI], −0.5 to −2.2%; P=0.002). On subgroup analysis sugammadex was associated with US$1042 lower total costs (95% CI, –US$1198 to –US$884; P<0.001) in patients with lower risk. In contrast, sugammadex was associated with US$620 higher total costs (95% CI, US$377 to US$865; P<0.001) in patients with a higher risk (American Society of Anaesthesiologists physical status ≥3 and preoperative hospitalisation). In the study by Lan et al they did post-hoc analysis of a randomized controlled trial (RCT) and evaluated 1784 patients who underwent elective surgeries under general anaesthesia in Taiwan between March 2020 and August 2020. The time to extubation costs and personnel costs were significantly lower in the sugammadex group (17.4 ± 15.6 and 25.8 ± 16.3 USD, respectively) compared with the neostigmine group (19.0 ± 18.6 USD, p = 0.0032; 27.2 ± 18.7 USD, p = 0.0130). However, the economic benefits did not outweigh the higher drug costs of sugammadex (186.2 ± 44.7 USD) compared with neostigmine (23.4 ± 7.7 USD, p < 0.0001). The total costs in the neostigmine group were significantly lower compared with the sugammadex group, 50.6 ± 21.4 and 212.0 ± 49.5 USD (p < 0.0001), respectively. In another RCT by Fiorda et al, they recruited 37 patients and observed that sugammadex group was associated with a significantly faster moderate NMB reversal. They did not find any evidence of increased perioperative costs associated with the use of sugammadex in patients undergoing outpatient surgeries.

While these studies have yielded mixed results, they generally suggest that sugammadex may be cost-effective in certain clinical scenarios where rapid recovery is

paramount. However, the cost-effectiveness of sugammadex is highly dependent on various factors, including drug pricing, reimbursement policies, and healthcare delivery models. Further research is needed to elucidate the long-term economic impact of sugammadex use and its role in optimizing perioperative care.

Conclusion

To conclude sugammadex represents a significant advancement in the management of neuromuscular blockade reversal, offering rapid and reliable reversal with minimal side effects. Its clinical benefits are well-documented, contributing to improved patient outcomes and enhanced perioperative safety. However, the high cost of sugammadex remains a barrier to its widespread adoption, promoting discussions about its cost-effectiveness and financial sustainability. As anaesthesia providers strive to deliver high-quality care while navigating budgetary constraints, the decision to use sugammadex must be informed by a comprehensive assessment of its clinical efficacy, safety profile, and economic value. Ultimately, whether sugammadex is worth the cost depends on a nuanced evaluation of its benefits and trade-offs within the context of individual patient care pathways and institutional priorities.

Suggested readings

1. Wachtendorf LJ, Tartler TM, Ahrens E, Witt AS, Azimaraghi O, Fassbender P, Suleiman A, Linhardt FC, Blank M, Nabel SY, Chao JY, Goriacko P, Mirhaji P, Houle TT, Schaefer MS, Eikermann M. Comparison of the effects of sugammadex versus neostigmine for reversal of neuromuscular block on hospital costs of care. Br J Anaesth. 2023; 130:133-41.
2. Lan W, Tam KW, Chen JT, Cata JP, Cherng YG, Chou YY, Chien LN, Chang CL, Tai YH, Chu LM. Cost-Effectiveness of Sugammadex Versus Neostigmine to Reverse Neuromuscular Blockade in a University Hospital in Taiwan: A Propensity Score-Matched Analysis. Healthcare (Basel). 2023; 11:240.
3. Fiorda Diaz J, Echeverria-Villalobos M, Esparza Gutierrez A, Dada O, Stoicea N, Ackermann W, Abdel-Rasoul M, Heard J, Uribe A, Bergese SD. Sugammadex versus neostigmine for neuromuscular blockade reversal in outpatient surgeries: A randomized controlled trial to evaluate efficacy and associated healthcare cost in an academic center. Front Med (Lausanne). 2022; 9:1072711.
4. Jiang Y, Bash LD, Saager L. A Clinical and Budgetary Impact Analysis of Introducing Sugammadex for Routine Reversal of Neuromuscular Blockade in a Hypothetical Cohort in the US. Adv Ther. 2021; 38:2689-708.

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When Right Heart Goes Wrong: What Every Anaesthesiologists Should Know

The function of the right side of the heart is integral to the cardiac pump by providing preload to the left ventricle and systemic circulation and maintaining interventricular interdependence. Traditionally anaesthesiologists have focussed on the assessment and optimization of the left ventricle in their practice and the right ventricular (RV) failure has received relatively less attention. In recent years studies have shown that RV failure is a common but under-recognized cause of perioperative morbidity and mortality after noncardiac surgery. RV dysfunction is found in up to 25% of hemodynamically unstable postoperative patients and its diagnosis leads to a change in the management in 59% of cases. Therefore, the importance of identification and management of RV dysfunction or right heart failure is recognized increasingly by anaesthesiologists.

Definition and aetiologies:

Right heart failure (RHF) syndrome is characterized by the inability of the RV to generate enough stroke volume thereby resulting in systemic venous congestion, underfilling of the LV, and in the most advanced cases, cardiogenic shock. The aetiologies of RHF are diverse and can be summarised as follows;

1. RV Pressure overload due to precapillary pulmonary hypertension, obstruction to RV outflow tract due to pulmonary stenosis, massive pulmonary embolism, acute lung injury, or acute respiratory distress syndrome and post-capillary pulmonary hypertension due to pathologies of the left heart.
2. RV Volume overload caused by left to right intracardiac shunts
3. Impaired RV contractility due to ischemia, cardiomyopathies. Post-cardiotomy states.

Identification of patients at risk of RV dysfunction

The risk factors for perioperative RV dysfunction include various patient-related and surgery-related risk factors. To facilitate the early identification of patients at risk for perioperative RV deterioration, the Perioperative Quality Initiative (POQI) group has proposed the POQI-IX Individualized Right Heart Risk Assessment Tool (PIRRAT) that combines patient and surgical risk factors before surgery (Table 1).

Medical Risk	Surgical or procedural Risk	Functional status using NYHA classification
Age > 65 years	Trendelenburg position	
Acute lung disease	Pneumoperitoneum	
Chronic lung disease	Intracavitary procedures	
OSA	Prone position	
Obesity (BMI > 30)	Hypercapnia	
Venous thromboembolic disease	IVC/aortic manipulation	
Smoking (> 20 ppy	Deliberate hypotension	
Acidosis	Sympathectomy	
sepsis	Structural heart	
CAD		

Table 1: POQI-IX Individualized Right Heart Risk Assessment Tool (PIRRAT)

In this risk assessment tool, patient risk factors, each surgical or procedural risk factor is weighted equally and, when present, is assigned a score of 1. Finally, the patient's preoperative functional status at the time of assessment is based on their New York Heart Association (NYHA) Functional Status 1 through 4 is used as a multiplier after adding the risk factors to the surgical or procedural risk factors

Based on the score, further work-up of the patient may be planned using cardiac biomarkers, transthoracic echocardiography, or invasive haemodynamic assessment.

Preanaesthetic evaluation of patients with RV dysfunction

Patients in early RHF have non-specific symptoms that are difficult to identify. The clinical manifestations of more advanced RHF are summarized in Table 2.

Symptoms	Fatigue/ dyspnea on exertion Pre syncope, syncope Cachexia
Signs	Tachypnea Tachycardia/S3 gallop/parasternal heave Elevated JVP Peripheral Edema Ascites hepatomegaly
Serum markers	Elevated serum creatinine, bilirubin, BNP, NT-BNP
ECG	Sinus Tachycardia Atrial arrythmias
Echocardiography parameters	Interventricular septum (IVS) bowing RV fractional area change (RVFAC) <25% Tricuspid annular plane systolic excursion (TAPSE)<1.4cm RV longitudinal strain ≤15%

Table 2: Clinical features and laboratory findings in patients with RHF

Preoperative optimization: In patients with acute RHF, the urgency of proposed surgery should be ascertained by discussion with surgeons and cardiologist consultation. For patients at risk of RV dysfunction and those with chronic RHF following should general points should be considered;

1. Patients may be on a variety of medications depending on underlying conditions, and co-morbidities. Perioperative continuation or discontinuation of these medications should be decided as per standard recommendations.
2. For patients presenting for non-urgent procedures, consideration for initiation or modification of drug treatment should be given. For example; in patients with significant venous congestion, diuretic or ionodialators such as milirinone or levosimendan can be considered.
3. A review of chest imaging can identify parenchymal disease requiring further diagnostics or therapeutics
4. Correction of reversible causes of increased pulmonary vascular resistance (PVR)such as hypoxia, hypercarbia, acidosis, hypothermia RV dysfunction in the perioperative period:

The perioperative period exposes patients to many insults that may contribute to RVD. Excess preload may occur in the form of injudicious intravenous fluid administration, resulting in RV distension and tricuspid regurgitation. Impaired contractility may occur due to myocardial ischaemia. RV afterload may increase by many mechanisms, including:

- Bronchospasm
- Tension pneumothorax, lung collapse
- Pulmonary thromboembolism:
- Lung injury and inflammation: Due to pre-existing lung disease and the combined deleterious effects of ventilator-induced lung injury, systemic inflammation and fluid overload.
- Positive-pressure mechanical ventilation, PEEP
- Surgical factors such as patient positioning, pneumoperitoneum, diaphragmatic compression

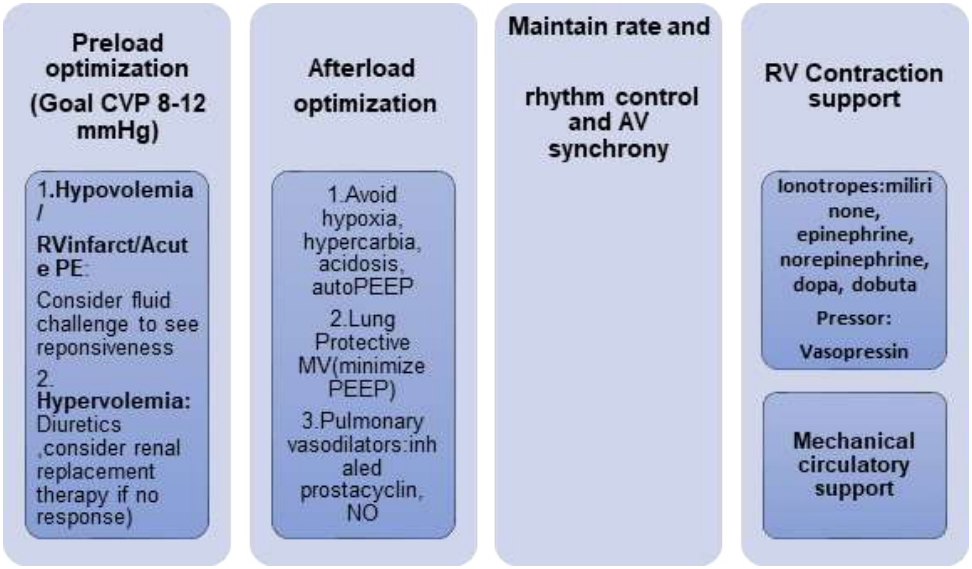
Perioperative monitoring: Adequate perioperative monitoring is essential for early detection and treatment of RHF. Apart from standard ASA monitoring, the following should be considered for high-risk patients and lengthy or complex procedures;

1. Pre-induction arterial line
2. Central venous catheters and in selected cases pulmonary artery catheters
3. Focused thoracic or transesophageal echocardiography for haemodynamically unstable patients
4. Near infra-red spectroscopy (NIRS) for measurement of regional mixed arterio-venous oxygen saturation

Haemodynamic goals: Intraoperative hemodynamic goals in these patients focus on preventing acute RV dysfunction and maintaining cardiac index to ensure adequate end-organ perfusion. The following recommendations can provide general guidance to aid in achieving these goals;

1. Reduce RV afterload: Minimizing RV afterload of RV is a key component of the prevention and management of RHF. As conditions such as chronic lung or heart diseases that increase afterload cannot be reversed acutely, iatrogenic factors leading to an increase in PVR (hypercarbia, hypoxia, acidosis) should be avoided. Intraoperatively ventilatory parameters should be optimized so that the lowest possible airway pressure is generated.
2. Optimize preload: In patients with RV dysfunction, both overfilling and underfilling of RV can be detrimental. Any increase in intravascular volume can worsen the dilatation and impair the filling of LV. Hence judicious administration of fluid bolus and assessment of fluid- responsiveness by change in stroke volume or cardiac output should be done in these patients.

3. Optimize rate and rhythm: It is preferable to maintain sinus rhythm and a relatively high heart rate to prevent overdistension of RV.
4. Maintain contractility of RV: Anaesthesiologists should be aware of the effect of anaesthetic agents on RV contractility and in high risk patients these should be avoided. Intraoperative RHF can result due to perioperative risk factors such as fluid overload, IPPV, patient positioning, pneumoperitoneum described previously leading to hypotension or tachyarrhythmias. The treatment involves simultaneous and timely execution of multiple strategies aimed at optimizing RV preload, afterload, and contractility as shown below.



Post-operative management: Postoperatively, vigilant monitoring is essential for optimizing RV function and preventing complications. This involves optimizing heart rate and rhythm, balancing fluid titration with fluid restriction, maintaining normal acid-base status, avoiding positive pressure ventilation and hypoxia, providing adequate analgesia, temperature management, and early utilization of pulmonary vasodilators and inotropes when indicated.

Suggested Readings:

1. Murphy E, Shelley B. Clinical presentation and management of right ventricular dysfunction. BJA Education 2019; 19 (6): 183-190
2. Ibekwe SO, Deschamps J, Grocott MPW, Liang Y, Shaw A, Perry TE. Perioperative quality initiative consensus statement on perioperative assessment of right ventricular function. Perioper Med 12, 66 (2023). https://doi.org/10.1186/s13741-023-00351-x

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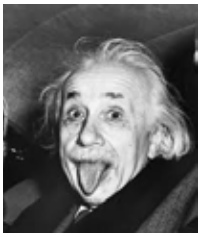
Competency-Based Time-Variable Anesthesia Postgraduate Education

A Vital Imperative or a Long-Overdue Mandate?



"It is, in fact, nothing short of a miracle that the modern methods of instruction have not yet entirely strangled the holy curiosity of inquiry; for this delicate little plant, aside from stimulation, stands mainly in need of freedom; without this it goes to wrack and ruin without fail." - Albert Einstein

Change, an inevitable force, intricately shapes the professional trajectories of individuals, particularly within the realm of medical education in India. Regrettably, India has predominantly mirrored Western paradigms in medical education until the recent adoption of a competency-based curriculum by the Medical Council of India, now known as the National Medical Commission, in 2019. This transition introduced detailed methodologies for acquiring competencies, along with the implementation of foundational courses, medical humanities, and ethics. These initiatives sparked nationwide discourse among stakeholders in Indian medical education. While the competency-based medical education (CBME) model garnered widespread acceptance and critique alike, the shift from the conventional fixed-time variable outcome curriculum to a competency-based framework raised significant concerns. Faculty members, the linchpin for implementing this new system, grappled with uncertainties, likely exacerbated by inadequate training. Moreover, the cultivation of student empowerment through practices like self-directed learning necessitated clarity. Despite these challenges, the overarching belief that a competency-based curriculum would benefit learners and, by extension, the broader community resonated strongly. However, it is imperative to recognize that time constraints should not impede the learner's journey towards mastery. [1]

As the COVID pandemic swept across the globe, the foundational principles of affording learners sufficient time to master essential competencies were abruptly halted. Numerous final-year students and interns found themselves thrust into high-stakes environments such as intensive care units and ward management, demanding a myriad of competencies for unsupervised execution. Now, as we gradually emerge from the pandemic's "It is, in fact, nothing short of a miracle that the modern methods of instruction have not yet entirely strangled the holy curiosity of inquiry; for this delicate little plant, aside from stimulation, stands mainly in need of freedom; without this it goes to wrack and ruin without fail." - Albert Einstein tumultuous aftermath, interest in Competency-Based Medical Education (CBME) has resurged, albeit

at a measured pace. [2]

The National Medical Commission (NMC) recently introduced guidelines for competency-based postgraduate medical education in Anesthesiology, marking a pivotal shift from traditional curricula. These guidelines outline expected achievements and set clear expectations for resident doctors. While some institutes have adopted the new competencybased curriculum, many still adhere to traditional methods. The guidelines propose a threeyear timeline and define competencies across various domains, though questions remain about how time variability will be incorporated. Implementing this change poses challenges, including the need for more faculty, time, and resources. This introduction of CompetencyBased Time-Variable Anesthesia Postgraduate Education addresses the limitations of traditional models and responds to the increasing demand for skilled Anesthesiologists. The phased structure of this training program spans three years, with an initial focus on mastering basic principles and progressing to more complex cases and specialized experiences. Ultimately, graduates are expected to possess a comprehensive skill set essential for modern healthcare delivery, including anesthesia planning, critical care management, and effective communication. [3]

Traditional postgraduate education methods in Anesthesiology typically involve lectures and seminars. While precise data is lacking, many institutes exhibit inadequate implementation and follow-up of academic schedules, resulting in incomplete coverage of essential topics. Attendance and assessment standards are often subpar, with residents frequently missing lectures due to burnout or clinical duties. The demanding nature of hospital settings leaves residents fatigued and unable to fully engage in educational activities. Furthermore, the increasing number of residents in India has outpaced the capacity of classrooms and infrastructure. A major drawback of traditional teaching methods is the lack of emphasis on practical skills assessment. Residents' ability to perform critical procedures safely and independently is often overlooked in Favor of theoretical knowledge. Didactic lectures promote passive learning and offer minimal opportunities for active student engagement, hindering the development of crucial clinical competencies. [1]

The impetus for reform in medical education arises from societal pressures demanding heightened accountability, driven by an increased emphasis on quality, safety, and the avoidance of adverse outcomes, often exacerbated by

the relentless news cycle. Traditional time-based educational paradigms, further constrained by duty-hour limitations, struggle to keep pace with the ever-expanding breadth of medical knowledge and skills necessary for proficient practice. Technological advancements and evolving medical procedures, particularly evident in specialized fields like Anesthesiology, necessitate prolonged periods for the acquisition and mastery of skills. Embracing milestone-based education offers an avenue for augmented experiential learning without necessitating an extension of training duration, thereby equipping residents to deliver more adept complex perioperative care. Competency-based education furnishes a structured framework for skill development, ensuring uniform and substantial learning experiences across various programs. Despite ongoing debates regarding its effectiveness in cultivating intricate skills, empirical evidence from esteemed institutions such as Johns Hopkins' Neurosurgery Department lends credence to its efficacy. Internationally, competency-based models have garnered success, albeit encountering obstacles like faculty apprehension and capacity building challenges. [4, 5]

Individuals may exhibit various levels of performance across different professional activities or competencies, which can complicate the education, training, and unsupervised practice continuum. This lack of continuity limits opportunities to reinforce learning, potentially contributing to disparities in learning pace. Furthermore, clinical competency committees often advance learners to the next phase despite weak or contradictory evidence of readiness, driven by factors like financial pressures, reputational concerns, and legal risks. However, the transition to unsupervised practice should prompt reflection on the consequences of inadequately prepared trainees. While logistical challenges and bureaucratic hurdles, such as time-dependent licensing and accreditation, are often cited as barriers to introducing variability in training duration, deeper issues persist. These include a lack of consensus on achievement markers for phase transitions, ineffective education handovers, and insufficient support systems for those considering alternative career paths. Career changes may stem from various factors, such as financial strain or misalignment with personal expectations, prompting individuals to seek alternative professions within or outside of medicine that better align with their skills and aspirations. [6]

Corraccio et al advocate for transitioning from the current rigid timeframe of medical education to a more flexible, time-variable approach focused on deliberate practice. Deliberate practice involves purposeful learning, coaching,

feedback, and repetition aimed at achieving and sustaining expertise. This shift offers several advantages, including fostering a lifelong growth mindset, adapting to changing population health needs and career trajectories, and consistently enhancing patient care quality and outcomes as providers progress towards expertise. [7] Figure. 1

Figure: AI generated artistic illustration (Microsoft Copilot) for prompt 'different learning speeds of students, include spectrum of colours to represent different speeds.' For Time variable competency based postgraduate anesthesia education.

The adoption of Competency-Based Time-Variable Anesthesia Postgraduate Education (CBME) presents both transformative potential and significant challenges. While CBME offers personalized learning experiences and promises to augment traditional educational methods through innovations like artificial intelligence, obstacles such as inadequate infrastructure, limited faculty resources, and resistance to change impede its widespread implementation. Overcoming these challenges requires substantial investment in faculty development and infrastructure. However, CBME has been shown to improve mental health outcomes among medical students and enhance proficiency in key competencies, suggesting its potential to positively impact the broader healthcare ecosystem. Ongoing research efforts will continue to evaluate the effectiveness of CBME and identify areas for refinement. Embracing a growth mindset and fostering a culture of continuous improvement are essential for the evolution of medical education to meet the evolving needs of patients and society. [8,9]

Conclusion:

In conclusion, Competency-Based Time-Variable Anesthesia Postgraduate Education represents a pivotal advancement in medical education. By addressing deficiencies in traditional residency training and embracing innovative teaching methodologies, CBME holds the promise of producing competent, compassionate healthcare professionals ready to navigate the complexities of modern medical practice. As we embark on this transformative journey, collaboration, innovation, and a commitment to excellence will be essential in realizing the full potential of CBME in anesthesia education and beyond.

References:

1. Gehlawat M, Thumati G, Samala P, Alekhya CL, Shailaja A, Sharma A. CompetencyBased Medical Education for Indian Undergraduates: Where do we Stand?. APIK Journal of Internal Medicine. 2023 Jun 12.
2. Sahadevan S, Kurian N, Mani AM, Kishor MR, Menon V. Implementing competency-based medical education curriculum in undergraduate psychiatric training in India: Opportunities and challenges. Asia-Pacific Psychiatry. 2021 Dec;13(4):e12491.
3. National Medical commission. Guidelines for competency based postgraduate training programme for MD in anaesthesiology. National Medical commission. Uploads. 2019. [Accessed on 10 April, 2024] Available at: https://www.nmc.org.in/wp-content/uploads/2019/09/MD-Anesthesia.pdf
4. Long DM. Competency-based residency training: the next advance in graduate medical education. Academic Medicine. 2000 Dec 1;75(12):1178-83.
5. Ebert TJ, Fox CA. Competency-based education in anesthesiology: history and challenges. Anesthesiology. 2014 Jan 1;120(1):24-31.
6. Schumacher DJ, Michelson C, Winn AS, Turner DA, Elshoff E, Kinnear B. Making prospective entrustment decisions: Knowing limits, seeking help and defaulting. Medical education. 2022 Sep;56(9):892-900.
7. Carraccio C, Lentz A, Schumacher DJ. Dismantling Fixed Time, Variable Outcome Education: Abandoning 'Ready or Not, Here they Come'is Overdue. Perspectives on Medical Education. 2023;12(1):68.
8. Gordon M, Daniel M, Ajiboye A, Uraiby H, Xu NY, Bartlett R, Hanson J, Haas M, Spadafore M, Grafton-Clarke C, Gasiea RY. A scoping review of artificial intelligence in medical education: BEME Guide No. 84. Medical Teacher. 2024 Feb 28:1-25.

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Neuromonitoring in Spine Surgery - A Way Ahead

Introduction

Intraoperative neuromonitoring (IONM) has now become a standard of care for complex spine and spinal cord (SC) surgeries. It provides instantaneous feedback about any iatrogenic injury to the spinal cord during surgical manipulation, thereby preventing any postoperative catastrophic neurological sequelae. The IONM used mainly deformity correction and spinal cord tumour excision surgery. Traditionally the electrophysiological monitoring such as somatosensory evoked potential (SSEP), transcranial motor evoked potential (TcMEP) and electromyography (EMG) are the modalities used for IONM.

SSEP is mainly used continuously to assess the integrity of the posterior column of the spinal cord. Although it is monitored continuously, signal changes are detected around sixteen minutes after any neurological insults so can't be used as a single monitoring modality. Now TcMEPs are most commonly used by IONM in spine surgeries. The TcMEPs monitor the integrity of the anterior column of spinal cord where lies the corticospinal tract. Although it is considered to be the most validated method to detect impending ischemia of the SC, it requires triggered stimulus so can't be used for continuous monitoring. It is also seen that muscles MEP response to transcranial electrical stimulus is highly variable and requires a protocolised anaesthesia regimen to prevent false positive signals.

Why do we need another monitor?

Also, it is to be noted that the electrophysiological signals changes occur after ischemic insult already transpired in the SC. Hence, we need a monitor which can caution beforehand about the ischemic insult to the SC by directly monitoring SC perfusion. Recently, Near-Infrared Spectroscopy (NIRS) has garnered attention for its ability to provide non-invasive, continuous monitoring of tissue oxygenation and perfusion, offering valuable insights into the metabolic status of the spinal cord and surrounding tissues during surgery.

Principle of Near Infrared Spectroscopy (NIRS)

NIRS monitoring is based on diffuse optical spectroscopy whose first in vivo application was demonstrated by Jobsis in 1977. He found that biological materials are relatively transparent to the near infrared wavelength spectrum so can be used to monitor real time tissue oxygenation saturation. There are four important blood chromophores with whose help relative changes in oxygen concentration of a particular region can be measured. NIRS monitor consist of a sensor which acts as both a light emitter diode and photodetector, optical fibre and analysing monitor.

NIRS for spinal cord hemodynamics : where do we stand till now After its approval by US food and drug administration (USFDA), NIRS has been the most sought-after device

to monitor cerebral and somatic tissue perfusion and oxygenation but the same has not been replicated in case of SC hemodynamics. According to a recent literature review there were only 26 studies which have studied the correlation of NIRS and SC oxygenation, majority of these are animal studies. The initial research in humans was in the cases of aortic aneurysm where spinal cord perfusion was assessed during aortic cross clamping to prevent postoperative paraplegia in the patients.

Macnab et al were the first who studied SC oxygenation in three pigs using a NIRS sensor placed on an exposed posterior spine at the level of T9-T10. In case of hypoxia and distraction of the spine the changes in NIRS values occur in less than one second thereby promulgating it to be the most sensitive device to monitor SC ischemia.

A study by Kogler et al used fiberoptic probe technology to monitor SC hemodynamic in 16 sheeps using pharmacological, physiological, and aortic cross clamping intervention. They found that on proximal aortic cross clamping there was a delay of only 2 minutes to detect the drop of 50 % in SC blood flow using diffuse correlation and diffuse optical spectroscopy. However, the clinically significant drop in evoked potential occurred after 16 minutes. Similarly, the signal recovery was assessed after removing cross clamping and it was found that SC blood flow signals return to baseline within 1 minute, but it takes around 18 minutes for evoked potential to return to baseline. Consequently, based on the result of above study it can be extrapolated that using NIRS spine monitoring a spine surgeon not only be alerted well advanced about any inadvertent error in placement of pedicle screw but also their rectification can be seen within minutes.

It should be noted that SC perfusion does not depend on just one radicular feeding artery but it is supplied by an extensive collateral network. The arterial supply of paravertebral muscle contributes predominantly in the collateral network supplying the SC therefore NIRS sensor placed on paraspinal muscle can act as surrogate to study SC perfusion. There are substantial evidence both in animals and humans which validated the above statement especially when the NIRS sensors were placed in the lumbar paravertebral region.

There are a few clinical studies of NIRS to monitor SC perfusion in humans. Most of these studies were done initially in aortic aneurysm repair surgery. Demir et al successfully used NIRS during aortic dissection surgery in two patients for SC perfusion and their conclusion underscored that when compared to SSEPs and MEPs, NIRS stands out as a practical and time-efficient method for monitoring the SC in real-time, enabling early detection of ischemia and hypoxia. The human studies have mostly used transcutaneous sensors to monitor SC blood flow until a group of researchers from United Kingdom for the first time used specially designed spinal NIRS optodes in eighteen posterior cervical spine surgery patients. These optodes were placed either

translaminar or transdural 1 cm apart and indocyanine green dye was used as tracer (Figure 1). The above authors were able to extrapolate the physiological changes of hypercapnia on SC perfusion using NIRS. Recently a multispectral imaging device was used to study spinal cord oxygenation during spine surgery in pigs. This device simultaneously uses both transmission and reflection mode of NIRS and appears to be more portable, flexible and cost effective. Future studies are needed to validate this device for monitoring spinal cord oxygenation.

Challenges and Future Directions: Despite its advantages, NIRS faces certain challenges in the context of spine surgery, including limited depth penetration and susceptibility to interference from surrounding tissues or surgical instruments. Future research efforts aim to address these limitations through technological advancements, such as multi-channel NIRS systems and integration with other IONM modalities. Additionally, large-scale prospective studies are needed to further elucidate the clinical impact of NIRS-guided neuromonitoring on long-term outcomes in spine surgery.

Conclusion: Near-Infrared Spectroscopy represents a valuable adjunctive tool for intraoperative neuromonitoring in spine surgery, offering real-time assessment of tissue oxygenation and perfusion. Despite existing challenges, NIRS holds significant promise in improving patient safety and surgical outcomes by facilitating early detection of ischemic events and guiding surgical decision-making. Continued research and technological innovation in this field are essential to fully harness the potential of NIRS in enhancing the quality of spine surgical care.

Further suggested reading:

1. Mainard N, Tsiakaka O, Li S, Denoulet J, Messaoudene K, Vialle R, et al. Intraoperative Optical Monitoring of Spinal Cord Hemodynamics Using Multiwavelength Imaging System. Sensors (Basel). 2022 May 19;22(10):3840.
2. Vanpeteghem CM, Van de Moortel LMM, De Hert SG, Moerman AT. Assessment of Spinal Cord Ischemia With Near-Infrared Spectroscopy: Myth or Reality? J Cardiothorac Vasc Anesth. 2020 Mar;34(3):791–6.
3. Rashnavadi T, Macnab A, Cheung A, Shadgan A, Kwon BK, Shadgan B. Monitoring spinal cord hemodynamics and tissue oxygenation: a review of the literature with special focus on the near-infrared spectroscopy technique. Spinal Cord. 2019 Aug;57(8):617-625.
4. Kogler AS, Bilfinger TV, Galler RM, Mesquita RC, Cutrone M, Schenkel SS, Yodh AG, Floyd TF. Fiber-optic Monitoring of Spinal Cord Hemodynamics in Experimental Aortic Occlusion. Anesthesiology. 2015 Dec;123(6):1362-73.

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Cardiac Risk for Non-Cardiac Surgeries

A comprehensive Guide of Identification and perioperative management with special focus on patients with Right sided Heart Failure and Pulmonary Hypertension

In India, around 4000 non cardiac surgeries are performed in one lakh population annually and 5 percent of them develop cardiac complications after surgery. It is estimated that cardiovascular complications are responsible for roughly one-half of all the mortality experienced by patients undergoing noncardiac surgery. A thorough preoperative evaluation of patients with appropriate risk stratification is necessary to minimize perioperative complications and reduce morbidity and mortality.

The American College of Cardiology (ACC) and the American Heart Association (AHA) have developed a set of clinical practice guidelines to standardize the preoperative cardiac evaluation of patients undergoing non-cardiac surgery. A known history of risk factors for cardiac disease, patient's functional status, and the urgency of procedure form the basis of such recommendations. The result is an individualized cardiac risk assessment which aims to reduces the risk of Major Adverse Cardiac Event(MACE), as it determines the need for further optimization of the patient with diagnostic testing, medical therapy, and even coronary interventions.

No substitute to clinical examination!

A thorough exam, along with non-invasive testing can provide information on three cardiac risk markers: LV dysfunction, myocardial ischemia, and heart valve abnormalities, all of which, are significant determinants of adverse postoperative outcome.

The physical examination focuses on the cardiovascular and pulmonary systems and includes auscultation of the heart and lungs, inspection of arterial pulses and veins, abdominal palpation and examination of the extremities for edema and vascular integrity.

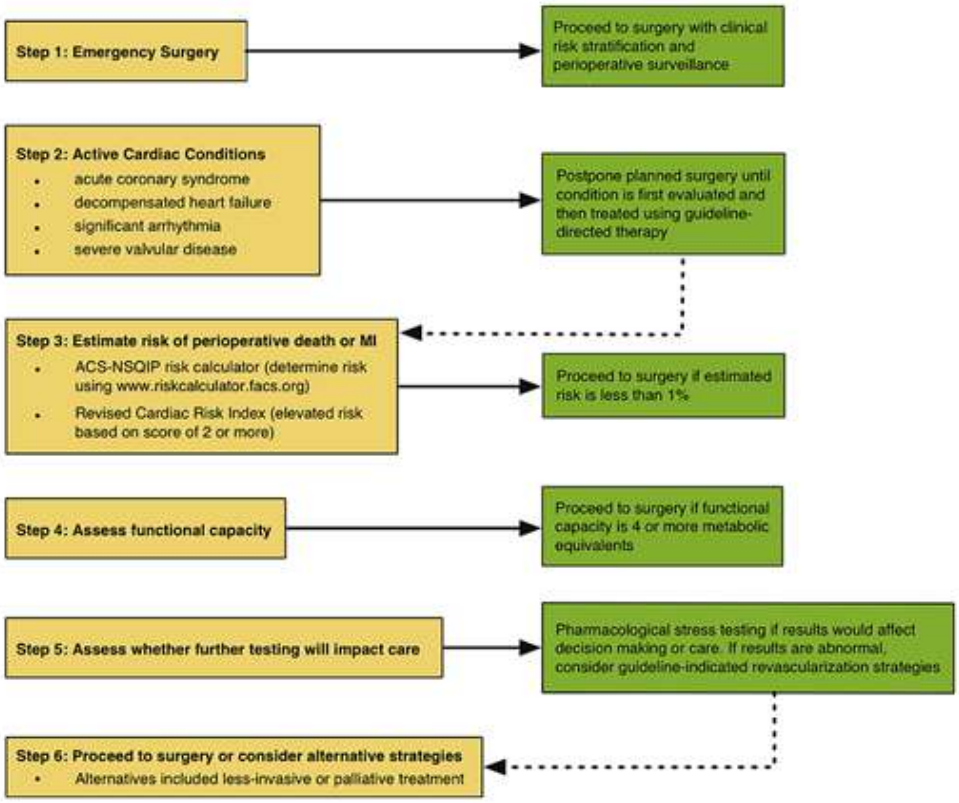
Risk Factors

Clinical risk factors for a perioperative major adverse cardiac event (MACE) include the following:

Cardiac Risk for Non-Cardiac Surgeries

Risk Factors
Reduced functional status (< 4 METs)
Ischemic heart disease (history of MI, angina pectoris, etc.)
Heart failure
Cardiomyopathy
Significant arrhythmias (Mobitz II AV block, 3rd-degree block, symptomatic ventricular arrhythmia, symptomatic bradycardia, newly recognized ventricular tachycardia)
Chronic renal failure
History of cerebrovascular accident or transient ischemic attack
Diabetes mellitus requiring Insulin
Chronic pulmonary dysfunction
Obesity
Anemia

After a thorough physical exam and evaluation of risk factors, surgical patients should undergo assessment for additional preoperative interventions by using the ACC/AHA algorithm. It is followed in a stepwise fashion and stops at the first point that applies to the patient. Following is the algorithm for the same.



Cardiac Risk for Non-Cardiac Surgeries

Risk calculators for assessment of the perioperative risk of MACE RCRI

Revised Cardiac Risk Index (RCRI) was developed by Lee et al. in 1999 . It is the most used tool in clinical practice due to its ease of use and reliability. The RCRI uses six clinical risk predictors, each of which are assigned equal weight.

Components of Revised Cardiac Risk Index*	Points Assigned
High-risk surgery (intraperitoneal, intrathoracic, or suprainguinal vascular procedure)	1
Ischemic heart disease (by any diagnostic criteria)	1
History of congestive heart failure	1
History of cerebrovascular disease	1
Diabetes mellitus requiring insulin	1
Creatinine > 2.0 mg/dL (176 µmol/L)	1

Revised Cardiac Risk Index Score	Risk of Major Cardiac Events†,‡
0	0.4%
1	1.0%
2	2.4%
≥3	5.4%

MACE, in this case, is defined as death, MI or cardiac ar

NSQI Surgical Risk Calculator

In 2013, the NSQIP Surgical Risk Calculator was created to provide procedure-specific risk. It is an online calculator which uses 21 patient-specific variables and calculates the risk of developing MI or cardiac arrest.

Pulmonary Hypertension and Right sided Heart Failure

The pulmonary vasculature system is normally a low-pressure, low resistance circuit. Pulmonary hypertension is classified as a mean pulmonary artery pressure greater than or equal to 25 mmHg at rest and is definitively diagnosed by right heart catheterization. Over time, the consistently elevated pulmonary pressures begin to increase the right ventricular afterload, leading to right ventricular hypertrophy and ultimately dysfunction.

Cardiac Risk for Non-Cardiac Surgeries

Patients with pulmonary hypertension with or without right ventricular heart failure have significantly increased morbidity and mortality when undergoing anesthesia and surgery. The stress of the surgery can exacerbate pulmonary hypertension and lead to various potential perioperative complications.

Preoperative Evaluation: It should include a thorough history and physical exam. Patients with mild pulmonary hypertension may complain of generalized fatigue, whereas patients with more severe disease complain of angina, near syncope, and syncopal episodes. Physical exam findings correlating with right ventricular dysfunction are distended neck veins, tricuspid regurgitation, S3 gallop, hepatomegaly, abdominal ascites, and peripheral oedema.

Preoperative labs and imaging are beneficial for knowing the status of the patient's disease and developing an anaesthetic plan. For patients with unknown disease status, pulmonary function testing and arterial blood gas should be considered. **Anaesthesia for patients with Pulmonary Hypertension and Right sided Heart Failure** Procedure specific concerns are essential. Before proceeding, the team needs to consider the risk-benefit ratio, and the anesthesiologist needs to verify that he or she has the available tools to manage acute right ventricular failure should it occur. Patients should be medically optimized to lower pulmonary vascular resistance afunction prior to surgery if possible.

Intraoperative Monitoring: The ASA recommends that a pulse oximeter, electrocardiography, blood pressure device, and temperature monitoring should be applied for all surgical cases. Additional and more invasive monitoring like invasive blood pressure monitoring, may be required for patients with multiple or advanced comorbidities. The arterial line allows for quick intervention and determining the appropriate ventilatory management.

A central venous catheter with a pulmonary artery catheter should be placed to monitor central venous and pulmonary artery pressures and targeted therapy for vasopressors, vasodilators, and fluids. Transesophageal echocardiography (TEE) can be used to evaluate the right ventricle.

Cardiac Risk for Non-Cardiac Surgeries

Induction: General anesthesia is a common anesthetic approach for patients with pulmonary hypertension. Peripheral nerve blocks and/or epidurals are helpful for perioperative pain control. Uncontrolled pain can be a trigger for a pulmonary hypertension exacerbation. Spinal anesthesia should be avoided because of the rapid onset and profound sympatholytic effects.

Etomidate is ideal for induction because it minimally affects cardiac function and systemic vascular resistance and is generally well tolerated with pulmonary hypertension. Intravenous or nebulized treatments with prostanoids or nitric oxide can be given to minimize pulmonary hypertensive responses to intubation. A rapid sequence induction is preferred.

Adding a benzodiazepine and/or opioid during induction will help decrease a sympathetic response. The overall goals are to avoid changes in preload, systemic vascular resistance, and contractility for the right ventricle to maintain cardiac output.

Ventilation: It is preferred to begin with low tidal volumes and keep peak airway pressures under 30 mmHg and End tidal carbon dioxide between 30 to 35 mmHg, and positive end-expiratory pressure (PEEP), ideally between 5 and 10 cm water. Increasing levels of PEEP can compromise preload and cause systemic hypotension. One-lung ventilation should be avoided if possible. Blood flow decreases to the non-ventilated lung, causing an acute exacerbation of pulmonary hypertension due to hypoxic pulmonary vasoconstriction.

Medications: The vasodilator drugs that are widely used for treatment are prostanoids, endothelin receptor antagonists, nitric oxide, and phosphodiesterase inhibitors. The aim is to balance blood pressure, fluid management, oxygenation, and acid-base physiology throughout the procedure. However, complications may still arise. These can include acute right heart failure, arrhythmias, systemic hypotension, and even death. With right heart failure, the right heart is not adequately pumping blood through the pulmonary vasculature and the left heart, decreasing cardiac output. It is managed by fluid administration, afterload

reduction, and improved contractility.

If the intravascular volume is depleted due to excessive blood loss or insensible losses, the heart cannot maintain cardiac output because of inadequate right-sided filling pressures. Fluid administration would be appropriate to increase filling pressures and thus cardiac output. To reduce right ventricle afterload, correct any hypercapnia, hypoxia, or acidemia. If there is no improvement, then pulmonary vasodilators should be added. Lastly, improving right ventricle contractility with inotropic agents such as norepinephrine may be beneficial. Most dangerous intraoperative complication from a pulmonary hypertension exacerbation is right ventricular failure causing persistent systemic hypotension.

Systemic hypotension needs to be aggressively treated with vasoconstrictors such as vasopressin or phenylephrine, an alpha one agonist. The most common arrhythmias are supraventricular tachycardia, and they can trigger right heart decompensation. The goal is to restore sinus rhythm with either electrical cardioversion, radiofrequency ablation, or drug therapy such as amiodarone. Overall, communication is important to ensure preparedness amongst all providers and patient safety.

References

- Green JB, Hart B, Cornett EM, Kaye AD, Salehi A, Fox CJ. Pulmonary Vasodilators and Anesthesia Considerations. Anesthesiol Clin. 2017 Jun;35(2):221-232.
- Caddigan S, Granlund B. Anesthesia for Patients With Pulmonary Hypertension or Right Heart Failure. [Updated 2023 Jan 29]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024
- Kim D, George MP. Pulmonary Hypertension. Med Clin North Am. 2019 May;103(3):413-423.
- Lobo SA, Fischer S. Cardiac Risk Assessment. [Updated 2023 Jul 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024

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An Anesthetist in Antarctica

Antarctica, the southern-most land mass, is the coldest, driest, and windiest continent on earth. It remains pristine and mostly untouched by human activity. Less number of humans set foot on Antarctica each year than on the summit of Mount Everest. It has no native human settlement. The total human population on the continent ranges from 1200 – 5000 depending on the season, consisting primarily of researchers and support staff. Vegetation is sparse, but fauna is plentiful along the coastline, consisting of seals, whales, sea birds, fish, and other marine life, making it an immense biodiversity hotspot.

Antarctic exploration started at the turn of the 20th century, and since then many countries staked territorial claims on the land. This potential for territorial conflict was largely resolved by the signing of the Antarctic treaty in 1949 by 12 countries, and its subsequent adoption by others. Today, 56 countries including India are signatories to the Antarctic treaty, that ensures freedom of scientific research and peaceful use of the continent. The treaty also prohibits nuclear testing, military operations, economic exploitation, and territorial claims in Antarctica. The only permanent structures allowed are scientific research stations.

India began scientific exploration of Antarctica with the first Indian Antarctic expedition in 1981. Since then, the Indian Antarctic Program has expanded into a multi-disciplinary, multi-institutional collaborative program under the control of the National Centre for Polar and Ocean Research (NCPOR), Ministry of Earth Sciences (MoES), Government of India (GoI). In 1983, we set up “Dakshin Gangotri”, our first research base in Antarctica. This was superseded by the “Maitri” base in 1989 and the “Bharati” base in 2012. These are the two functioning Indian research bases in Antarctica today.

The Indian Scientific Expedition to Antarctica (ISEA) is a round-the-year project that is conducted every year by the NCPOR. As with any expedition to a remote place, medical support is needed. I was fortunate to be a part of the medical team as Expedition Medical Officer for the 35th Indian Scientific Expedition to Antarctica in 2015-16.

The expedition usually has 3 teams – one for each of the two research stations, and a voyage team. The station teams reach Antarctica by air from Cape Town. The voyage team sets sail from Cape Town at the beginning of the Antarctic summer (around December), visits each of the two research stations for supplies, and then returns to Cape Town by the end of the Antarctic summer (around April).

An Anesthetist in Antarctica

Depending on requirement, the appointment for the expedition may be for short term (4 months) or for long term (12 – 14 months). Doctors from any specialization are eligible to apply for the chance of going on the expedition. However, anesthetists, being the “jack of all trades” and the masters of managing critical situations, are especially suited.

Medical problems on the expedition can range from trivial day to day ailments, to serious medical emergencies and life-threatening trauma. Frostbite, burns, electrocution, and drowning are other potential situations. Mental health issues are often encountered due to prolonged isolation and altered day-night cycle. Doctors who go on the expedition should have basic proficiency in first aid and the initial management of basic medical emergencies. Both stations have basic medical facilities including OT table, anaesthesia machine, sterilizing equipment, X-ray machine, portable ultrasound machine and instruments for basic laboratory work. Communication channels in Antarctica have improved drastically over the last decade with reliable access to internet. In case expert help and consultation is needed, WhatsApp groups consisting of medical professionals from various fields, many of whom have earlier served in Antarctica, are activated for advice and guidance. Medical evacuation from Antarctica is challenging. Air support availability depends on weather conditions as well as daylight availability. There may be months during which medical evacuation is impossible. Collaboration between neighboring stations of different nations through pooled expertise and resources is critical during adverse situations. Stations of Russia, Australia and China are situated close to the Indian station, and we often need to answer each other’s “call for help”.

Apart for medical duties, doctors on the expedition, just like any other expedition member, need to pitch in with general station maintenance activities, cleaning chores, and cooking. There is plenty of scope for exploration of surroundings and photography during the free time. However, one must be extremely cautious as one wrong step may lead to serious injury.

Weather in Antarctica usually ranges from pleasantly chilly during a sunny summer day (about 5 to 0 degree Celsius) to extremely cold during the polar night and during blizzards (temperatures as low as -50 degree Celsius). Living conditions in the stations are surprisingly comfortable and cheerful. We get to meet people from different fields and walks of life, something we are usually deprived of within our professional circle.

An Anesthetist in Antarctica

Highlights of my stay in Antarctica included sailing through sea ice and ice bergs, spotting whales and seals, walking alongside groups of penguins and witnessing with wonder the Aurora Australis (Southern Lights) lighting up the night sky. But most of all, I enjoyed the break from the mundane life of a doctor in a hospital, to that of an expeditioner following the footsteps of legends at the remotest corner of our planet.

The NCPOR usually brings out advertisements for the post of expedition medical officer every year. Those interested should visit the NCPOR website and follow the updates. The application usually comes out in March/April, followed by an interview in May/June, in Goa or in Delhi. Selected candidates are then taken on a week-long training course at Auli, Uttarakhand. Deployment to Antarctica usually happens between October – December.






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Anaesthesia for A Newly Joined Resident

As any other MBBS graduate joining residency, a newly joined anaesthesia resident must be overflowing with a sense of excitement, the zeal, a determination to make a change in patients' lives and healthcare. But that's not the case for an anaesthesia resident, we are nervous, questioning what we have chosen, thinking whether anything will change because of us in our patients' lives. This in my view is the state of most of us when we join anaesthesia. So, there are two types of MBBS graduates joining this department. First, who are not sure of any other medical discipline and second are the ones who are not willing to step in a surgeon's scrubs. I am glad enough to say that I had the opportunity to meet a third group of residents who are less in number but they do exist, the ones who took anaesthesia by choice, their first preference.

Now that one has taken the step in the world of anaesthesia, it's like a cosmos comprising not just of an anaesthetist, but an overlapping world inhabiting almost all of what we read in our MBBS. For me this was one big reason I could think of when I decided to enter this branch, a touch of everything we read, saw and learnt could be felt here. Ironically, residents know more about all other worlds but very less about their own magical world which they have stepped into. For most of us, we would have had the experience of OTs, but mostly from the other side of the screen, the curtain between a surgeon and an anaesthetist, and we must have never bothered much about this side before.

The first change in our lives as a newly joined are the operation theatres itself, the chilling cold ORs which are our workplace, our little offices in this world. The second being the idea of sterility, which I was known to but not acquainted to when I joined residency. So, the first day I held the surgeons shinning gloved hands when he was passing me the screen and it took me a whole of two very long minutes just to realise what has happened that led to everyone in the OR sigh and stare at me. As if this was not enough I went and with a very kind heart gave a syringe to my fellow surgeon who was asking for it since long, expecting gratitude but instead got a long stare from everyone again.

A day doesn't starts for anaesthetists in the morning, it actually starts a day prior with the pre anaesthetic checkup which is almost the only duration of a two sided conversation between us and the patients which might make us feel miserable, the less patient interaction being one of the sought reasons to choose anaesthesia. For a newly joined resident reaching the OT on time is a task in itself. Being few minutes late is always acceptable in wards, or in OR itself if we are on

the other side but we are expected to be early than everyone else in the theatre which does not go very well with our idea of equality in today's world. Once everyone starts building their presence in our office, the OT the nervousness and the bubble of not knowing what to do here keeps whirling up and up in our minds. For most of us, we would not even know where to exactly stand or exist in the OR. On my first day, I was standing at the foot end of the patient as that's where I landed first when I entered the theatre and could see my colleagues doing something at the head end with a mask and a balloon. I could hear monitors with loud beeps which I had never noticed before when I was an intern. Suddenly after a while, my faculty noticed a clueless person behind a face mask standing aloof.

Most of us will be noticed in ways similar to this and be asked for our names, where are we from, why take up this branch which would kind of increase the anxiety already existing in our heads and mostly asked to observe things being done for our first week. We would see some endeavours at the head end in the beginning followed by hours of surgery which would appear to be more interesting to look at then the monotonous monitors we are actually asked to look at followed by some more work at the head end of the patient and calling out their names as loud as possible, removing the tube and taking the patient to the recovery.

Despite this series of not so engrossing events, we would witness some of the many miracles of mankind, our beloved anaesthetic drugs and gases that are literally breathtaking and tranquilising, taking them to a parallel world of dreamless sleep devoid of pain and anxiety. Everyday a new operation theatre, new set of patients from a newborn to an old aged posted for a diverse range of surgeries but what persists is, the same dilemma of what and whether to do or just observe would keep hounding my head for the first two weeks.

The initial days may also lead you to a state of existential crisis where from being determined to change a patient's life for good you would start questioning your self worth and whether you will ever make a difference in anyone's lives including your owns. The following weeks you will step in the phase of doing something, making drugs with the mind boggling, most complex mathematics of deriving dilutions and once you crack your answer to dilution you would enter the physically most challenging, the injury prone job of breaking ampoules.

One thing at a time you would land up doing intravenous cannulations, lying every time by saying one small prick to the patient and ending up giving a small Mount

Fuji to their hands only to be overtaken by your seniors. As a first year, you will get the chance to meet some really generous seniors giving you the chance to be the master of the head end, hold the mask and balloon, and once the patient is induced which you would not even realise until you see apnea alarm on the monitor or be bombarded with, " start assisting, your patient is in" from the person sharing the throne of head end with you, your saviour.

And then is the task of making a seal and ventilating the patient, with an empty stomach in morning makes this the toughest hand day of your gym class. As if this is not enough you would be asked questions listening to which you would definitely forget to press the balloon in between for which you would be alarmed again by your saviour. This cycle continues until the longest three minutes would finish and the laryngoscope would be handed over to you and the real battle starts, beginning with the most heard question of, "What do you see inside?" pops up from the faculty. With your mind turning completely blind and in case you succeed in uttering some words and get to see the most sought part of the body for an anaesthetist, the glottis, you will get the tube to pass and you win your small battle.

As a first year resident you would feel you have learnt anaesthesia if you have done this, the happiness is unmatchable and unexplainable. There are a lot of such moments of instant gratification in the life of a first year anaesthesia resident - the backflow after removing an iv cannula's stylet, the appearance of CSF in the spinal needle's hub, the LMA slowly popping out a bit on inflation, the loss of resistance felt with the epidural needle, the etco2 rectangle on the monitor after you have put the tube in. But all these happy moments are preceded by a series of failures; atleast so was the case for me.

The quote - the more you fail, the more you learn stands practically apt for a first year anaesthesia resident. Innumerable times you will be overtaken by your seniors, sometimes them failing too in their first attempts which would make you feel a little less bad but ultimately you see them succeeding, keep thinking what went wrong with you and if you are blessed and have the courage to ask you will understand too. The anaesthesia machine is a new entity for an anaesthetist when you join and will stay new for most of the year, with you trying to understand the various waveforms, the numbers being displayed and the colour coded gases. The utmost feel of responsibility comes in a first year anaesthetists' life when we are left alone in our new world.

Anaesthesia for A Newly Joined Resident

The monitor gives you a sense of comfort for most of the times till the alarm starts taking your breath away, making you heart pounding in fear such that you can identify the cause of alarm only after atleast thirty seconds have passed and on top of that if the other side worlds people, the surgeons start asking you the most difficult question of your life, “Is everything good, should we stop?”, you are doomed. If your senses are successful in remembering the three golden words in the world of anaesthesia – call for help, you will be saved.

As the months pass in your office, the OT, you become more familiar with the environment, the people, the anaesthesia workstation, your monitors and your beloved chair, the throne you lounge on, the most treasured thing for you, the first year will fly by. On most days you will see your fellow residents drowned in what would appear absolute boredom to you while some cases would make you see them caught in the hustle of catecholamine surge. The first year will teach you the importance of observation, the more you observe the more you learn. The answer to why you had to come early can be realised – anaesthesia is anticipation, the wiser your anticipation the calmer you are when the storm arrives and as once told to me, you should anticipate and not assume. You will learn that every intravenous access is a new altogether; every airway is a new airway.

Most importantly you will realise how you manage the whole of the patient by sitting on the other side of the screen both by observing your seniors managing things and you doing your bit in helping them and at the end returning home with a happy and satisfied heart if not every day, but certainly on most of the days. Learning the art of anaesthesia is way far for a first year but atleast we will know why we chose this. After my first year I realised and I feel that we actually don’t choose this branch but Anaesthesiology chooses us and if such is not the case with everybody I would quote one of my professors – it’s never too late to quit this profession, if you aren’t really into this!

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Career Options in Pediatric Anesthesia in India

Pediatric anesthesia in India presents a dynamic and rewarding career path for medical professionals passionate about pediatric care and anesthesia. As the field continues to evolve, there is an increasing demand for skilled practitioners who can provide safe and effective anesthesia to infants, children, and adolescents undergoing surgical procedures. This article delves into the various career options available in pediatric anesthesia in India, highlighting the roles, responsibilities, training requirements, and opportunities for aspiring professionals.

Pediatric anesthesia involves administering anesthesia to pediatric patients ranging from newborns to adolescents. It requires specialized knowledge and skills due to physiological and anatomical differences between children and adults. Pediatric anesthesiologists work closely with pediatric surgeons, pediatricians, and other healthcare professionals to ensure the safety and comfort of pediatric patients peri-operatively for a large spectrum of surgical cases ranging from simple short procedures to complex long duration surgeries including laparoscopy, thoracoscopy, robotic surgery,. Their role extends to non-operating room procedures such as radiology (MRI, CT, Interventional radiology, radiotherapy, PET scan), GI endoscopy, sedation ofr echocardiography, EEG etc, haematology (bone marrow harvesting), placement of intravenous access/central venous access etc.

Career Pathways:

Training and Education: MBBS and MD/DNB Anesthesia are basic prerequisites for further training in pediatric anesthesia. During residency, trainees gain hands-on experience during their rotation in pediatric theatre but the exposure is limited and often the decision-making skills are not honed during this short period.

Training in Pediatric Anesthesia: Subsequent to residency, individuals may opt for a fellowship program specializing in pediatric anesthesia. Fellowship training provides in-depth knowledge and practical experience in pediatric anesthesia techniques, pediatric pharmacology, and the management of pediatric perioperative care. There are various levels of specialised training available in the country. For those who intend to administer anesthesia to children on an occasional basis, a short training can be undertaken either separately or as part of senior residency, preferably in a busy centers that has an active pediatric wing. For those who desire to pursue pediatric anesthesia as part of multi-specialty practice, it is advisable to undergo at least one year training, preferably in a pediatric center. There are several different fellowship programs in India:

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• Indian Society of Pediatric Anesthesia IAPA accredited 12 centers across the country for one year fellowship as a structured program. The IAPA website has all relevant details of the centers, contact numbers, how to apply and what to expect. The selection process rests with the host institute and usually the session starts in January or July. There is an exit exam at the end of the training and a nominal fees to the society. The stipend is given as per the institute policy. All students get an opportunity to participate in extensive academic sessions besides a good hands-on experience.

• State/university fellowship of one year duration on similar lines as above. Besides these fellowships, there are two more programs:

DM Pediatric anesthesia- PGI Chandigarh and KEM hospital, Mumbai offer DM seats in this field. Selection is through the NEET SS exam and the duration of training is 3 years.

FNB Pediatric anesthesia- this is a new program of two-year duration with several institutes across the country. The selection and curriculum is through FET held by the National board of examinations (NBE). FET is a MCQ-based qualifying-cum-ranking examination, usually in Feb, once a year. There is no upper/lower age limit, and the application fees is nominal. The total duration of the question paper is 105 minutes (Part A - 45 minutes and Part B - 60 minutes) and 50th percentile is considered qualifying.

Over and above these training programs, one should visit other centers either in the country or abroad as an observer so that a more diverse experience can be attained. Keeping yourself updated with the latest literature published and attend conference/CMEs at national and international level is another way forward to strengthen the skills required for quality care in pediatric anesthesia.

Job Opportunities: a. Hospitals: Pediatric anesthesiologists find employment opportunities in hospitals and medical centers across India, including government hospitals, private hospitals, and specialty pediatric hospitals. b. Academic Institutions: Some professionals choose to work in academic institutions, where they can combine clinical practice with teaching and research. c. Private Practice: Pediatric anesthesiologists may also establish private practices, offering specialized anesthesia services to pediatric patients in collaboration with pediatric surgeons and other specialists.

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It has been seen that parents are now demanding to meet the anesthetist before and after the surgery of their child so that their queries about the safety of anesthesia drugs can be discussed. It is always reassuring for them if the anesthetist has had specialised training in pediatric anesthesia. Similar comfort is sought by most pediatric surgeons who understand the nuances of treating a small child and the poor margin of safety that has to be tread all the time.

Challenges and Rewards:

Challenges: Pediatric anesthesia presents unique challenges, including managing pediatric airways, calculating appropriate medication dosages, and addressing the emotional needs of young patients and their families.

Rewards: Despite the challenges, a career in pediatric anesthesia offers immense rewards, including the opportunity to make a significant difference in the lives of children by ensuring their safety and comfort during medical procedures. Besides, like any other specialised field, it is well paying and quite gratifying.

Career options in pediatric anesthesia in India offer diverse opportunities for medical professionals passionate about pediatric anesthesia. With the right training, skills, and dedication, individuals can pursue fulfilling careers in pediatric anesthesia, contributing to the well-being of pediatric patients and their families across the country.

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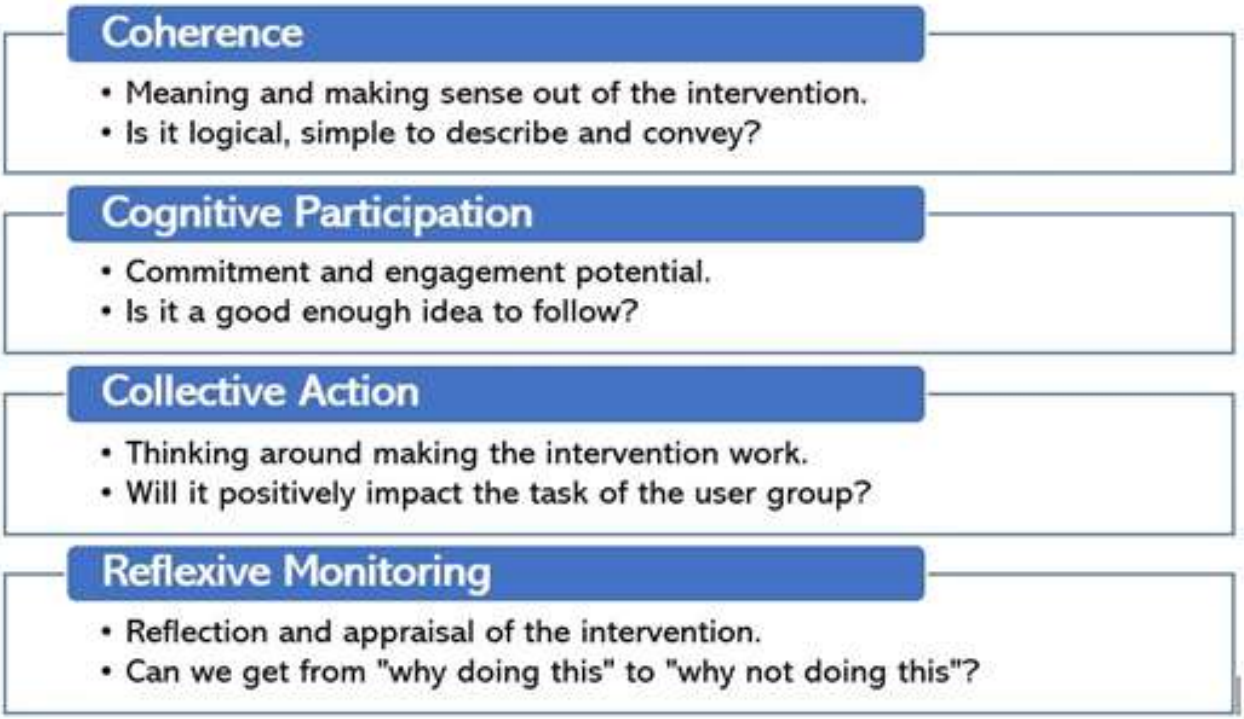
Normalizing the Complex Interventions in Perioperative Practice: Think Simple, Think C3R!

Almost every other day at the workplace, one proactively seeks opportunities to develop novel approaches aimed at improving the delivery of perioperative care. Herein, stimulating a 'simple' step-by-step thought process, as illustrated, can indeed be instrumental in form of a sensitizing tool, assisting the clinicians efficiently ponder and navigate through the issues of implementing interventions which may otherwise be seemingly 'complex'. It is believed that the young anesthesiologists and researchers will benefit from the tenets of this thinking exercise, what is better coined as the 'normalization process theory'.

Hope you are enjoying reading the newsletter and remember to keep it simple, folks!!!



Suggested reading:

Murray E, Treweek S, Pope C, MacFarlane A, Ballini L, Dowrick C, et al. Normalisation process theory: a framework for developing, evaluating and implementing complex interventions. BMC Med. 2010;8:63.

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CAD Patient with Pacemaker for Transurethral Resection of Prostate (TURP)

1. Describe the anatomy of prostate gland. What are the key components of the nerve supply to the prostate gland?
2. How does the innervation of the prostate gland influence the choice of anesthesia technique for transurethral resection of the prostate (TURP)?
3. What are the current medical therapy options available for benign prostatic hyperplasia (BPH) and lower urinary tract symptoms (LUTS)?
4. What are the various types of pacemakers?
5. What are the components of a pacemaker? Also describe the nomenclature used for pacing.
6. What are the indications for a permanent pacemaker? Mention the indications of pacing after myocardial infarction.
7. Name the different modes of pacing.
8. What are the potential complications associated with pacemaker implantation?
9. What are the factors that can alter the depolarization threshold of cardiac pacemakers?
10. What is pacemaker syndrome? Describe the management.
11. What are the commonly encountered sources of electromagnetic interference in the perioperative setting? How will you minimize the effect of electro cautery?
12. What are the preoperative concerns in a patient with cardiac pacemaker posted for TURP?
13. How will you evaluate the function of the pacemaker in the preoperative period?
14. Discuss the intraoperative monitoring for patients with pacemakers.
15. What are the pros and cons of Spinal anaesthesia in these patients?
16. What are the complications associated with lithotomy position?

17. What are the different irrigation solutions used? Describe the characteristics of an ideal irrigation fluid.

18. How do you estimate the volume of fluid absorbed? What are the factors that increase the absorption of irrigation solution?

19. What are the potential complications during TURP?

20. What is TURP syndrome? Describe the prophylactic measures to avoid TURP syndrome.

21. How do you suspect TURP syndrome under general anaesthesia? What are the differential diagnoses of TURP syndrome?

22. Describe the management of TURP syndrome.

23. Describe the effect of magnet application on the function of pacemaker.

24. What strategies would you employ to ensure a smooth transition from the hospital to home for the patient with a pacemaker, addressing any potential challenges or barriers to discharge?

25. Can you discuss the role of multimodal analgesia in managing postoperative pain for patients with coronary artery disease and a pacemaker?

Suggested Readings:

- Stoelting's Anesthesia and Co-existing Disease 7th edition
- Fleisher LA, Fleischmann KE, Auerbach AD, et al. ACC/AHA guideline on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Circulation. 2014;130:e278-e333.
- Stone ME, Salter B, Fischer A. Perioperative management of patients with cardiac implantable electronic devices. Br J Anaesth. 2011;107(S1):i16-i26.

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Unconditional & unmatched love..

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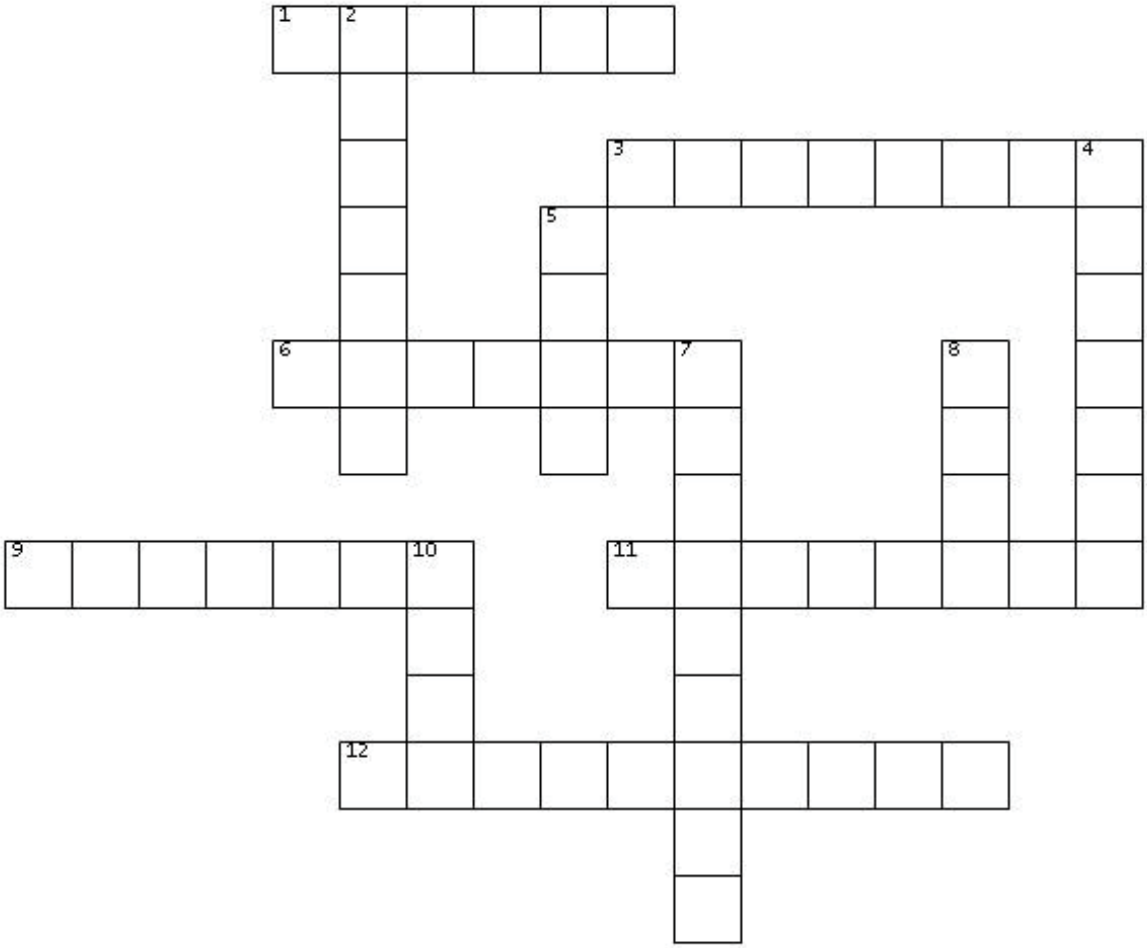
Crossword



Across

1. American anesthesiologist known as the founder of first academic programme in the same and known for first use of Thiopentone in 1934
3. Common name of the plant from which Digoxin is derived
6. Psychiatric drug that can cause potentiation of NDMB
9. Common Korean herb used for physical and mental stamina that can cause hypoglycemia and hypertension and can lower warfarin levels in blood
11. The Queen for whom John Snow used chloroform for childbirth
12. Patients with BMI>70 kg/m2 are classified as

Down

2. Further classified Guedel's stage 1 of depth of anesthesia in 1954 to 3 substages
4. Commonly abused herb for weight loss that can cause arrhythmias and MI
5. Programme established in 2016 aiming to look at perioperative care of major non cardiac surgery patients
7. New Zealand dental anesthetist who developed EMO and Oxford Ether Vaporizers
8. German surgeon who did first surgery under spinal anesthesia
10. Published earliest description of ultrasonography guided subsartorial saphenous block

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Entries to be sent at isadelhiexecutive@gmail.com and dramitkohli@yahoo.com by 20 May 2024

March Crossword Answeres

Across
1. Hunstad
2. Wilson
3. Lisfranc
4. Portsmouth
7. Mainstream

Down
1. Hollenhorst
2. Simone
5. Glucagon
6. Magill
8. Bier

Monthly Meet Calender

Sr No	Month	Institution/ Venue	Contact Person
1.	December 2023	West zone at Aakash Health care	Dr Anshu Gupta(GC) & Dr Namita sharma
2.	January 2024	East zone at RGSSH	Dr Arvind Arya and Dr Geetanjali(GC)
3.	February 2024	AIIMS	Dr Lokesh Kashyap, Dr Puneet Khanna & Dr Nishkharsh Gupta (GC)
4.	March 2024	VMMC & Safdarjung Hospital	Dr Sujata Choudhary & Dr Nishkharsh Gupta (GC)
5.	April 2024	MAMC	Dr Munisha Agarwal & Dr Ridhima Sharma(GC)
6.	May 2024	ESIC Group of Hospitals	Dr Prasad CGS & Dr Sudhir Gupta
7.	June 2024	Sir Gangaram Hospital	Dr Jayshree Sood & Dr Ridhima Sharma (GC)
8.	July 2024	LHMC	Dr Maitree Pandey & Dr Ridhima Sharma (GC)
9.	August 2024	UCMS	Dr R.S. Rautela & Dr Geetanjali (GC)
10.	September 2024	PGMER & RML	Dr Neerja Banarjee & Dr Ridhima Sharma (GC)

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