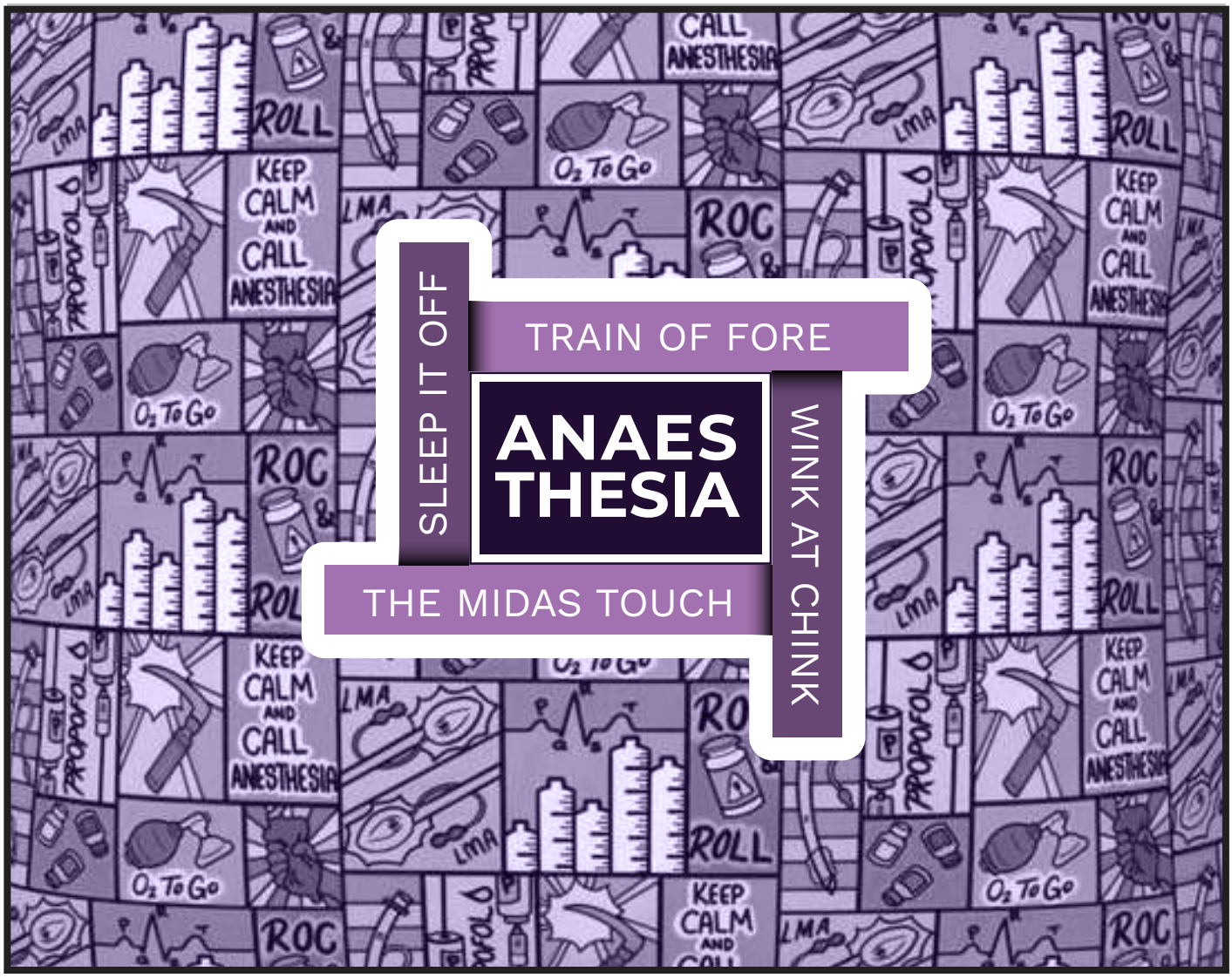
ISA
Indian Society of Anaesthesiologists
Delhi Branch
Eternal Vigilance



ISA DELHI

6th ISSUE, MAY 2024

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President (ISA Delhi Branch message)

Dear Friends

Greetings

Now we have to gear up for annual ISA Delhi conference. 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. Annual delhi ISA Conference will be held for three days (Workshops 27 September & Conference 28 - 29 September 2024 at Hyatt Centric Janakpuri, New Delhi

The first Six monthly meetings at Akash Hospital Dwarka, Rajeev Gandhi Super Speciality, Tahirpur, AIIMS, VMMC & SJH, MAMC and ESI Basai Darapur, 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.

Last ISA Delhi clinical CME meet of May 2024 was organized by ESI group of hospitals. Inspite of very hot summer, it was well attended by senior faculty and residents.. ISA Delhi is organizing various academic programs with other activities. CME and workshop on “Ultrasound for budding Anesthesiologists” was organized by G.B. Pant Institute and it was well attended, appreciated and was very successful program.

Medico legal and ethics cell of ISA Delhi has been created to discuss and help various medico legal problems of all ISA Delhi members.

ISA Delhi has launched “ISA Delhi academic series”, which has been huge success. Anesthesiologists including PGs, senior faculty and Consultants participated in webinars.

Preparation for our annual event , ISACON 2024 has already been started and flyer will be released soon.

Next monthly ISA Clinical meet will be organized by Sir Gangaram Hospital at JP Siddhartha hotel. 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 !

The month of May in India marks the peak of summers where the capital region reels under intense heat waves. ISA Delhi advises its members to stay hydrated, wear light clothing and avoid outdoor activities during peak afternoon hours. We all celebrated Budh Purnima and Eid-Ul-Fitr marking the end of Ramadan, the holy month.

ISA Delhi congratulates Department of Anaesthesiology, MAMC under the leadership of Dr Munisha Agarwal for successfully conducting CME on Labour analgesia on 4th May 2024 under the aegis of ISA Delhi branch. It was very well attended by good number of delegates and much appreciated by faculty members. I also congratulate Team ESI group of hospitals for organising 6th CME cum monthly clinical meet on 22nd May 2024 at ESI Basaidarapur which was largely attended by budding anaesthesiologists. The unique part of this meeting was that the scientific presentations were from ESI hospitals across different parts of Delhi.

On one side ISADelhi academic series is gaining popularity amongst postgraduates, ISA Delhi shall soon be accessed on Most of the social media platforms.

I, on behalf of organising committee of 63rd Annual Conference of ISA Delhi branch, ISACON DELHI 2024 invite you all to academic fiesta from 27th-29th September 2024. I request all my seniors and teachers to bless us with your experienced thoughts for smooth conduct of conference and urge my YuvaISAians to come up with fresh ideas to be incorporated in the event

Long Live ISA Delhi

Dr Amit Kohli
Honorary Secretary
ISA Delhi

Honorary Treasurer (ISA Delhi Branch message)

Dear ISA Delhi members,

Greetings from the treasurer's desk.

On behalf of ISA Delhi branch, my heartfelt gratitude goes out to all those who have attended the ISA monthly clinical meets with tremendous enthusiasm.

The stage is being set for the annual conclave of ISA Delhi branch, ISACON Delhi 2024. A three-day conference which commences from 27th September 2024 shall comprise of eight interactive hands-on workshops and an immersive academic design. The maiden brochure of ISACON Delhi 2024 has already been circulated and the full details of the scientific feast shall follow shortly. Please keep the spirits high and participate wholeheartedly in the forthcoming ISACON Delhi 2024 at Hyatt Centric, Janakpuri, New Delhi.

Before I conclude, I would like to remind you that ISA Delhi branch has its own YouTube channel, X and Instagram handle where you can update yourself with the current events and revisit the recorded version of newly launched academic series. You can find the names of social media handles on the cover page of this newsletter. Please subscribe and maximize your engagement there as well.

Thank 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 6th 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!

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Sixth Monthly Clinical Meet

The sixth monthly clinical meet of Delhi state chapter of ISA was organized by ESI group of Hospitals on Wednesday, 22nd May 2024. ISA dignitaries, senior faculty members and delegates from various institutions of Delhi attended the clinical meet. Dr Deepika Govil, Medical Commissioner ESI, Dr Nirmala Iyer, Medical Superintendent ESI PGIMSR Basaidarpur, Dr Sanjay Mishra Additional MS and Dr Mridusmita Mandal Deputy MS also graced the occasion.

ISA office bearers were invited to the dais and meet commenced with ISA Flag rising following which all dignitaries were invited for lamp lighting and Saraswati Vandana. President ISA Delhi, Dr Lokesh Kashyap; Vice President ISA Delhi, Dr Arvind Arya; Honorary Secretary ISA Delhi, Dr Amit Kohli and Editor, Dr Puneet Khanna addressed the gathering. Dr Amit Kohli updated the gathering about present and future ISA activities. ISA office bearers and senior faculty members Dr Jayshree Sood, Dr Rakesh Kumar Sharma, Dr Madhu Jain, Dr Pramilla Bhalla, Dr Usha Saha, Dr Bimla Sharma, Dr Vandana and ex HOD ESI PGIMSR Basaidarpur, Dr Madhu Gupta were felicitated. Academic sessions were interspersed with quiz questions for the audience and at the end of all sessions there was an enlightening discussion with the faculty and delegates. This was followed by release of ISA newsletter by ISA Delhi executive committee and editorial board members. Dr Ritu Lall, Senior Specialist, Department of Anaesthesiology, ESI PGIMSR Basaidarapur proposed vote of thanks which was followed by high tea.

Session 1: (CME) Effect of ventilator piloted pulmonary recruitment manoeuver on post operative pain in laproscopic cholecystectomy
Presenter: Dr Ananya Sharma
Moderator: Dr Madhu Gupta
Summary:

INTRODUCTION: One of the causes of postoperative pain and PONV in laparoscopic cholecystectomy is retained CO2. Pulmonary Recruitment Maneouvre (PRM) is a way to remove this CO2. Previous studies, predominantly done on gynaecological procedures were with manual PRM. Only one previous study has been done with ventilator piloted PRM on laparoscopic cholecystectomy. So the aim of this study was to evaluate the effect of ventilator piloted PRM on postoperative pain and PONV.

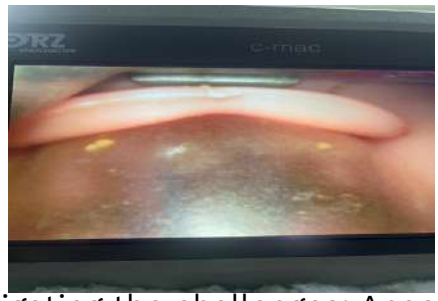
METHODOLOGY: A total of 100 patients were randomized into two groups, one where a PRM was given for 1 minute before incision closure (P Group – n=50) and

other where it was not given (C group – n=50). A specific protocol was designed for analgesia and antiemesis which was same in both the groups. Postoperatively, in PACU, patients were evaluated for postoperative pain and PONV using NRS. When NRS>5, rescue analgesic IV Fentanyl given. When NRS>3, rescue antiemetic given.

RESULT: In this study, mean pain scores were significantly lower in P Group as compared to C group. Significantly lower proportion of patients received rescue analgesia in P group at 8 hr (p value 0.009) and at 12 hrs (p value 0.012) respectively. Significantly lower number of patients received rescue antiemetic in P group at 4 hr (p value 0.015) and at 6 hrs (p value 0.160) respectively. No significant changes in hemodynamics were seen during or after the manoeuvre.

CONCLUSION: This study demonstrates that this simple and safe one minute ventilator-based manoeuvre helps with postoperative pain and PONV. More studies with ventilator based PRM needs to be done on non-gynaecological laparoscopic surgeries to establish the definite advantage of this manoeuvre in all laparoscopic procedures.

Session 2: How I Do It: Nasotracheal intubation with cuff inflation technique
Presenter: Dr Ritu Lall
Moderator: Dr Madhu Gupta, Dr Ravee Ranjan Kumar, Dr Parul Kaushik
Summary: While performing laryngoscopy for NTI, ETT tends to lie along the posterior pharyngeal wall. The laryngoscope blade lies on hyoepiglottic ligament to lift the glottis, thus moving it further away from the ETT. This alignment can be corrected by either applying external laryngeal maneuver, magills forceps or ETT cuff inflation technique. We used the ETT cuff inflation technique with 15 to 20 ml air, which in turn lifts the tip of ETT off the pharyngeal wall and align it with glottis. Two studies were conducted at ESI PGIMSR Basaidarapur, comparing intubating conditions while performing NTI with McIntosh vs Conventional and D blade C-Mac Video Laryngoscope. The results showed that in both groups all patients could be successfully intubated with cuff inflation technique and only few patients with Mcintosh required Magill forceps. Hence, ETT cuff inflation technique along with video laryngoscope is a safe and simple alternative to align the ETT with glottis for NTI.


Session 3: How I Do It: Navigating the challenges: Anaesthetic approach in a child with bilateral TMJ Ankylosis

Presenter: Dr Mohit Kharbanda

Moderator: Dr Unnati Asthana, Dr Lalit Mohan

Summary: Temporomandibular joint (TMJ) ankylosis in children, congenital or acquired, poses significant challenges to the anesthetist due to restricted mouth opening, recession of mandible and limited joint mobility. Though the plan of choice is Awake Fiberoptic Bronchoscopy (FOB) guided intubation, lack of co-operation in a young anxious child adds to the burden.

One such intriguing case of a 9-year-old girl operated for gap arthroplasty at ESIC Dental college and hospital, Rohini was presented. A focused history aimed at congenital deformities, mode of injury and functional limitations was taken. A detailed airway examination revealed difficult mask ventilation (receding mandible), impossible oral laryngoscopy and SAD placement (mouth opening of 1 finger) and anticipated difficult extubation. An Xray of cervical region revealed grade III adenoid hypertrophy which regressed to Grade I after management with topical steroids and vasoconstrictors for two weeks. Patient co-operation was achieved by depiction of the procedure of Awake FOB with videos and diagrams with reassurance to both the patient and the parents. ENT surgeons were kept standby for tracheostomy if needed. Airway was topicalized with 4% lignocaine by nebulization done twice. Pre-oxygenation along with para- oxygenation with nasal prongs ensured adequate oxygen reserves throughout. The difficult airway armamentarium is a must keep. Awake nasal FOB was successfully performed using SAYGO (Spray As You Go) technique with minimal sedation using fentanyl 1 mcg/kg followed by induction of anesthesia. After an uneventful surgery, an awake extubation was done once complete recovery was ensured. This case illustrates the challenges and strategies involved in anesthetic management, beginning with rapport building to gain co-operation, counselling, visualize adenoids for nasal intubation and adequate airway preparation.

Overall, this case underscores the importance of preoperative assessment,

interdisciplinary collaboration and meticulous airway management to ensure safe anesthesia.



Session 4: Emergency surgery in Myotonia Congenita – A safe anaesthetic approach

Presenter: Dr Soumya

Moderator: Dr Prasad C.G.S. and Dr Parul Kaushik

Summary: A case of 39-year-old female patient with Myotonia Congenita posted for exploratory laparotomy in view of perforation peritonitis. During pre-op evaluation, patient was found to be case of Myotonia Congenita, diagnosed 1.5 year back and was on Tab. Mexilitine 100 mg twice daily. After pre-op stabalisation, general anaesthesia with TIVA and endotracheal intubation with a clean anaesthesia machine was planned. Vaporizers were removed and anaesthesia machine flushed with 100% Oxygen to remove traces of inhalational agents. Modified RSI done using fentanyl, ketamine and propofol for induction and rocuronium for muscle relaxation with TOF monitoring. For maintenance, ketamine propofol infusion and fentanyl infusion with BIS monitoring. Hemodynamic stability maintained with CVP guided fluid and IBP monitoring and normothermia with warming blanket and warm i/v fluids. At the end of surgery, patient was shifted to ICU in view of metabolic derangements. After mechanical ventilation for 24 hours with TOF monitoring and corrections of metabolic derangements and electrolyte disturbances, patient was extubated and shifted to surgical ward on post-op day 3.

Session 5: Comparison of Ambu Aura Gain and LMA Proseal in adult patients scheduled for laproscopic surgeries

Presenter: Dr Shruti Gupta

Moderator: Dr Seema Kalra

Summary: Second generation supraglottic airway devices (SAD) are popular due to their better seal pressure and an additional gastric access channel. Ambu Aura

Sixth Monthly Clinical Meet

Gain (AAG) is a newer SGD, has a preformed anatomical curvature. A prospective randomised control trial in 100 patients scheduled for laparoscopic surgeries, whereby clinical performance of Ambu Aura Gain (AAG) was compared with Proseal LMA when used by residents. AAG took significantly less time for insertion even when used by residents. Reported range of time taken for insertion, is due to difference in definition of time for successful insertion. AAG was less easy to insert, probably due to the preformed curvature of AAG. Both devices were comparable in success rate of first attempt insertion, oropharyngeal pressures, fibreoptic assessment of anatomical position, hemodynamic parameters and postoperative airway morbidity. We suggest that AAG can be used as an alternative device successfully when used by residents, for securing airways in patients undergoing laparoscopic surgeries.

Compiled by
Dr. Anshu Gupta
LHMC, New Delhi

Anaesthesiologist as ECMO Intensivist: Heralding A New Era?

It is the desire of each Anaesthesiologist to preserve perioperative patient safety and autonomy. In today's changing ICU of anaesthesiologist scenario each postoperative patients, should be placed under the supervision of an anaesthesiologist just as they are under the guidance of a surgeon/cardiologist or other physician/surgeon. As anaesthesiologist despite us being perioperative physicians we devaluate ourselves and encompass ourselves in negativity. General public too is unaware of what anaesthesiologists perform in the operating room! This is why ASA branded us as "physician anaesthesiologist." Despite that we are denied by the administrators the right equipment or salary as the capital budgeting of a busy hospital, is not dependent on a "physician anaesthesiologist". So why shouldn't we, in these tight scenarios, expand our wings and move in either a lateral, leadership role, such as either an ECMO intensivist or a pain physician and Echocardiographer or a critical care Intensivist. This job profile is **critical** and essential just as any perioperative anaesthesiologist is, but they are not dependent on the surgical branches.

Being a part of an ECMO team in India from AIIMS and other national bodies like ECMO Society Of India and The Simulation Society and now as the President of South West Asia and Africa Extracorporeal Life Support Organization (SWAAC ELSO), I learnt that ECMO is an essential stethoscope in every ICU of a tertiary public and/or private hospital today and we anaesthesiologist have a major role to play in it. Simply because we are a hospital-based specialty, must we in effect apologize for our very existence and "take the fall" for a suboptimal perioperative financial climate, over which we have little to no control?

ANAESHESIOLOGISTS ARE GREAT ECHOCARDIOGRAPHERS AND ECMO INTENSIVISTS

Anaeshesiologists are great echocardiographers and ECMO intensivists who can provide good clinical skills for both Echocardiography and ECMO. A lifesaving procedure such as extracorporeal membrane oxygenation (ECMO), too needs good

imaging modality for success and better patient's prognosis. [1] The placement of cannulas and the right patient selection for ECMO, all requires echocardiography.[2] Only an anaesthesiologist or intensivist can provide an in-depth knowledge of ECHO on ECMO. Echocardiography plays a fundamental role in the management of patients supported with ECMO.[3] It is particularly useful for the detection of cardiac complications that may arise during ECMO. It helps in many ways during the ECMO run, as shown in Table 1

Table 1:- Echocardiographic monitoring on extracorporeal membrane oxygenation[4]
Patient selection
Monitoring during support
Insertion and correct placement of cannulas
Detecting complications
Decision making: Cardiac recovery, weaning, bridge to extracorporeal membrane oxygenation

TYPES OF EXTRACORPOREAL MEMBRANE OXYGENATION

ECMO is a rescue therapy used to provide cardiac and/or respiratory support for critically ill patients in whom maximal conventional medical management has failed. There are two types of ECMO – the veno-venous ECMO (VV-ECMO) and veno-arterial ECMO (VA-ECMO). VV ECMO provides adequate oxygenation and carbon dioxide removal in isolated refractory respiratory failure. VA-ECMO is preferred when support is required for cardiac and/or respiratory failure.

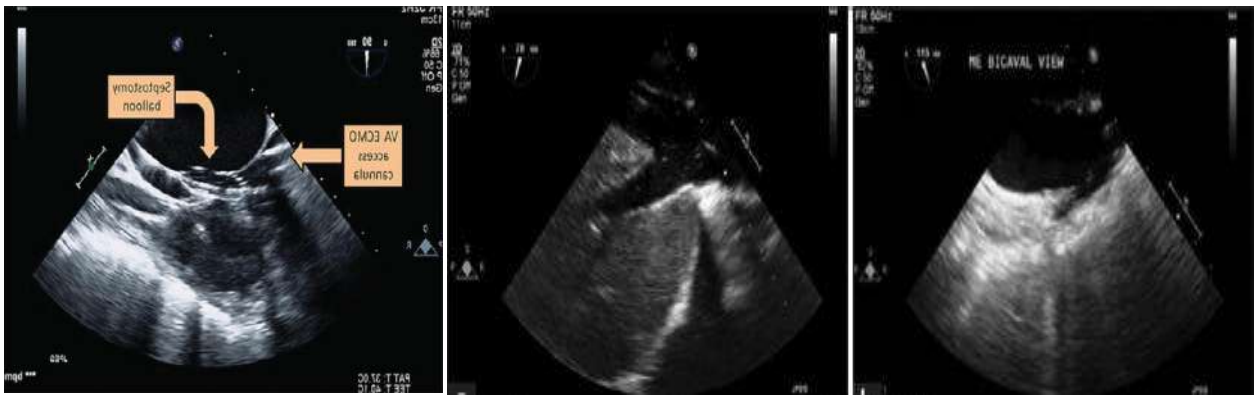


Figure 1:- Transesophageal echocardiography is an ideal procedure for guiding the septostomy catheter and balloon inflation.

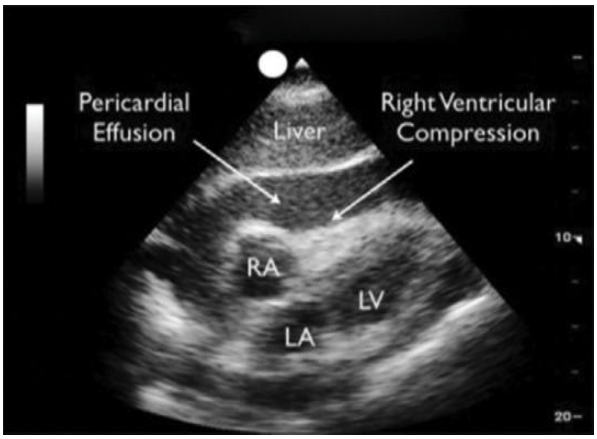


Figure 2:- Pericardial tamponade detected by ECHO when on ECMO

Complications of any part of the ECMO circuit can be well seen on echocardiography as also thrombosis with two-dimensional (2D) or 3D echocardiography. Echocardiography is mandatory during initiation of ECMO, cannula insertion, hemodynamic monitoring, and detecting complications during weaning and should be an essential monitoring for a successful ECMO run. Also postoperative analgesia is an extremely important part of the post-operative care of these patients for early mobilization and shorter ICU length of stay and attenuation of stress response. For these various regional analgesia techniques can be used like thoracic epidural and interpleural anaesthesia,[5] subarachnoid analgesia,[6] paravertebral block and nowadays local anaesthetic infusion into the wound. Cardiac anaesthetists can manage all these better than other critical care specialists or cardiac surgeons. So although in my opinion cardiac anaesthesiologists are best equipped to be in charge of cardiac ICU, they need also to be trained in other critical care management.

Having an anaesthesiology intensivist as part of a mobile ECMO team would add a great skillset through an understanding of cardiac and respiratory compromise and the nuances of mechanical circulatory support devices that allows them to be able to manage the device and haemodynamics during transport. Additionally, the cardiac critical care anaesthesiology intensivist serving as shock consultant would play a vital role in this process and would lead the effort to identify which patients may benefit from mobile ECMO initiation.

The INTERMACS categorization system should be understood by all ECMO intensivist dealing with patients with heart failure.[7] Fluency in pathways for patients who fail to wean from ECMO must be achieved. Initiation and management of ECMO and other

ECLS use for advanced respiratory and cardiac failure, including E-CPR, is necessary.[8] For all this an anaesthesiologist as a perioperative physician is an ideal clinician this time not **behind the curtains during patients surgery but far ahead of others as a "Skilled perioperative and Postoperative Physician intensivist".**

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Role of Peri-operative Extra-Corporeal Membrane Oxygenation: Anaesthesiologist Perspective

Extracorporeal membrane oxygenation (ECMO) has emerged as a crucial life-saving intervention in the perioperative period, especially when the traditional measures with drug therapy or further advanced measures like ventilatory support and intra-aortic balloon pump fails. ECMO is an advanced technique which provides temporary cardiac and respiratory support to critically ill patients or patients undergoing complex surgical procedures. This article includes a basic introduction about ECMO, its role in perioperative setting, indications to start ECMO, potential challenges, controversies and complications related to this advanced procedure.

Literature says that ECMO has been used since the 1960's and 70's when Robert H Bartlett (1) and team showed that ECMO played an important role in sustaining life in severe pulmonary and cardiac failure in paediatrics. Since then, ECMO has been in practice. Its role was well established in paediatric patients where cardiac and respiratory failure made use of ECMO as a life saving technique. (2) The use of ECMO in adult patients was mainly in refractory cardiac or respiratory failure patients as a bridge therapy as these patients were waiting for heart or lung transplant. During Covid H1N1 pandemic, mortality was attributed to pneumonitis, respiratory failure which progressed to ARDs which was not amenable to treatment with conventional medical management. The only hope for survival of these patients was lung transplantation. COVID-19 affected lungs had acute and severe lung tissue damage which resulted in severe hypoxia. The deterioration of the lungs was so rapid that even lung transplant was not the answer. The ventilatory support had also limited results. ECMO came as a life saving technique and was
widely used during and after COVID-19. Patients managed with ECMO had better outcomes, therefore this technique became quite popular. As peri-operative physicians and anaesthesiologists managing the critical care patients, the knowledge of ECMO became an essential part of our training.

Introduction: As the name suggests, this is an intervention where the functions of lungs and heart are transferred to a machine which has a centrifugal pump working as heart and membrane oxygenator working as lung for exchange of gases. This device works on an extra corporeal circulation established and arranged in sequence in the circuit.

Technique and types: For simple understanding, ECMO can be either veno-arterial (VA) or veno-venous (VV) type depending on the underlying pathology to be

tackled. (3)

VV ECMO: In patients with respiratory failure, who have normal cardiac functions, the choice is veno-venous (VV) ECMO. In these patients , there is failure of exchange of gases at the alveolar level. The underlying pathology involves alveolar-capillary membrane, leading to hypoxia and hypercarbia. The blood is withdrawn from one of the major veins and after oxygenation and removal of CO2 by an external oxygenator, the blood is pushed back to the venous system, thus the lungs get the oxygenated blood and the same is pushed to left side of heart and to rest of the body for tissue oxygenation. The VV- ECMO provides oxygenation and removes CO2, thereby decreasing workload on lungs and give time to the damaged lungs to heal. In two venous cannula systems in VV ECMO, drainage occurs usually via the cannula placed in the common femoral vein and return of oxygenated blood is through the right internal jugular or other femoral vein. The precise positioning of the cannula is important where the cannula tip, when using one venous cannula, should rest in the infra-diaphragmatic part of IVC ideally. The proximal opening should be positioned in the superior vena cava (SVC) or SVC-RA junction, thus directing the opening towards the tricuspid valve. Blood flow is set at 3-6L/min for satisfactory oxygenation and O2 flow rates are set at twice this flow.

Veno-Arterial (VA) ECMO: This type of ECMO is used when the cardiac functions are very poor and the heart is unable to push blood to lungs and from there to the rest of the body. Patients may or may not have respiratory disease. So for patients of severe cardiac or cardio-respiratory failure VA ECMO is preferred. In this technique, the blood is withdrawn from one of the major veins and as it passes through the extracorporeal circulation with oxygenator and pump incorporated, the oxygenated blood is pushed back into one of the major arteries back to the body.

The oxygenated blood will return to the aorta and thereby cause significant reduction in the preload to reduce the left ventricular end diastolic volume (LVEDV) and wall stress of the failing heart. This type of extracorporeal circuit aims at providing partial cardiac support and hence the left ventricle continues to have a certain amount of intrinsic activity and generates 20-30% of stroke volume. (4) The rest 70-80% of the cardiac output is produced by the extracorporeal circuit. Thus some cardiac ejections continue to occur.

Central vs peripheral VA ECMO: The circuit of VA-ECMO is assembled in parallel

to the heart and lungs. The cannulation is either central or peripheral. The access cannula extracts venous blood from the large central veins or right atrium and after oxygenation in the membrane oxygenator; the pump returns the blood to a major artery. Central cannulation is performed at ascending aorta whereas femoral, axillary or carotid arteries are used during peripheral cannulation. Central cannulation is a preferred approach in post- cardiotomy ECMO. The flow rates may vary from low flows of 2-3L/min to as high as 4-6L/min. This determines whether partial assistance to native circulation will suffice or is there a demand to totally replace the patient's cardiac output. Ideal site for cannula placement is in the ascending aorta just above the aortic valve. ECMO can bridge patients with end-stage heart failure to heart transplant, and extend the use of marginal donors, grasp the ECMO indication and timing of application, avoiding irreversible dysfunction of the vital organs and preventing complication during ECMO, ECMO may decrease mortality of critical patients in the peri-operative period of heart transplantation.

Challenges in ECMO program: Since its inception, ECMO has been bombarded with several challenges owing to financial implications, feasibility and expert management. In view of extra-corporeal circulation, there is a need of anti-coagulation, which needs constant monitoring. One has to be aware of bio-compatibility of cannula, tubings, pump and oxygenator. Over the last few decades, there have been numerous technological advancements resulting in decreased incidence of complications and improved survival.

Indications for ECMO: Institution of ECMO in pediatrics with complex congenital heart disease, acute cardiogenic shock and as a bridge to heart transplant in heart failure patients is well established. Apart from these, the other extended indications for its use in peri-operative period are thoracic surgeries, especially lung transplant, airway and tracheal surgeries, mediastinal masses etc. (5) Even in obstetric emergencies like amniotic fluid embolism, peripartum cardiomyopathy and PAH, ECMO has been used successfully. Its potential role in trauma, malignant hyperthermia, anaphylaxis and E-CPR in OT is being explored and has gained recognition.

Management of patient on ECMO: Mazzeffi et al(3) published guidelines on intraoperative management of patients on ECMO in 2021 which gives insight with step wise guidance for beginners. ECMO circuit comprises blood pump, membrane oxygenator, air-oxygen blender, heat exchanger, cannula and tubing. In

central ECMO, cannulation is done directly in the cardiac chambers or major vessels, whereas in peripheral ECMO, the cannula are inserted in peripheral vessels. In neonates and small children, it is usually central ECMO. The terminology with respect to cannulation is “Inflow cannula” that drains blood from the patient and “Outflow cannula” is the return cannula, through which oxygenated blood is returned back into the circulation. ECMO blood pump uses centrifugal flow where the device draws blood into a central inlet, then propels it forward through an outflow orifice using centrifugal force.

Anticoagulation: Owing to extracorporeal circulation, anticoagulation management is of paramount importance. As there is no venous reservoir, ACT required is around 200 sec. However, a tight control has to be maintained because >300 sec may lead to increased risk of bleeding. Coagulation monitoring, platelet count, aPTT, ACT all are essential parts of ECMO management.

Distal limb perfusion: In peripheral VA ECMO, the major issue is the distal limb perfusion. Dopler examination of backflow cannula is recommended in case perfusion of the limb is deteriorating. General measures like antibiotics, prevention of bed sores, sending blood cultures thrice a week and maintaining asepsis should be followed.

Monitoring patient on ECMO: Essential monitoring, apart from standard ASA monitors include arterial inflow line pressure, perfusion pressure, pre-oxygenator O2 saturation and post-oxygenator O2 saturation, temperature, CVP, ABG, ACT etc. (4) Blood investigations include haemogram, KFT, LFT, platelet counts are done on a daily basis. Routine echocardiography and maintaining a record to monitor progress daily is the ideal way to go. Neurological monitoring may be required in a subset of patients with BIS or NIRS. Maintenance of optimal volume status and ensuring end organ perfusion is the cornerstone in long term management of ECMO.

Echocardiography: Transesophageal echocardiography helps to guide the precise position of both the cannula, specifically flow of blood at the tip of return cannula and side holes of drainage cannula. In VV ECMO, right ventricular (RV)size, RV systolic function, RVSP, TAPSE should be measured and recorded. In VA ECMO, keep a record of bi-ventricular function and dimensions of both RV and LV. In case LV dimensions increase, it suggests decreased forward flow and guides fluid and inotropic management. Sedation and analgesia has to be tailored depending on

patient needs. Maintenance of nutrition is also important, enteral route is preferred. Serial ABGs to guide ventilatory strategy. Manage FiO2, PEEP, respiratory rate depending on the values at that point of time. PaO2 of 50-55 mmHg, SpO2 of 88-90% is acceptable in these patients.

Weaning and termination of ECMO: Weaning is considered when signs of recovery are apparent and the radiological and echocardiographic signs are improving and satisfactory. In VV ECMO, once a patient's full ventilation is resumed and maintains SpO2 for more than 6 hours with no oxygen supply to the oxygenator, decannulation may be attempted.

In VA ECMO, flow rates are gradually decreased while LV function is constantly monitored using ECHO. If the patient has satisfactory LV contractility with EF > 25% and aortic VTI more than 12cm at flow rates 1-1.5L/min, we can proceed for weaning successfully.

Complications

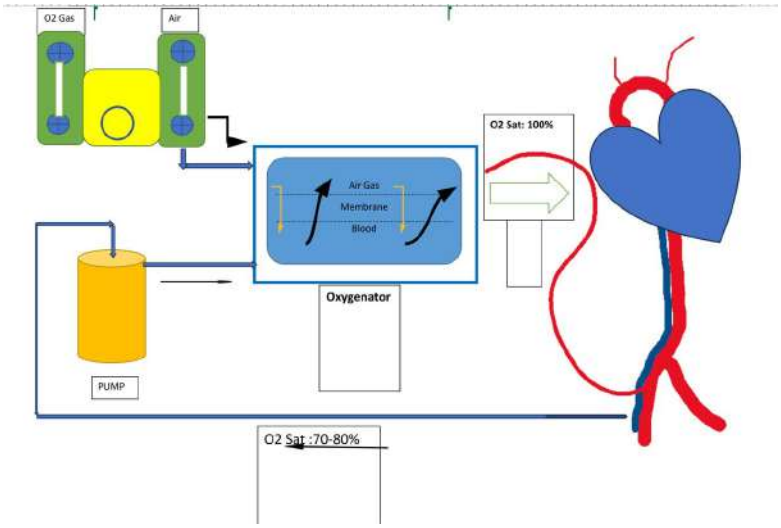
Haemorrhage is the most common complication in around 10-30% of patients. Systemic thrombo-embolism, heparin induced thrombocytopenia, pump failure, air embolism, sepsis, limb ischemia etc. are other complications.

E-CPR or ECMO supported CPR

E-CPR refers to initiation of VA-ECMO in a patient who experienced a sudden and unexpected pulse less condition attributable to cessation of cardiac mechanical activity. ELSO and American Heart Association (AHA) guidelines have recognized E-CPR as a resuscitation technique in those patients who develop cardiac arrest owing to some reversible pathology. But, in view of financial issues and medico-legal and ethical concerns, E-CPR will take some time for universal acceptance.

Summary: ECMO is a specialised technique which is used when all other treatment modalities are exhausted. VA ECMO is when the cardiac functions are also affected. VV ECMO is for patients who have only respiratory system involved and the cardiac functions are normal. A very strong and experienced intensive care team which looks after all the aspects of patient management is key to success. The training for ECMO is available through various fellowship programs online as well as in person training.

Basic peripheral VA ECMO circuit



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Acupuncture: An Ancient Science Still Relevant

According to 2021 World Health Organization report, acupuncture is the most widely practiced traditional medicine globally. In 2020, the centres of Medicare and Medicaid services in US started covering acupuncture for chronic low backpain.

The word acupuncture comes from Latin: Acus – needle; puncture – to penetrate. Legend states that it was a serendipity by a Chinese soldier who when pierced with an arrow in the chest, was miraculously cured of a skin lesion which had been bothering him!

It is based on Chinese philosophy of yin and yang. There is constant struggle in universe between opposing forces. In healthy and balanced state normal vital energy or Qi is produced. In disease state there is imbalance of this energy. There is a network of channels having acupuncture points. These channels connect internal organs to exterior of man. Stimulating these acupuncture points help in balancing energy. There are 12 meridians pertaining to different organs and eight extra meridians. There are more than 361 classical acupuncture points. It is believed that ears, hands and feet are the micromodel of the entire body.1

1 Needles can just be inserted, stimulated manually or stimulated with electric current called Electro-acupuncture. This also forms the basis of cutaneous stimulation of these points, used in trans cutaneous electrical nerve stimulation and application of pressure known as acupressure. Another ancient technique is Moxibustion which involves heating or burning certain areas of body with powdered leaves of moxa plant (Artemesia vulgaris).(1)

Other techniques came up which can stimulate and many are effective even without using needles like: lasertherapy, magnetotherapy and reflexotherapy and so on.(1)

Acupuncture in China has a known history which is spread over more than 5000 years. The question at present is not whether it works rather how it works? It is still not easy to answer. Effect of needling is both subjective and objective. Subjective effect is slight pain and appearance of a peculiar sensation called “Deqi”. Objective effects are analgesia, sedation, homeostasis, immune enhancing effect, anti inflammatory and anti allergic effect, psychological effect and enhancing motor recovery. The scientific basis consists of multiple factors like gate control theory, chemical or humoral mechanisms etc.(1)

Acupuncture: An Ancient Science Still Relevant

Sterilization and antisepsis are required to prevent local infection and hazards like hepatitis. WHO has given benchmarks for the practice of acupuncture. Modern medicine uses acupuncture in both treatment of diseases and in anesthesia/analgesia. It is simple, safe, effective and economical form of therapy. Two of the first reports concerning acupuncture anesthesia were from Shanghai dated 30 August and 5 September 1958. Dr Yin Huizhu carried out a tonsillectomy under acupuncture anesthesia. By 1980s many surgeries were being carried out.2 Acupuncture was combined with selected drugs and named “acupuncture-drug balanced anesthesia”.(2) Perioperative acupuncture and other similar techniques have been advocated for preoperative sedation, to reduce use of opioids intraoperatively and for postoperative pain. Electroacupuncture and transcutaneous electrostimulation have been used. In an experimental study in Japan, 30 cases of acupuncture anesthesia for surgical pain were performed. Out of these 80% were successful. In another study acupuncture anesthesia was used for 11 patients requiring minor surgical procedures. Low frequency electrical acupuncture (LEFA) of some points along with simultaneous high frequency electrical acupuncture to surgical field was used. It was concluded that LEFA increased the pain threshold of skin satisfactorily, but it was not enough for surgery on deep tissues. Main benefits are it is simple and does not have side effects, distant areas can be stimulated, there is long lasting effect and wound healing is faster.(3) Use of acupuncture leads to reduction in volatile anesthetic and opioid requirement as well as provide analgesia and prevent activation of pain pathway as well as enhances recovery.(4-6) With time and advent of safer drugs Acupuncture is considered more useful as an adjunct.(7) However, there are several drawbacks like anesthesia produced has individual variations, time taken to induce anesthesia is too much. Therefore, it is more commonly used as a modality for pain relief.

Silver spike point (SSP) and transcutaneous nerve stimulation (TENS) have been used in postoperative pain relief after abdominal and thoracic surgeries. Both modalities are shown to be effective in relieving pain and decreasing doses of analgesic drugs.(3)

WHO drew a provisional list of disorders that are amenable to acupuncture treatment(1)

1.Upper respiratory tract-Acute sinusitis, rhinitis, tonsillitis and common cold

2.Respiratory system- Acute bronchitis and bronchial asthma
3.Eye Disorders-Acute conjunctivitis, central retinitis, myopia in children, cataract

4.Disorders of mouth-Toothache, gingivitis, acute and chronic pharyngitis

5.Gastrointestinal disorders-Spasms of oesophagus and cardia, hiccough, gastroptosis, acute and chronic gastritis, gastric hyperacidity, pain relief in chronic duodenal ulcer, acute duodenal ulcer, acute and chronic colitis, acute bacillary dysentery, constipation, diarrhoea, paralytic ileus.

6.Neurological and musculoskeletal disorders- headache, migraine, trigeminal neuralgia, facial palsy and paresis following stroke, peripheral neuropathies, poliomyelitis sequelae, Meniere's disease, neurogenic bladder dysfunction, nocturnal enuresis, intercostal neuralgia, cervicobrachial syndrome, frozen shoulder, tennis elbow, sciatica, low back pain, osteoarthritis.

Acupuncture for Pain management

Acupuncture has been traditionally used for both acute and chronic pain conditions. The underlying mechanism as described in TCM is the balance of yin and yang energy using the body's own healing power, but modern evidence suggests that gentle stimulation or the feeling of 'De-qui' excites mainly Aδ-type fibers and activates the gate control system in the spinal cord to relieve pain.(a) When the needles are twisted up and down repetitively, the deep tissues, particularly muscle, are locally injured, proinflammatory mediators are released and excite nociceptors directly or indirectly.8 It is therefore, conceivable that C-type fibers are involved in manual acupuncture-induced analgesia, via activating the negative feedback regulatory mechanism or diffuse noxious inhibitory control in the brainstem.9

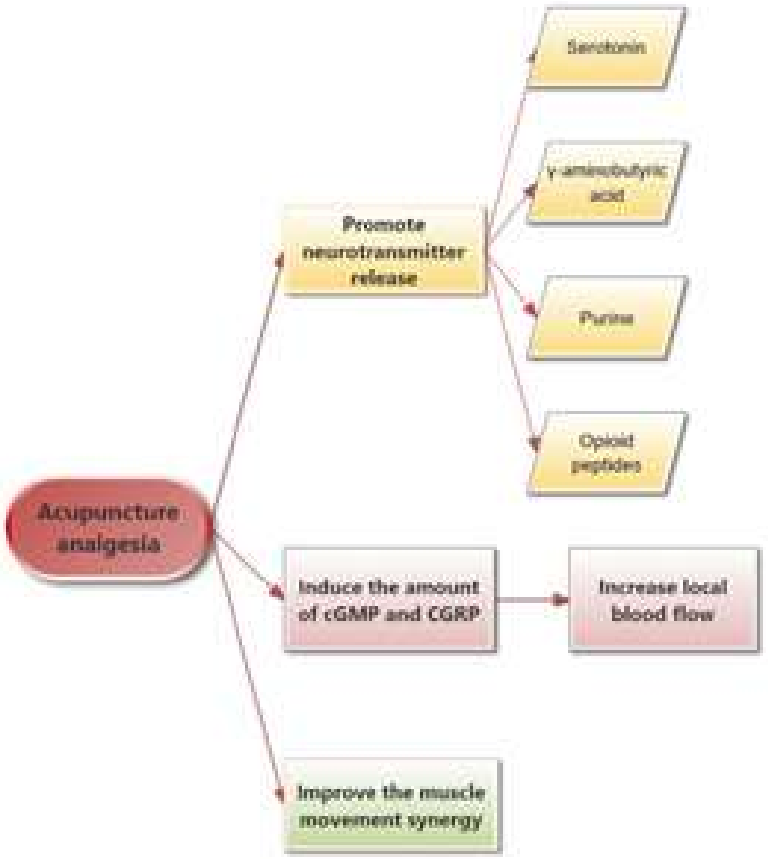
When electrical current is employed, stimulation is based on the frequency, intensity and type of impulse used, thus exciting Aβ-type fibers and some Aδ-type fibers. Some studies also indicate the notion of C-type fiber involvement in EA analgesia.10

There is considerable debate on whether acupuncture or EA mainly provides psychological effects similar to placebo rather than physiological effects. electrophysiological findings indicate that both pre- and post-synaptic inhibition probably get involved in EA or acupuncture-induced antinociceptive responses in spinal neurons, resulting in inhibition of release of neurotransmitters, such as substance P and glutamate, from terminals.10

Acupuncture: An Ancient Science Still Relevant

By activating or deactivating brain structures, acupuncture stimulus, on one side, inhibits the activities of nociceptive-sensitive neurons through the cortical-subcortical systems, on the other side, blocks the nociceptive afferents through PAG – RVM – spinal dorsal cord descending inhibition pathway.9 Acupuncture analgesia is a complex physiological process mediated by various neurotransmitters and neuromodulators, such as opioid peptides, 5-hydroxy-tryptamin (5-HT), noradrenalin (NA), glutamate and its receptors, γ-amino-butyric acid (GABA), substance P, angiotensin II, somatostatin, arginine vasopressin, neurotensin, dopamine (DA), and so on.9 Detailed discussion is beyond the scope of this review, figure 1 summarizes the neuro-hormonal effects of acupuncture in pain modulation.

Figure1: Neurohormonal response of acupuncture



Conditions identified by WHO which may be amenable to acupuncture therapy are described in table 1:

Table 1: Conditions amenable to acupuncture therapy

Arthritis
Chronic neck pain
Low back pain
Headache
Migraine
Trigeminal neuralgia
Post-herpetic neuralgia
Peripheral neuropathies
Intercostal neuralgia
Tennis elbow
Frozen shoulder
Cervico-brachial syndrome
Phantom limb pain
Fibromyalgia
Dysmenorrhoea
Labour pain/stimulation of labour
Dental pain
Chronic duodenal ulcer (pain)
Chronic colitis

Acupuncture and Critical care

Although not specifically approved for use in critically ill patients, acupuncture can have a positive modulatory effect in decreasing the inflammation, namely TNF α and IL6 levels thus reducing inflammation in the target organs. Its anti-inflammatory effects involve the regulation of functions of immune cells, including macrophages, granulocytes, mast cells, and T cells. In acupuncture stimulation, macrophages transform from the M1 to the M2 phenotype and the negative TLR4 regulator PPARγ is activated to inhibit the intracellular TLR/MyD88 and NOD signaling pathways. The downstream IκBα/NF-κB and P38 MAPK pathways are subsequently inhibited by acupuncture, followed by suppressed production of inflammasome and proinflammatory mediators. Acupuncture also modulates the balance of helper T cell populations. Furthermore, it inhibits oxidative stress by enhancing SOD activity via the Nrf2/HO-1 pathway and eliminates the generation of oxygen free radicals, thereby preventing inflammatory cell infiltration. Upon information integration in the brain, acupuncture further stimulates multiple neuro-immune pathways, including the cholinergic anti-inflammatory, vagus-adrenal medulla-dopamine, and sympathetic pathways, as well as the hypothalamus-pituitary-adrenal axis, ultimately acting immune cells via the release of crucial neurotransmitters and hormones. Thus, it may be helpful in limiting the disease process in SIRS, pancreatitis and ARDS. It also has beneficial effects in asthma, COPD, traumatic brain injury, epilepsy, ventricular remodelling after myocardial infarction, offer renal protection and inflammation of the genitourinary tract such as pyelonephritis, cervicitis, pelvic inflammatory disease, etc.(11)

Apart from directly affecting the disease process, it can be used as adjunct for analgesia, sedation, prevention of delirium and anxiety.(12)

Some evidence suggests that hypertension and other chronic cardiovascular diseases can be improved by treatment with acupuncture. stimulation of the median nerve to mimic electroacupuncture diminishes regional myocardial ischemia triggered by a sympathetically mediated increase in cardiac oxygen demand. It has been hypothesized that LR3 (Taichong) stimulation would affect hemodynamics in the peripheral arteries and ST36 (Zusanli) stimulation would affect macrocirculatory parameters suggest possible beneficial effects of emergency acupuncture stimulation for shock resuscitation.(12)

Studies have also shown improved tidal volumes, dynamic compliance, RSBI values

and decreased ventilatory days with improved weaning in difficult to wean patients.12

In addition, often the enteral nutrition is limited by delayed gastric emptying and a relaxed gastro-oesophageal sphincter, which may be alleviated by the use of acupuncture. Once the disease process is resolved, critically ill patients require extensive rehabilitation and gain of muscle strength. Acupuncture therapy has already effectively shown to increase nerve function and restore muscle atrophy and muscle mass. A recent study found that acupuncture counteracts skeletal muscle atrophy by increasing IGF-1 levels and stimulating muscle regeneration.(12)

Acupuncture in cancer care

Acupuncture is widely used for people with a cancer diagnosis to relieve symptoms related to cancer and cancer treatments for symptoms such as fatigue, pain (myofascial, arthralgic, musculoskeletal), chemotherapy-induced peripheral neuropathy (CIPN), chemotherapy-induced and anticipatory nausea and vomiting, radiotherapy-induced xerostomia (RIX), and anxiety. Clinically, acupuncture is used to manage many additional symptoms, such as depressive symptoms and hot flushes. It may be helpful in elderly in frail patients however, absolute contraindications include patient consent, cellulitis/ infection at the site of insertion, needle phobia, immunosuppression and recent radioactive treatment.(13)

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Simulation is Nothing But a Mirage!!!

Dr. Simi, a young anaesthesiologist at a government hospital in New Delhi, was thrilled when a space was designated for a skills lab in her hospital. Recently, she had attended a simulation workshop abroad, unaware that it was sponsored by the company that produced expensive simulation devices. Driven by her ambition to pioneer simulation-based anesthesia education in India, she engaged in intense debates with hospital administrators and spent months meticulously preparing paperwork to justify the benefits of acquiring a high-fidelity simulator for residents and undergraduates. Finally, her perseverance paid off, and she successfully initiated the procurement of an advanced Human Patient Simulator (HPS) simulator.

Eager to celebrate her hard-earned achievement, Dr. Simi treated herself to a bottle of wine and looked forward to unwinding with her favourite Hollywood movie, where a handsome hero save the world from an Egyptian Pharaoh's mummy.

Exhausted from her endeavours, she settled onto her couch for a lazy Saturday evening movie session, taking a sip of wine and quickly succumbing to drowsiness. As she drifted into an extraordinary dream, a commanding voice shattered the tranquillity of her dimly lit kitchen, evoking a mix of fear and excitement: "Who dares disturb the slumber of Pharaoh Ramses?"

To her amazement, bathed in an otherworldly glow, stood the majestic Pharaoh himself. Dr. Simi, startled by this surreal encounter, watched in disbelief as Ramses brandished a sword illuminated by sparkling diamonds, ready to slice her newly acquired HPS simulator in half. Fuelled by a surge of protective fury, she grabbed a cup on her kitchen table and boldly confronted Ramses, vehemently defending her cherished possession.

"Why, Your Majesty, do you aim to destroy my simulator?" she pleaded, her voice a blend of frustration and defiance. "Do you even comprehend the tremendous effort put into procuring it on GeM? Your outdated beliefs cannot fathom the potential of this technological marvel. It is the need of the hour, an essential step for training future medical professionals in safe and effective patient care."

Struck by Dr. Simi's audacity in facing him armed only with a cup, Ramses lowered his sword, his curiosity aroused. "And what, pray tell, is the purpose of this peculiar contraption?" he inquired, his tone tinged with both scepticism and

interest.

Unwavering, Dr. Simi launched into an impassioned explanation. "Simulation, Your Majesty, provides a safe haven for medical students to refine their skills in a controlled environment," she elucidated, her conviction ringing clear in her voice. But Ramses, embodying regal scepticism, remained unmoved. "Safe?" he scoffed, his demeanour dripping with disdain. "A true healer must confront the raw essence of suffering – the foul stench of infection, the trembling uncertainty of a failing heart. This simulation you speak of... it seems nothing more than a child's toy."

Undeterred, Dr. Simi persisted, her determination unwavering. "Yet, Pharaoh, these simulations possess a lifelike realism that approaches the miraculous," she countered, her words brimming with fervour. "Our mannequins bleed, they react, they even convey programmed emotions."

A hint of amusement flickered in Ramses' dark eyes as he considered her argument. "Emotions?" he pondered, his scepticism yielding to curiosity. "Can a mere puppet capture the unyielding determination of a warrior fighting for each breath? Or the primal fear etched in a mother's gaze as her child's life hangs in the balance? Can such imitation truly test the resilience of a healer's spirit?"

Image created using multiple prompts using Microsoft Co-Pilot.

Simulation is Nothing But a Mirage!!!

Simi, her initial confidence wavering in the face of Ramses' cynicism, gathered her courage to respond. "But Your Majesty," she started, her voice tinged with uncertainty, "simulation provides students with precise scenarios and the chance for repetition. It enables them to tackle rare diseases and handle complex complications, situations rarely encountered with real patients."

Ramses' laughter echoed through the dimly lit apartment, his mirth filling the space. "Rare diseases? Complications?" he chuckled; his amusement evident. "In life's true chaos, such challenges arise unpredictably, woven into the fabric of existence. A mere simulation cannot compare to the unpredictable tapestry of human suffering. True healing requires intuition shaped by the whims of fate."

Simi's spirits sank at Ramses' words, the weight of his argument pressing down on her. "Perhaps, Your Majesty," she conceded, her tone acknowledging the truth in his words, "simulation does offer a controlled environment, shielded from the messy reality of human illness. But it serves as a crucial preparatory tool, allowing students to refine their skills before facing the unpredictable nature of real-world practice."

Ramses' smile broadened, his satisfaction plain to see. "Refine?" he questioned, his gaze penetrating. "Or do they dull their senses? In a sterile environment where mistakes carry no consequence, true learning is stifled. It is the crucible of real-life consequences, the fear of failure, that shapes a healer's true character. This simulation," he continued, gesturing dismissively, "is but a gilded cage, a tempting illusion that fosters complacency under the guise of readiness." Continuing his interrogation, Ramses' words carried the wisdom of ages. "Consider the poverty afflicting your nation, the insidious grip of corporate interests, and the daunting financial and spatial demands of such equipment," he reflected, his tone contemplative. "Can the significant investments required truly be justified without clear evidence of their impact on student learning and clinical outcomes? Despite efforts to heighten realism, can this device genuinely replicate the visceral experience of real-life patient encounters?"

His dark eyes bore into Dr. Simi, probing deeper into the heart of the matter. "Do your learners perceive simulations as lacking authenticity compared to the chaotic unpredictability of the clinical world? Do institutions grasp the long-term benefits of simulation-based education, or do they allocate resources without clear evidence of its efficacy?"

Simulation is Nothing But a Mirage!!!

Dr. Simi, seeking to defend the merits of simulation, offered her perspective. "Yes, learners may find the simulation close to the clinical experiences, One approach could be to inform learners about the nature of the simulation in pre-briefing itself and encourage them to suspend disbelief," she proposed, her voice tinged with optimism.

But Ramses, ever the sceptic, raised a crucial point. "Is complete transparency truly attainable? or will it dilute the educational value by influencing learners' decisions and actions?" he countered, his gaze unwavering.

Dr. Simi, undeterred, sought to highlight the importance of fostering a positive attitude towards simulation. "Through various strategies, we can cultivate a mindset that encourages learners to engage fully with the simulations," she asserted, her determination palpable.

Yet Ramses interjected, his scepticism casting a shadow over her optimism. "But do your learners truly immerse themselves in these simulations, or do they perceive them as artificial and disconnected from reality?" he challenged. "Can promoting a positive attitude alone overcome these inherent limitations?"

With a final, echoing laugh that seemed to reverberate through the very walls of her apartment in South Delhi, the Pharaoh faded back into the shadows, leaving Dr. Simi to ponder the weight of his words. As she slumped into her chair, the initial euphoria of her triumph faded, replaced by a creeping sense of doubt. Ramses' parting words echoed in her mind: "Simulation is nothing but a mirage." The encounter with Ramses made Dr. Simi realize that simulation wasn't a magic solution but merely a tool for medical education. She believed that the future of medicine might lie in balancing simulation with real-life experiences. While useful for skill practice, simulation couldn't replicate real patient encounters. Dr. Simi resolved to approach medical education with this balance in mind, acknowledging the challenges of simulation-based learning. She vowed to address authenticity and emotional engagement, ensuring that simulation complemented rather than replaced real-world experiences. Ramses' scepticism lingered in her mind, his words haunting her: "Simulation is nothing but a mirage."

Key Points from the story :

'Ignorance is not always bliss!' Limitations and challenges in using simulation in

anaesthesia and critical care cannot be ignored, even though it can be an invaluable tool for training and improving clinical skills:

1. Cost: Setting up and maintaining simulation facilities can be expensive. High-fidelity mannequins, equipment, and space requirements can strain budgets, especially for smaller institutions or those in resource-limited settings.
2. Time: Simulation sessions require time for setup, execution, and debriefing. This can be challenging to schedule for busy healthcare professionals, especially when trying to balance clinical duties and training.
3. Realism: While simulation technology has advanced significantly, it still may not perfectly replicate the complexities and nuances of real patient care scenarios. Some learners may struggle to fully immerse themselves in the simulated environment, impacting the effectiveness of the training.
4. Limited Scope: Simulations are typically designed to replicate specific scenarios or procedures. While they can be highly realistic within those parameters, they may not adequately prepare practitioners for the wide variety of situations they may encounter in real clinical practice.
5. Technical Challenges: Simulation equipment, including mannequins and simulators, can sometimes malfunction or fail to accurately represent clinical scenarios. Technical issues during simulation sessions can disrupt the learning process and frustrate both the trainers and the trainees.
6. Emotional Impact: While simulation scenarios are artificial, they can still evoke emotional responses from participants, particularly when dealing with high-stress situations or adverse outcomes. This has ethical implications, causing ‘manufactured/avoidable’ stress to an emotionally sensitive trainee, to a stressful scenario which he/she may or may not face at all. Managing these emotional responses and ensuring psychological support for learners is essential but can be challenging.
7. Overreliance: There's a risk that learners may become overly reliant on simulation training and neglect other forms of learning, such as hands-on clinical experience or didactic instruction. While simulation is valuable, it should complement, rather than replace, other forms of education and training.
8. Transferability: While skills learned in simulation may translate to improved performance in real clinical settings, there's always a risk that learners may struggle to apply what they've learned when faced with actual patients. Bridging the gap between simulation and real-world practice requires deliberate practice and ongoing reinforcement.

9. Resource Allocation: Devoting resources to simulation training may divert attention and funding away from other critical areas of healthcare, such as staffing, equipment procurement, or infrastructure improvements.
10. Ethical Considerations: Designing simulation scenarios that accurately replicate critical care situations while ensuring patient safety and respecting ethical boundaries can be challenging. Balancing the educational benefits of realistic scenarios with the need to protect patient privacy and dignity requires careful consideration and oversight.

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Author disclosure: The authors utilized tools (Microsoft Co-Pilot, and ChatGPT) to craft a narrative story format to engage readers' interest using various creative prompts. They have thoroughly reviewed the text to ensure its validity and authenticity. As simulation in medical education has both pros and cons, readers are advised to read the recommended reading materials before drawing their conclusions.

Recommended reading.

- Alinier G, 2022. Simulation-based education: deceiving learners with good intent. Advances in Simulation.
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Simulation is not a Mirage...oh Wise Traveler!

The myth of simulation can only be tackled by separating it from technology. Simulation is not technology!! Literally speaking, simulation is mimicking life in part or process. Anyone who understands this will understand that simulation is not a recent innovation. After the students had been accepted by Sushruta, he would instruct them in surgical procedures by having them practice cutting on vegetables or dead animals to perfect the length and depth of an incision. Once students had proven themselves capable with vegetation, animal corpses, or with soft or rotting wood – and had carefully observed actual procedures on patients – they were then allowed to perform their own surgeries (1) (Figure-1). The idea of simulation seems vagrant and extravagant to us as we have been practicing the concept of **"see one, do one and teach one"** since modern practice of medicine began. With our non-complaining patients never raising their voice against novices using their body parts and the lifesaving processes as practicing dummies and simulation suites. The times have changed now, and not just are we in access to artificial and animal parts for practicing skills but also simulators to practice many lifesaving processes that students would encounter occasionally.

The high cost and technology involved with Hi-fidelity simulators will only hurt the eyes and sensibility of the detractors who refuse to see the applicability of these equipment for learning complex technical and non-technical clinical processes. The term "simulation" has been discredited by people who refuse to understand that it is not the 'technique' of simulation that is conceptually wrong, but the association of hi-cost with hi-fidelity simulators that has made people wary of "simulation". Any practitioner of medical education or in fact any educator would have used the concept of simulation innumerable times while teaching and learning. How many times have we asked our residents to practice the steps of endotracheal intubation by performing them iteratively till they acquire automation in doing head positioning, opening the mouth, taking the laryngoscope, introducing the laryngoscope and inserting the endotracheal tube in the correct sequence and using the correct play of hands? So why do we squint our eyes and tilt our lips when the same student is able to do this process using a replica of human head?

Do we mean that the concept of simulation is acceptable if the simulators are cheap!!

Cost is something that needs to be weighed with the risk benefit ratio. Let us look at the complex skill of performing angioplasty.

Simulation is not a Mirage...oh Wise Traveler!

It is now the zellenium times and the Pharaoh Ramses has been planned to undergo angioplasty. In this future zellenium world, patients choose their physicians. So, who would the Ramses choose as his angioplaster? The physician who has undergone intensive simulation exercises in angioplasty suites or a physician who refused to undergo training since he is waiting for some patients to allow him to practice performing angioplasty on them.

The response to the above question is obvious, I guess!! The cost of the physicians' training on angioplasty simulator, when added to the total bill of the angioplasty can only be a minor irritant to the great Pharaoh Ramses!

We lose perspective when we equate Hi-end (fidelity)simulation with Hi-cost simulators. For learning non-technical skills, we need to have a hi-fidelity simulation-based training program. This may not necessarily involve buying a hi-cost simulator. Of course, a hi-cost hi-technology simulator always adds value to the whole learning program but the learning itself is dependent on the teacher/debriefer/facilitator **NOT** on the simulator.

Setting up a simulation centre is an investment. The returns (both financial and pedagogical) are based on the student experience. If the student feels learned after a simulation-based session it reflects on both the simulation system and the teacher/facilitator. If the student still lacks competency after the session, it reflects on the student and the teacher/debriefer. The simulator, and its cost thereof, is not necessarily a part of the equation of teaching and learning!!

So, which is a bigger failure for any Institute which has teaching and training as its mandate? Buying a hi-cost simulator and not using it to its full potential OR not buying a simulator and preventing students, teachers, and the patients from benefitting from simulation-based teaching.

The most rational approach to this question is identifying the needs of the students and teachers first rather than plunge head long in the competition to buy the costliest and the swankiest simulator. A centre/Institute/hospital which runs a successful undergraduate medical/nursing program will utilise the skill lab equipped with manikins and task trainers useful for learning basic skills. A Hi-stakes obstetric unit should be able to utilise its hi-fidelity simulators for in-lab and in-situ multidisciplinary crisis management learning sessions. Though, in a reverse situation where a undergraduate institute has a well-equipped lab with

Hi-fidelity simulator the students will always be at an advantage as they get exposed to crisis management at an earlier stage in their career. It's time to move-on to **"see one, simulate one, do one and teach one (maybe using a simulator!)"**

So, who is stopping us? The still unclear role of simulation-based teaching integrated in the standard curriculum. Though, the newer NMCN guidelines based on competency-based teaching addresses this to some extent (2), simulation-based teaching is still an add-on activity that some students and teachers (and of course, Pharaoh Ramses) think, can be done without! Unless we identify the lacunae in our training (and there are many, even the detractors will agree!) that can be taken care of by using simulation, we will be puzzled by its utility. In this baffled state, while some will end up dabbling in using simulators in-effectively, others will go ahead and disparage it.

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Figure-1

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Prehabilitation: The Anaesthesiologist's Role and The Future Directions

The concept of prehabilitation was successfully applied during the second world war to improve the health of poorly nourished British recruits. However, the term 'Prehabilitation' was coined by Topp et al.(1) as a strengthening programme to improve the functional capacity of patients in ICU. Similarly, preoperative optimization of the medical, physical, nutritional and psychological health amongst various surgical populations i.e. paediatric, geriatric, obstetric, obese, bed-ridden, critically/terminally ill, cancer patients can improve the final postoperative outcome/recovery of the patients by many folds. Traditionally, rehabilitation has been the mainstay of efforts to improve recovery with the focus being placed on the postoperative period; however, it was realised that it does not improve muscular and functional reserve at the time of major surgery.

Prehabilitation prepares individuals preoperatively by modifying the risk factors or optimizing their health status; thus, improving the functional reserve which eventually leads to reduction in the surgical stress and thus improving the postoperative recovery. The application of prehabilitation should be multidisciplinary involving a range of professionals

Why is it needed?

The surgical stress leads to neuroendocrine, metabolic, immunologic changes causing increase in metabolic rate, oxygen consumption, protein catabolism; thus eventually leading to delayed recovery and increased morbidity. Hence, increasing the functional capacity via prehabilitation leads to achieving earlier minimal level of functional independence postoperatively. For various surgeries, ERAS protocols have been followed to improve the postoperative recovery; however, just an early discharge from the hospital is not what is intended. In addition to physical recovery, various other patient-centric postoperative recovery parameters include social, emotional, functional and individual sustainability are considered equally important.

The preoperative period provides a "teachable zone", where patient is very susceptible and is compliant to interventions. Mc Gills Perioperative programme suggests that Preanesthetic clinic and Prehabilitation clinic should work in collaboration. The first step is patient screening to predict the poor outcome. The second step include the assessment of functional capacity, nutritional and psychologic status along with laboratory testing. This step also includes formulation and implementation of individualized prehabilitation plans and continuation in the postoperative period as well.(2) (Figure 1)

Components of prehabilitation programme

Prehabilitation follows a multimodal approach encompassing medical optimization, physical exercise, nutritional support and stress reduction. Table 1 describes the various components of prehabilitation, patient assessment and interventions.

Physical intervention: A combination of strength and aerobic exercises are recommended to improve both muscle strength and cardiopulmonary fitness postoperatively. There is no recommended optimal physical exercise regimen and it should be individualized; however, one to five sessions per week each 30-60 mins is usually considered. Borg scale is a subjective tool used to assess patients effort during exercise training. The score has been found to correlate with heart rate, respiration, sweating, serum lactate and muscle fatigue. It ranges on a scale of 6 -20 (6 being no effort felt at all and 20 being maximal exertion) and provides us with an objective value to compare pre and post intervention status of a patient.(3) Nutritional support: Nutritional therapy is likely to benefit malnourished patient irrespective of the grade of surgery and also well-nourished patients scheduled for high risk surgery. The aim is to promote the anabolic state in the postoperative period; therefore, ESPEN guidelines suggest doubling the intake of daily protein requirements. Preoperative carbohydrate loading improves insulin resistance and minimises protein loss during the susceptible period. The concept of immune-nutrition is also being considered; wherein, ingestion of amino acids like glutamine and arginine, omega 3 fatty acids and nucleotides have been suggested to overcome hyperinflammation, immune-impairment, promote wound healing, thus reducing infection rates and hospital stay. (4)

Pharmacological Optimizing: Ongoing chronic diseases like anaemia, COPD, HTN, DM, etc. should be optimized preoperatively to improve the functional capacity and improve the overall postoperative recovery.

Stress Reduction: The aim of psychological support is to reduce anxiety or fear linked to the disease diagnosis and surgery. The risk reduction support helps in reducing the risk of various complications such as acute/chronic postoperative pain, impaired wound healing, delayed recovery etc. (5) It also helps in motivating patients to comply with their prehabilitation intervention programme.
Recently proposed definition of Surgical Prehabilitation

There has not been any universally accepted or standardized definition of prehabilitation. Very recently, a scoping review involving 76 RCTs has consolidated a

common definition i.e. 'Prehabilitation is a process from diagnosis to surgery, consisting of one or more preoperative interventions of exercise, nutrition, psychological strategies and respiratory training, that aims to enhance functional capacity and physiological reserve to allow patients to withstand surgical stressors, improve postoperative outcomes, and facilitate recovery.' (6) Prehabilitation, by this definition, is complementary to the existing surgical preparations that include risk stratification, medical optimisation, and patient education, which aims to improve the post- operative outcomes. However, this proposed definition needs further evaluation from international stakeholders before it is accepted globally. (6)

Duration of Prehabilitation

It is difficult to define the duration of prehabilitation due to the wide variety of surgical patient population and the interindividual differences amongst patients in terms of the coexisting diseases and nature of surgery. Not all patients can benefit from the same time schedule and same predefined set of interventions. However, it is recommended that any prehabilitation intervention targeting a long-term outcome should be planned at least 3-4 weeks before surgery but should not extend more than 3 months as it may lead to high attrition rate. So duration can be patient and physician-guided but should be somewhere between 1-3 months, if the disease process permits.

Prehabilitation in various patient sub-populations

The emergence of prehabilitation concept has led to the paradigm shift in the care of an elderly surgical patient. Frail and elderly patients are more prone to adverse outcome and slow recovery after any intervention. These patients have decreased physical strength, nutritional reserves and they need psychological support. Preoperatively, in addition to frailty assessments in elderly patients, various strategies are designed to promote better balance, flexibility, and muscle power by incorporating exercise training. The maintenance of body protein is the primary nutritional goal in older patients to prevent the development of sarcopenia. The focus of prehabilitation also includes reversing muscle loss and improving nutritional status before surgery. Additionally, there is a need for individualization of the prehabilitation program which may have to be increased in duration and to be continued even into the postoperative period. (7) The main challenge faced in geriatric patients is the non-adherence to the preoperative exercise regimens; however, high acceptance to nutritional regimen has been observed. However, future adequately powered RCTs demonstrating overall benefit of prehabilitation are needed.

Obese patients are a category of patients who have the insight to their physical status but lack the will power to work on it. Therefore, needing moral support and individual physical and nutritional training in the in-hospital set up, as if left to follow the advised at home, compliance will be a concern. There has been limited studies assessing prehabilitation strategies in obese patients undergoing non-bariatric surgery. Preoperative polysomnography has been shown to improve both the diagnosis of obstructive sleep apnoea and the prediction of postoperative complications; however, no recommendation for prehabilitation strategy. The various prehabilitation strategies for bariatric surgery include a combination of calorie restrictive diet, structured exercise program, psychological support, and anti-obesity pharmacotherapy; however, needs further exploration.

Cancer patients are considered for prehabilitation based on their cancer stage and organs involved. These patients receive "dual hit" as a result of disease diagnosis/ progression and administration of therapeutic interventions i.e., neoadjuvant chemotherapy or chemoradiotherapy plus cancer surgery. Psychological trauma can be considered as the "third hit" as these patients generally have the feeling of impending doom and concerns for the near ones. The short preoperative timeframes available before surgery further limits the duration of prehabilitation. The recognition and the potential benefits of prehabilitation has been elucidated in the recent guidelines. (8)

Smoking affects approximately 25% of surgical population and is an established perioperative risk factor. Smokers need intense respiratory prehabilitation which include deep breathing exercises, incentive spirometry, controlled breathing, chest mobilization, endurance training of both upper and lower extremities along with cessation of smoking. These interventions should be applied preoperatively at least 2-3 weeks before and has a positive impact on their cardiorespiratory status, respiratory muscle power, decrease secretions and improve lung mechanics. All patients must be supported to quit smoking preoperatively using counselling and titrated nicotine replacement therapy.(9) No evidence however exists regarding the perioperative use of e-cigarettes.

Prehabilitation has also been evaluated in solid organ transplant recipients and donors, and in patients undergoing joint replacement surgeries, cardio-thoracic surgeries, neurosurgery interventions etc.

Future research directions

Postoperative recovery is a commonly used concept but is a complex process involving multiple domains i.e., physical, physiological, psychological, social, and economic. Various factors such as preoperative risk stratification, preoperative intervention, surgical resiliency are the potential indicators of recovery which can be worked upon in the preoperative phase. The incorporation of prehabilitation to the ERAS protocols for various surgeries is the need of the hour.

There has been a growing need for advance research in context to the various prehabilitation strategies. With the recent advent of ERAS protocols for various surgeries, there is a need to evaluate preoperative characteristics or intervention under ERAS care so as to assess if it influences the surgical stress response or recovery. As far as the research outcome is concerned, most of the studies encompass functional capacity measure such as 6MWT which does not reflect the functional or physiological reserve. Hence future studies utilizing physiological or functional reserve parameters e.g. blood pressure variability etc should be considered to evaluate the efficacy of a designated prehabilitation. The minimal clinically important difference (MCID) of the intervention should also be explored; however, its applicability could not be uniform as the MCID would vary between a healthy and a malnourished patient. Additionally, the research studies must elaborate the intervention to be utilized and its implementation should also be reported. For latter, the prehabilitation-specific reporting guidelines/checklist must be formulated before the trial. (10) Further systematic reviews/meta-analyses focusing on specific prehabilitation intervention in a defined surgical populations need to be conducted.

Conclusion

Prehabilitation is an innovative step that can cause a paradigm shift in the care of surgical patients by preventing functional decline associated with surgery. It includes a multimodal approach encompassing medical optimization, preoperative physical exercise, nutritional support and psychological support. The outcome benefits include reduced length of hospital stay, reduced acute/chronic postoperative pain, early recovery and lesser postoperative complications; however, the evidence is limited. The controversies regarding the effectiveness of prehabilitation include the components of the intervention (mono- or multimodalities), duration of prehabilitation and patients' adherence. The incorporation of prehabilitation within the ERAS program is highly recommended

and would allow the anaesthesiologist as a perioperative physician to have an paramount role in the multidisciplinary team involved in the care of a surgical patient.

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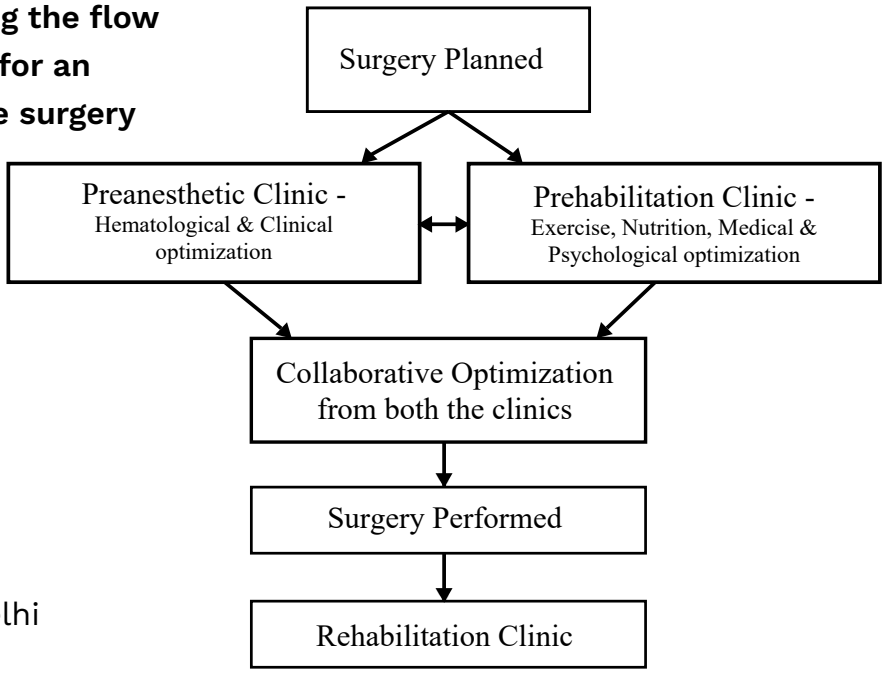
Table 1: Various components of Prehabilitation

Component	Assessment	Intervention
Physical Intervention	Cardiopulmonary Exercise Tests (6MWT, VO_2 Peak, Anerobic threshold), Functional status in routine activities, Quality of sleep Breath holding time Borg scale assessment (3)	*Endurance Training* – Increases overall physical fitness, balance and flexibility e.g., walking, jogging, hiking, swimming *Strength Training* – Use weights to build up individual group of muscles e.g., – push ups, pull ups etc. *Respiratory muscle training* – Deep breathing exercises, Incentive spirometry
Nutritional Intervention	Hematological tests (baseline), specific for anaemia, protein status, lipid profile	Increasing protein intake and timing its intake according to physical activity (20-30 gms taken post-exercise) Immuno-nutrition like Omega 3 & Vitamins Individualized dietary recommendations
Medical Intervention	Disease related tests like Echocardiogram, Glycosylated Hb, Pulmonary function tests etc	Optimization of chronic disease like HTN, COPD, DM etc.
Psychological Interventions	*Mood factors* – Anxiety, depression, psychological safety, perceived stress *Attitudinal factors* – self efficacy, optimism, desire of involvement *Personality factors* – Neurotism, extraversion, self-esteem	Aim at improving self-efficiency and resilience e.g. – deep breathing exercises, mindfulness, positive thinking and relaxation techniques Priming about the disease, surgical procedure, what to expect under anaesthesia, relapse, pain, post-operative rehabilitation etc

Fig 1: Flowchart depicting the flow of Surgical patients for an optimal outcome before surgery



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The Dangers of Beauty: Perioperative Anaesthetic Concerns of Cosmetology

The uprise of cosmetic awareness amongst the general masses has gained substantial attention worldwide, leading to booming of the cosmetic industry. The need, rather desire to “look good” is gaining popularity not only among the teenagers and young adults, but also the middle aged and elderly, which is fuelled by the easy availability and financial feasibility of cosmetic enhancement procedures. The general inclination of people towards cosmetically pleasing procedures has encouraged them to even go under the knife, surgically. However, this relatively recent trend in the beauty industry is not without its often unacknowledged risks of perioperative complications. The age redefining procedures like the use of neurotoxins, eyelash extensions, gel manicures, temporary and permanent piercing jewellery, skin tattoos and enhancement procedures could potentially increase our anaesthetic risk, which is not yet a part of our standard textbook teaching. Thus, creating awareness amongst our budding anaesthesiologists as well as established practioners to inculcate leading questions regarding cosmetic procedures as well as taking adequate perioperative measures concerning the same thus becomes of paramount importance. In this article, we briskly overview the various cosmetic procedures and its associated set of perioperative concerns providing insight into the beautiful yet dangerous world of cosmetology.

Botulinum toxin and its effects on neuromuscular paralysis

The use of Botulinum toxin, commonly called BOTOX, is quite popular as minimally invasive cosmetology for treatment of hyperfunctional facial lines caused due to repeated contractions of facial muscles like orbicularis oculi, procerus, corrugator supercilii, and frontalis, resulting in a seamless wrinkle free face. This neurotoxin, produced by the bacterium Clostridium botulinum, produces flaccid muscle paralysis by blocking the release of acetylcholine at the neuromuscular junction.(1) However, case reports have documented the inadequate surgical muscle relaxation despite full dose of muscle relaxant and documented evidence of no train-of-four, double burst, or tetanic stimulation patterns on forehead but accompanied by forceful muscular contractions on stimulation of the ulnar nerve.(2,3) This could lead to erroneous neuromuscular transmission monitoring with inadequate surgical relaxation that could increase the risk of perioperative respiratory complications and increased incidence of unnecessary postoperative mechanical ventilation. These cases highlight the need for using ulnar nerve stimulation for neuromuscular monitoring, a practice now recommended by the 2023 American Society of Anesthesiologists guidelines.(4) Additionally, it's

important to get a complete medical history, including any cosmetic procedures, before giving paralytic agents. As cosmetic procedures become more common, all patients should be asked about them during preoperative assessments to ensure proper monitoring and safe use of paralytics during surgery.

Ocular cosmesis and risk of injury

Eyelash extensions, which involve gluing artificial lash fibres to natural lashes for a fuller and longer look, are becoming more popular. However, they can lead to dry eyes, burning sensations, lid swelling, and pain. For anesthesia professionals, lagophthalmos, or incomplete eye closure during sleep, is particularly concerning. This condition can cause increased corneal exposure, dryness, bacterial build up under the lashes, microbial infections, and blepharitis.(5) Corneal injury is the most common eye complication during the perioperative period, especially under general anesthesia. Poor eyelid closure can lead to corneal abrasions and exposure keratopathies, and eyelash extensions can worsen these issues by causing lagophthalmos. Additionally, misdirected lashes falling into the eye can increase the risk of corneal injury.(5)

Ideally, eyelash extensions should be removed before surgery. If removal is not possible, patients should be informed of the heightened risks of corneal abrasions, infection, and lash loss. During surgery, placing a soft, oval eye pad over the eyelid and securing it with tape horizontally (preferred) or vertically from the brow to the zygomatic arch can help prevent direct adhesive contact with the eye, reducing the risk of corneal complications. Ocular lubricants can be used to prevent eye dehydration. Vigilance during intraoperative eye checks is crucial, particularly if there are changes in head or neck positioning.

Oropharyngeal piercings and risk of airway compromise

Permanent jewellery, a trend popularized by social media, involves custom-fit metallic bracelets, anklets, or necklaces welded together and often pierced into skin and subcutaneous tissues like eyelids, lips, nose and nasal septum, areas often concerning the anaesthetists airway intervention.(6,7) Permanent jewellery incorporated in other areas like the naval and even private parts hold the risk of burning while using electro cautery as patient jewellery or piercings could act as a return pathway and cause burns.(8) A thorough preoperative history taking along with clinical evaluation if feasible should be incorporated in our routine preanaesthetic evaluation. This jewellery should ideally be removed before

scheduled surgery and this should be included in preoperative instructions. If removal is not possible, potential risks such as burns, compression injuries from oedema, or dislodgement should be communicated to the patient and documented. When feasible, alternative technologies like bipolar electrocautery should be used, and care should be taken to prevent contact between the patient and metal objects. The Association of Perioperative Registered Nurses recommends removing metal piercings if they are located between the active electrode and the grounding pad. Removing jewellery is the best way to eliminate this risk, but it is not always possible. Taping jewellery to insulate it from electro-conductive materials has not been proven to reduce burn risk, though it may prevent loss of the item.

Gel based manicures and monitoring inaccuracies

Gel-based manicures have recently gained much popularity due to their durability ads they incorporate polymerized acrylate monomers that resist chipping and scratching. These manicures can result in spuriously high SpO2 readings, particularly with orange and light blue colours, suggesting that they might cause anesthesia professionals to overestimate oxygen saturation and possibly miss hypoxemia.(9) Spectrophotometric evidence shows that green and blue nail polish increase absorbance at 660 nm more than at 940 nm, the two wavelengths incorporated by pulse oximeters to measure the functional oxygen saturation in arterial blood, thus potentially misleading the sensor to indicate desaturation and leading to unnecessary interventions in the operating room.(10) To avoid these issues, it is advisable to request the removal of nail polish before surgery. If patients cannot comply, alternative pulse oximetry probe locations or turning the probe 90 degrees to avoid the painted nail bed may be necessary.

Tattoos and the associated perioperative risk

Tattoos can also present unique anesthetic concerns that require careful consideration and management. Tattooed skin may alter the effectiveness of certain anesthetic procedures, such as regional blocks or epidurals, where the presence of tattoo ink might obscure anatomical landmarks or lead to difficulties in needle insertion. Additionally, there is a potential risk of introducing tattoo pigments into deeper tissues, which can cause inflammatory reactions or infections. Preexisting tattoos can also complicate the placement of adhesive monitoring devices or surgical drapes, potentially affecting their adhesion and function. In some cases, tattooed skin may be more sensitive or prone to allergic reactions, particularly if the tattoo is recent or if the patient has a history of

adverse reactions to tattoo ink. Permanent tattoo inks might also cause burns during the use of electrocautery during surgical procedures.(11) The risk of contracting infections like Hepatitis B, Hepatitis C, and Human immunodeficiency virus can further compound the exposure risk of the perioperative team. Therefore, anesthesia professionals should thoroughly assess tattooed areas, consider alternative sites for needle insertion or monitoring device placement, and be vigilant for signs of skin irritation or infection. By addressing these concerns proactively, anesthesia providers can minimize risks and ensure safe and effective care for patients with tattoos.

To sum it up

Cosmetic procedures, while enhancing aesthetic appeal, pose significant anesthetic implications that must be meticulously managed to ensure patient safety. These minimally invasive easily available procedure often compound the anaesthetic risks for often avoidable factors. Its rising care in younger and older populations alike can become an unnecessary hazard for not only the patient but also the anaesthetist and the surgeon. It thus becomes imperative for anesthesia professionals to obtain comprehensive cosmetic procedure histories from patients, recommend the removal of certain cosmetic enhancements when feasible, and adapt intraoperative monitoring techniques to mitigate associated risks. This thorough approach includes preoperative education, modified monitoring practices, and careful intraoperative management. Through diligent preparation and proactive adaptation, anesthesia professionals can effectively navigate the unique challenges posed by cosmetic procedures, ensuring optimal patient safety and outcomes.

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Applying for International Anaesthesia Fellowships: Canadian Edition

Many Canadian hospitals are offering fellowships in various anesthesia subspecialties. The University of Toronto (UofT) is the body that overlooks all the fellowships in anesthesia. A graduate degree in Anesthesiology is sufficient eligibility to apply for these fellowships, and you do not require any USMLE scores. Most hospitals have a minimum wait time of 1-1.5 years between fellowship applications, acceptance, and joining thereof. Most applications are filled in the first half of the year and deadlines vary from hospital to hospital. It is an online application that includes your CV, letter of intent, and three letters of recommendation. Theapplications are shortlisted for interview. The whole process usually takes 2-3 months. The interviews mostly consist of general questions, rather than academic questions. The detailed structure of duties and expectations from the fellowship program can be found on the hospital site. Most of the fellowships are 1 year. The fellowships can either be sponsored/self-funded or salaried.

The following link takes you to various fellowships offered by the University of Toronto

Fellowships Offered | Department of Anesthesiology and Pain Medicine (utoronto.ca)

The CV should be in an appropriate format, UofT provides a guide to writing a professional CV, and the details can be accessed through the link.

Create your academic CV and cover letter - UofT Student Life (utoronto.ca)

Once selected the process evolves in getting certification from the College of Physicians and Surgeons Ontario. The documents required during the process are a Medical degree, MD specialist degree, a passport copy, a CV, a transcript from medical school (details will be provided on the CPSO site), the State Medical Council to issue a certificate of good standing, Letter of Appointment issued by PGME, Work permit, Canadian Criminal Record Search (level 2), Internship completion certificate. The following link is for the CPSO site where you will register as a new member, start an application, and upload the documents mentioned above one by one. All the documents should be uploaded and verified by CPSO before the start of the fellowship.

CPSO - Home

The application for the work permit can be assessed through the IRCC link below. Medical examination for IRCC application is available at various centers in India. There is no requirement for an ILET score provided your MD degree in English. You must start the application and can complete it in 6 months. Refrain from starting

multiple applications as it might delay the process. You will receive the work permit on arrival which you must upload in CPSO to get your certificate.

Sign in to your IRCC secure account - Canada.ca

For completion of your PGME application other required registrations are CMPA (Canadian Malpractice Association), and immunization record (tuberculin test, Anti-HbsAg, HbA, VZ, Mumps, Measles, Rubella antibody. The immunization form should be filled and a certified doctor must verify the reports attached. The Canadian Criminal Record Search should be done before the start of the fellowship. It is off lately to be done once you are in Canada, and takes at least 2 weeks so you may ask any of your friends in Canada to do it for you and the document can be emailed to you. Otherwise, you might need to go early well before the start of your fellowship. The link to the PGME Power portal for UofT is

Power (utoronto.ca)

Future prospects as a doctor in Canada

You can finish a year or two of fellowship and come back to your home country, but at the same time, there are prospects of getting Staff positions (consultants) in various hospitals across Canada. A Canadian PR is required to get staff positions. Usually, there are two pathways: 1st is to clear the FRCPC exam (this is a two-part exam with a written exam in September of the coming year in which you apply for eligibility followed by an oral in April of the year later). 2nd pathway is an academic pathway, in which you can apply for a staff position with a restricted license in the district or hospital you apply for a staff position. This pathway sets 1, 3 and 5 years academic goals which you have to fulfill after being appointed as an academic staff. If you opt for the later pathway then your license will be restricted to that hospital/province. The following link provides some details about the same.

CPSO - Academic Registration

Life as a fellow in Canada

Most of your usual day starts early in Canada, 7 am on almost all days, and even earlier if academic classes in your hospital are schedules in the morning. The on call duties are divided equally amongst the fellows, and one staff and postgraduate resident. (speaking of SickKids, the team composition might vary from hospital to hospital). Apart from that the usual week is five days working with reserved academic time so that you have time to get involved in academic research. Weekends (Saturday/Sunday) are off if you are not on call. You will also be entitled to 20 annual leaves.

Accommodation/rental in Canada takes one-third portions of your salary. Many condos are available to rent, furnished and non-furnished. The past fellows sell their household items which can be purchased at lower prices, apart from that you need to buy internet connection and mobile sim. Fido company has offers which you can enquire about and avail. Once you land in Canada, you must open a bank account to set pre-authorized debit for your monthly rent and give details to receive salaries. The salary in Canada is credited into your account every 2 weeks. Discounts are available for students so you should get your student card made by the University of Toronto. The connectivity in Toronto is good (I can not say for other cities) via the metro. You should get your Presto card and can reload it occasionally. If you know how to ride a bicycle you can purchase a yearly subscription for Toronto Bikeshare.

Winters in Canada need a special mention. Appropriate winter wear is a must to survive sub-zero temperatures. Investing in a good quality winter parka/jacket is worth it. You can opt for North Face/Columbia/Canada Goose (overpriced). Snow shoes from Sketchers are good, but North Face and Columbia offer good options. Boxing Day and black day sales offer amazing discounts so that you can reserve your shopping for those days.

Instructions will be sent for all the steps by the fellowship coordinator and PGME after your selection. Kindly follow them but, I have mentioned the general list of things to be done.

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Diabetic Foot

1. Explain the pathophysiology of Type 2 Diabetes Mellitus. What is the role of HbA1c in the management of T2DM?
2. What are the common clinical features of Type 2 Diabetes Mellitus?
3. How is Type 2 Diabetes Mellitus diagnosed? Describe the ADA diagnostic criteria.
4. Describe the potential complications of uncontrolled T2DM.
5. List the classes of oral hypoglycemic drugs. Explain the mechanism of action of metformin.
6. What are the side effects and contraindications of sulfonylureas?
7. Discuss the use of DPP-4 inhibitors in the management of T2DM.
8. Compare and contrast the benefits and risks of SGLT2 inhibitors.
9. Describe the different types of insulin preparations.
10. Explain the concept of basal-bolus insulin regimen.
11. How do you manage perioperative insulin therapy in diabetic patients?
12. Discuss the risks associated with insulin therapy, including hypoglycemia.
13. List the major complications of diabetes.
14. Discuss the minor complications of diabetes.
15. How does autonomic neuropathy affect anesthesia management in diabetic patients?
16. Describe the tests to evaluate autonomic neuropathy.
17. What are the implications of diabetic nephropathy for anesthesia?
18. Explain the impact of diabetic retinopathy on the perioperative management of diabetic patients.
19. What preoperative assessments are essential for a diabetic patient scheduled for surgery?
20. How would you optimize glycemic control in a diabetic patient preoperatively?
21. What are the specific concerns regarding cardiovascular risk in diabetic patients undergoing surgery?
22. Discuss the preoperative fasting guidelines for diabetic patients on insulin.
23. What is the significance of glycosylation of tissues in the context of airway management?
24. Explain how you would assess for potential airway difficulties in a diabetic patient.
25. What are the advantages of regional anesthesia in diabetic foot surgery? Describe the types of regional anesthesia techniques suitable for diabetic foot ulcer.
26. How does peripheral neuropathy in diabetic patients affect the choice of

regional anesthesia?

27. Describe the pathophysiology of Diabetic Ketoacidosis.
28. Outline the management protocol for a patient with DKA.
29. What are the anesthetic considerations for a patient with a history of DKA undergoing surgery?
30. Define gestational diabetes. Describe the important considerations in a pregnant diabetic undergoing non-obstetric surgery.

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Communicate Effectively- The Pearls

“Unnecessary noise is the most cruel absence of care which can be inflicted either on sick or on well.”—Florence Nightingale, 18591

“Soft skills are a set of skills used by humans when performing tasks or carrying out procedures while interacting with each other and underlying systems. Communication is one of the soft skill that all of us must try and master. Communication in the proper form protects professional integrity and raises patient safety and satisfaction. The interpersonal relationships between colleagues, seniors, juniors, administrators, research activities, and interaction with higher authorities must be based on effective communication principles.

Communication skills should be incorporated into the medical field. Medical personnel must be more sensitive since we deal with patients undergoing physical and emotional turmoil. Communication skills can be incorporated into various medical areas (Table1) and different areas might need different approaches during patient care. The first interaction between the anaesthetist and the patient happens in the pre-anaesthetic clinic. The anxious patient notices the doctor's body language and non-verbal gestures. The doctor’s approach to the patient with empathy and courtesy will help build a rapport. The doctor should dress properly modestly, not outrageously or too casually. The operating theatre in a hospital is a critical and complex area which requires high communication standards. The lack of effective communication between colleagues can lead to fatal adverse events, with an incidence reported as high as 30%3 to 43%4.

Table1.Communication skills can be incorporated into various medical areas
OPD Consultations
History taking
Obtaining informed consent from patients
Operation theatre
Intensive Care Rounds
Discussing medical errors
Breaking bad news
Interaction with colleagues and juniors

Communication Mnemonics- Communication can be verbal or non-verbal. Non-verbal cues (e.g. attitude, etiquette, manners, habits, and appearance) are of paramount importance. During stressful situations, there are certain mnemonics which can be helpful for effective communication.

Communicate Effectively- The Pearls

1. **ISBAR5 -** CLINICAL HANDOVER DURING PATIENT TRANSFER, SHIFT CHANGEOVER, OR ESCALATING INFORMATION OF A DETERIORATING PATIENT

- **Introduction-** Who are you, where are u? Patient name, age, and gender.
- **Situation-** What is happening at that moment? Reason for calling.
- **Background-** What are the issues leading to the situation?
- **Assessment-** What do you believe the problem is?
- **Recommendation-** What should be done to correct this situation, or what does the senior want to do when he arrives?

2. **CONES6 -** MANAGING MEDICAL ERROR

- **Context-** Conversation should happen in a quiet area with privacy. Prepare for the disclosure and expect emotions from patients/patient's families.
- **Opening Shot-** Inform the family that it is important news.
- **Narrative-** Explain the sequence of events, avoid blame or making excuses, offer a clear apology and emphasise that an investigation is being done regarding the error.
- **Emotions-** Expect emotions; be patient and empathetic.
- **Strategy & Summary-** Summarise and explain the possible treatment plan. Sensitive disclosures decrease the chances of malpractice claims.

3. **EVE6 -** MANAGING ANGRY PATIENT

- **Explore the Emotion-** Identify the emotion(sadness, anger), identify the reason for the feelings, and acknowledge.
- **Validate the Emotion-** Let the person know you understand their behaviour
- **Empathic Response-** Respond in a way that you have seen their emotions and understand them.

4. **SPIKES6 -** BREAKING BAD NEWS

- **Setting Up the Conversation-** Choose a quiet area, prepare what to say, read the medical history in advance, and have the key people who will be the decision-makers. There should be no physical barrier between physician and patient. Stay calm and maintain eye contact.
- **Perception-** Assess what the person already knows and assess their understanding.
- **Invitation-** Ask before you tell; ask if the patient/family wants to know the details of the medical condition.
- **Knowledge-** Avoid medical jargon. Give the information in small bits and verify

their understanding.

- **Emotions-** Acknowledge emotions and use open-ended questions about their feelings.
- **Strategy and Summary-** Discuss the medical plan and have it documented. Ask the patient/family to repeat what they have understood.

5. **TIMER6 -** WHEN TALKING TO A PERSON IN SUPERVISION

- **Think Through the Encounter-** Cross-check the complaint, take permission from higher authority before confrontation, have the correct information, take advice if needed, rehearse what to say and give honest feedback
- **Introduce Issues-** Address issues using the "I" statement. I'm worried about your behaviour, absence, etc., and maintaining eye contact.
- **Manage the Discussion-** Be non-judgemental, stay calm, and ask the junior to provide more information about his behaviour. Use the 6-second rule- when your emotions boil, wait 6 seconds or until calm before responding. Acknowledge & validate emotions, reaffirming the other person's issue.
- **Establish a Plan and Expectations-** Make a plan stating expectations with measurable and achievable changes in the person.
- **Revisit and Give Feedback-** Review, praise, and give honest feedback.

Barriers to effective communication

Failure of effective communication occurs when the physician is emotionally unstable, facing clinical overload, in complex clinical situations and with outcomes that are challenging to handle. It also occurs when staff constantly changes during shifts, post-duty, and holidays with incomplete information between medical personnel and, in turn, incomplete and unsatisfactory communication to patients, which may lead to grievances and litigations.

Effective communication is a tool that can transform the quality of care and strengthens inter-personal bonds.

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Labour Analgesia CME

The Department of Anesthesiology organized a CME & Workshop on labour analgesia: 'A step towards respectful motherhood' on 4th May 2024 under the leadership of the organising chairperson, Director Professor and Head, MAMC, Dr Munisha Agarwal. The team was comprised of the organising secretary, Dr Bharti Wadhwa; Scientific Chairperson, Dr Kirti N Saxena; Joint Secretary, Dr Amit Kohli; Treasurer, Dr Prachi Gaba; and CME coordinators, Dr Indira, Dr Ramita Kashyap and Dr Priyanka Singh.

The CME was held under the aegis of the ISA Delhi Branch and was inaugurated by the Worthy Dean of MAMC, Dr Poonam Narang and Medical Director LNH, Dr Suresh Kumar. The occasion was graced by the President and honorary Secretary of the ISA Delhi Branch, Dr Lokesh Kashyap and Dr Amit Kohli. This CME had a registration of 140 delegates and was attended by Postgraduate residents, Senior residents and Faculty from various institutes in Jaipur, Jalandhar, Mainpuri, Kanpur, Karnal, and Rohtak, apart from the Delhi NCR region.

The CME was a comprehensive refresher course on labour analgesia. It covered important topics such as setting up of a Labour Analgesia unit, preparing the parturient for labour analgesia, patient selection, sensitization, counselling & consent taking. Experienced and senior faculty discussed their experiences with navigating various complications of epidural labour analgesia, analgesia in parturient with heart disease, as well as conversion of epidural analgesia to surgical anaesthesia. The discussion on the challenges of administering an epidural block to a parturient, along with the optimal procedure for doing so, was an incredibly valuable and well-received session. In addition to the above, non-neuraxial alternatives for labour analgesia were an eye-opener for many of the delegates and received significant curiosity and interaction from the participants.

The Department of Obstetrics and Gynaecology at LNH also took part in the event, and all the deliberations were highly appreciated.

Labour Analgesia CME

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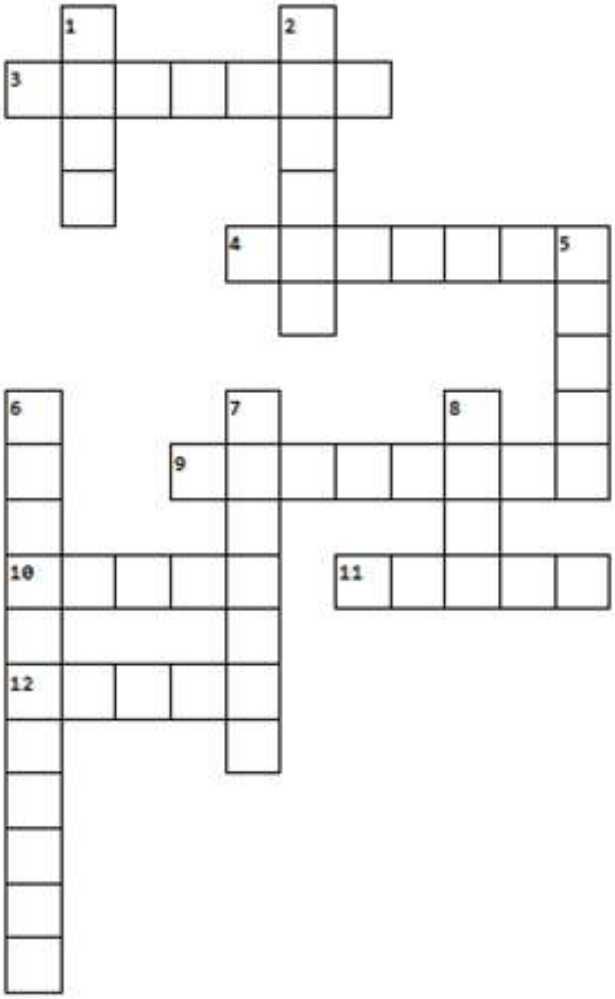
Crossword



Across

3. he used chloroform as anaesthetic

4. Grading of malignant hypothermia susceptibility

9. Grading of visibility of surgical field based on bleeding especially used for FESS

10. Which landmark trial on the role of tranexamic acid in non cardiac surgery

11. Name the trial that investigated the efficacy of corticosteroid in head injury patients

12. Name the landmark trial that compared the outcomes of transfusion strategies in critically ill patients

Down

1. Grading system used for allergic and anaphylactic reactions

2. father of modern anaesthesia

5. Name the trial that compared sotalol to amiodarone in atrial fibrillation

6. mechanism of action of neostigmine in reversing neuromuscular blockade

7. meyer overton hypothesis is used to describe ___ of agents

8. receptor involved in action of propofol

Answers to April crossword
Across: 1 waters, 3 foxglove, 6 lithium, 9 ginseng, 11 victoria, 12 hyperobese
Down: 2 artusia, 4 ephedra, 5 pqip, 7 macintosh, 8 bier, 10 gray

Compiled by
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Entries to be sent at isadelhiexecutive@gmail.com and dramitkohli@yahoo.com by **25th July 2024**

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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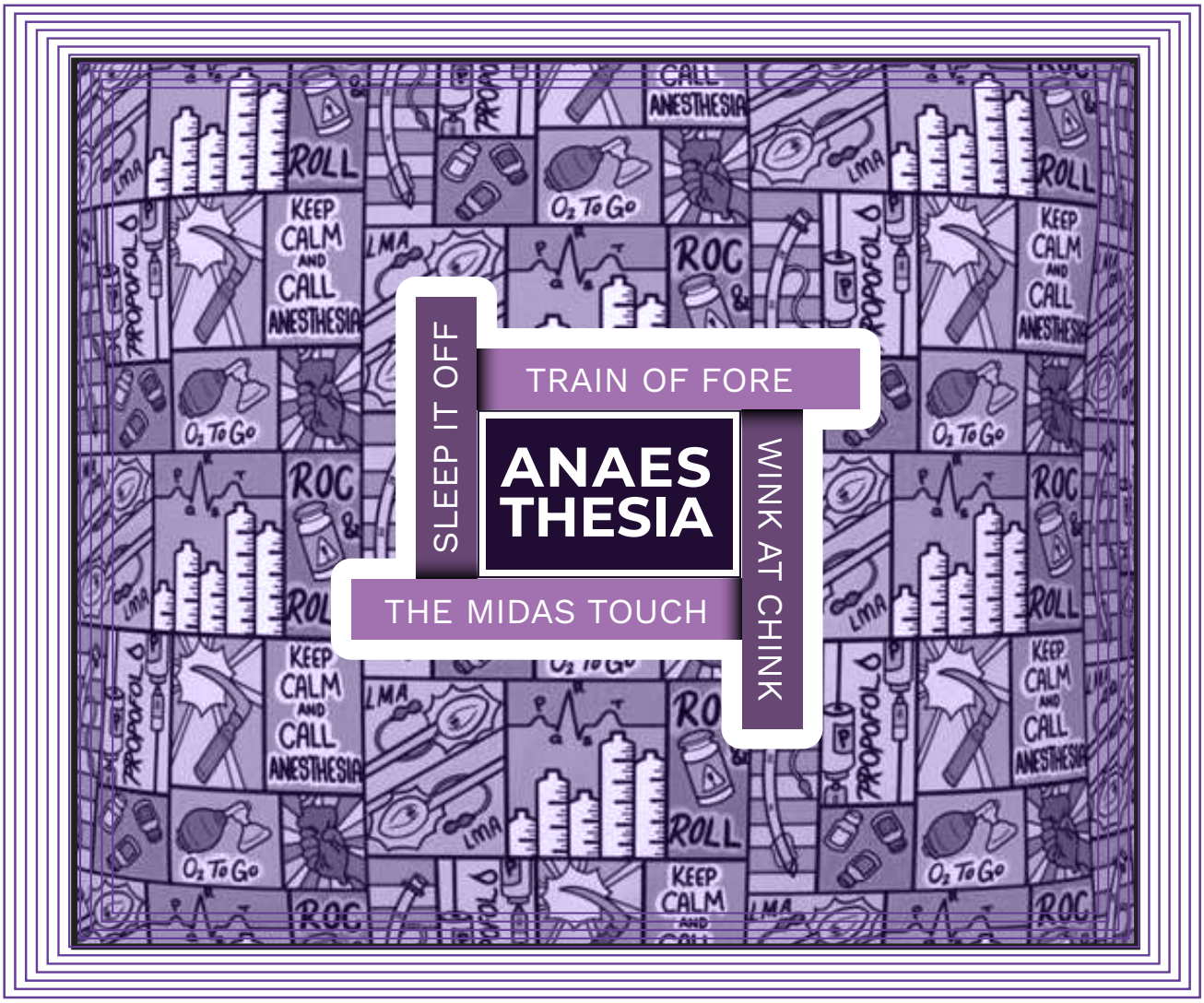

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