

Anesthetic management of a “Supercentenarian” (Oldest living person on Earth) posted for an emergency surgery

ABSTRACT

With the rise in living standards and evolution of science, there is a rise in life expectancy world over. This demographic transition has led to a rise in older persons, increasing the dependency ratios and “demographic burden.” Management of such old patients requires special considerations and understanding as aging is a physiological phenomenon in which the functional capacity of organs decreases due to degenerative changes in the structure. An important aspect to remember in Geriatric Anesthesia is that in spite of adequate compensatory mechanisms for age-related changes, there is a limitation of physiological reserve, especially in stressful circumstances like perioperative period. Geriatric patients are more sensitive to all medications and anesthetic agents. Lesser amount of drug is required to achieve the desired clinical effect, but have a prolonged effect. This elderly but well-preserved patient, possibly a case of small gut obstruction was posted for emergency laparoscopy and proceed. Seeing his age and easy friability, a well-planned preoperative assessment and optimization was done prior to wheeling him into operation theater. Administration of short-acting anesthetic drugs in titrated quantities and awareness about postoperative cognitive dysfunction (POCD) helped us to get better and faster recovery in the patient.

Key words: Aging; geriatric anesthesia; physiological reserve; supercentenarian

Introduction

The UN agreed cut-off is 60+ years to refer to the older or geriatric age group. Within the elderly population, further classification like oldest old (normally those 80+), centenarian (100+), and supercentenarian (110+) are also made.^[1] Aging also increases the probability of a large number of geriatric patients undergoing anesthesia for surgery. An important consideration in geriatric anaesthesia is that in spite of adequate compensatory mechanisms for age-related changes there is a limitation of physiological reserves especially in period of stress such as the peri-operative period.

Case Report

We hereby report a case of a, Supercentenarian^[1] who was successfully operated at our tertiary care super-specialty center for an emergency surgery and discuss the special considerations we had in mind while conducting the anaesthesia.

A 122 year old patient weighing 60 kg, an athlete of international fame^[2] was admitted to our tertiary care facility with a history of severe pain abdomen, vomiting, and

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inability to pass flatus for 04 days. On clinical examination, the patient was conscious, oriented and well preserved, and had no comorbidities. He was physically active even at this age, non-smoker, non-alcoholic, and not on any medications. Vitals pulse 64/min, BP 118/76 mmHg, breath rate 18/min, and SpO₂ 92% without any oxygen supplementation. Hematological and biochemical investigation results were within normal limits. Plain X Ray abdomen showed multiple air fluid levels [Figure 1] and abdominal computerized tomographic (CT) scan revealed the likely cause to be a band formation leading to small gut obstruction. He was posted for emergency laparoscopy and proceed, accepted in ASA grade-II with high risk. Informed written consent was taken for surgery and anesthesia, as a high-risk case.

A careful preanesthetic evaluation was carried out in the ICU. Bedside transthoracic echocardiography revealed concentric left ventricular hypertrophy (LVH) with 50% ejection fraction with no regional valve abnormality. Since there was limited scope of regional anesthesia and neuraxial block in this case, we opted for a Balanced General anaesthesia technique.^[3,4] After wheeling the patient in the operation theater, an 18-gauge cannula was secured. Standard monitoring was attached (ECG, NIBP, and Pulse Oximetry). The patient was premedicated with fentanyl 60 µg and ondansetron 4 mg, intravenously. We decided to use thiopentone as the intravenous anesthetic, since it is more cardio stable and causes less hemodynamic fluctuations, especially in elderly. A titrated dose thiopentone 120 mg initially and further 2 aliquots of 30 mg to make it total 180 mg at a dose of 3 mg/kg. Vecuronium being cardiostable neuromuscular blocking was used and 5 mg was given to achieve relaxation before attempting laryngoscopy and endotracheal intubation. Esmolol 20 mg intravenous route was given to control sympathetic response to laryngoscopy and tracheal intubation with size 8 endotracheal tube.

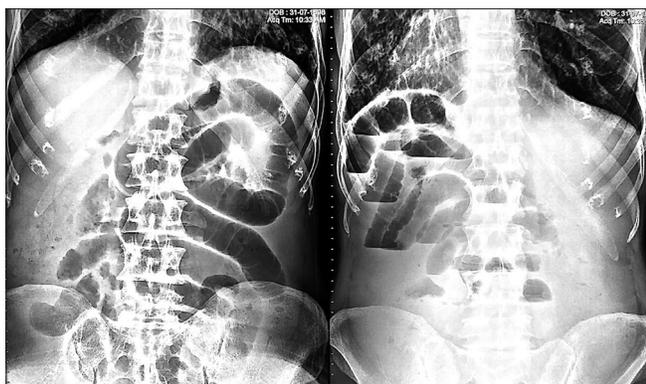


Figure 1: X-Ray abdomen showing multiple air-fluid levels

Anesthesia was maintained using oxygen in air and sevoflurane at 1%–2% concentration with the FiO₂ and PEEP being delivered to maintain oxygen saturation in excess of 92%.

Invasive arterial pressures monitoring started after induction of anesthesia. During the creation of pneumoperitoneum, hemodynamic parameters remained stable. On laparoscopy, a band was noticed over ileo-caecal junction causing obstruction. The band was resected laparoscopically. During laparoscopy, his liver was noticed to be small and shrunken depicting an old-aged liver. The entire duration of surgery was about 60 min.

In view of the advanced age of the patient, abdominal surgery and high chances of delayed recovery/Post operative cognitive dysfunction POCD,^[5] the trachea was not extubated and patient was shifted to the intensive care unit (ICU). He was maintained on pressure-controlled ventilation. After about 1 h when he was awake and started following verbal commands, trachea was extubated. However, full recovery from anesthesia took another 6 h and he remained delirious till then.

In postoperative period, he was kept pain-free by using multimodal analgesia in the form of 8 hourly intravenous paracetamol 500 mg along with tramadol 25 mg as and when required. Since postoperative pulmonary complications are well known in these patients, chest physiotherapy and incentive spirometry were given 24 h onwards [Figure 2]. Patient was ambulated early and was discharged within 7 days, with uneventful recovery.

Discussion

The elderly (≥ 65 years) population is the fastest-growing population all over the world. Management of such old patients requires special considerations and understanding as aging is a physiological phenomenon in which the functional capacity of organs and tissues decreases due to degenerative



Figure 2: Incentive Spirometry started on 1st Postop day

changes in the structure.^[3] The physiological effects of aging on various human organ systems are explained in Table 1.

Surgery and anesthesia may exert greater adverse effects on the elderly than on the younger brain, which are manifested by the higher prevalence of postoperative delirium and cognitive dysfunction. These delay rehabilitation and are associated with increases in morbidity and mortality.^[5]

Drug metabolism could probably be altered by the aging effect on hepatic or renal function.

The elderly are more sensitive to anesthetic agents and generally require smaller doses for the same clinical effect, and drug action is usually prolonged. Apropos, we must understand the pharmacokinetics of various drugs used in these patients and adjust the doses accordingly while conducting anesthesia.^[6-8]

Highlights of the case management

The anesthetic management of this case was challenging primarily due to the advanced age of the patient. The salient features that were kept in mind were:

- a. There is loss of functional reserve in all organ systems resulting in fragility
- b. Geriatric patients are more prone to perioperative stress
- c. Hemodynamic response to intravenous anaesthetics may be exaggerated because of the aging heart and vasculature
- d. Emergency surgery itself is an independent predictor of adverse postoperative outcomes

Since our patient presented as emergency case with obstructed bowel and emergent case presents special problems such

Table 1: Physiological Effects of Aging on various Human Systems

CVS	CNS	RESPIRATORY	ABDOMINAL
↓Arterial Elasticity	↓Brain volume	↓Compliance	↓Gut Motility
↓Heart Rate	↓Neurogenesis	↓Alveolar Surface	↓Liver volume
↓Baroreceptor reflex	↓Brain Blood flow	↓Residual Volume	↓Hepatic Blood flow
↑Afterload	↓Cognitive Function	↓PaO ₂	↓Drug Metabolism
↑Systolic BP	↑Tau Accumulation	↓Muscle Strength	↓Renal Blood Flow
↑CAD, HTN, CHF	↑Cerebrovascular dx	↓Response to Hypoxia	↓GFR
	↑Brain Inflammation	Bronchitis, Emphysema	↓Na Conservation
			↑Dehydration

as atypical presentations, alterations in pulmonary and circulatory system, and fluid and electrolyte balance change secondary to modifications in metabolic needs.

The various steps taken for the successful outcome were -:

PREOPERATIVE: Adequate optimization by administering 500 ml colloid solution to avoid sudden hypotension, nebulization with saline, and bedside echocardiography.

INTRAOPERATIVE: Induction of anesthesia by primarily using only short-acting anesthetic drugs. We gave slow titrated dose of thiopentone during induction and smaller dose of fentanyl.

POSTOPERATIVE: To prevent postoperative pulmonary complications, we kept in ICU on postoperative elective ventilation and started early ambulation, incentive spirometry, and chest physiotherapy.^[9]

To summarize, in view of the extreme age of our patient, the highlights of the anesthetic management, in this case, were understanding the physiology of aged and adequate preanesthetic assessment and optimization prior to surgery.

Consent

Written informed consent was obtained from the patient for publication of this manuscript and accompanying images.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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