Review Article

Improvement of Quality and Patient Safety in Anaesthesia Practice in Low-Resource Settings

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ABSTRACT

In modern healthcare system, health policy makers, healthcare professionals and organizations, and patients are becoming more aware of the importance of promoting quality care and safety practices. In anaesthesia practice, the specialty has come a long way since its establishment in Dhaka Medical College Hospital in Bangladesh in 1950s by the house surgeons at that time. In last few decades, there had been incredible innovations in anaesthesia, such as the introduction of sevoflurane, isoflurane, propofol, the laryngeal mask airway, pulse oximetry, HDU and ICU facilities and many more. However, in Bangladesh, being a low-resource country, there are still many challenges that the specialty must meet especially in quality of care and patient safety culture. Following some recent anaesthesia-related fatalities, concerns about anaesthesia flared up among patients, health professionals and policy makers. Therefore, different healthcare organizations, both public and private, are now looking at the resiliency analysis of the anaesthesia practice in order to improve quality and patient safety to enhance patient satisfaction and trust building. This review paper aims to discuss quality improvement and patient safety in anesthesia practice and their contributing factors, standardized practices, and strategies to facilitate safety with a focus on teamwork and communication in low-resource settings. However, the review does not seek to be exhaustive or systematic, but to highlight current areas of concern and some potential solutions.

Keywords: *Quality assurance, patient safety, anesthesia practice, perioperative care, healthcare organization*

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INTRODUCTION

The Sustainable Development Goals (SDGs) reaffirm a global commitment to achieve universal health coverage (UHC) by 2030, which means that "all people and communities, everywhere in the world, should have access to safe and high-quality healthcare services they need – promotive, preventive, curative, rehabilitative, or palliative – without facing financial hardship".[1] It signifies that delivering quality healthcare services and ensuring patient safety are essential components of UHC. However, we have experienced in our settings that even if we

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could achieve essential health coverage including financial protection, health outcomes would still be poor if services were low-quality and unsafe. Therefore, quality has been part of the healthcare and policy discourse for nearly half a century in modern healthcare system. Recently in low-resource country like Bangladesh, healthcare organizations have become more aware of the importance of improvement of quality in healthcare and patient safety.[2] Quality of care is one of the most frequently quoted principles of health policy, and it is currently high up on the agenda of policy-makers at national, regional and international levels.[1-3] Quality health care can be defined in many ways; however, according to the World Health Organization (WHO), quality health services should be: i) effective that provides evidence-based healthcare services to those who need them; ii) safe that avoids harm to people for whom the care is intended; and iii) people-centred that provides care responding to preferences, needs and values of the individuals.[3] Hence, in true sense, quality requires measurement and generation of accurate information and quality needs to be continually monitored and assessed to drive improvement as concept of healthcare and its requirements are changing all the time worldwide.[4] Speaking of patient safety, it is now considered as a culture in any healthcare organization where an integrated pattern of individual and organizational actions and behaviour based on shared beliefs and values that makes them strive to minimize the potential harm to the patients during the processes of healthcare delivery.[5] For instance, the World Health Organization (WHO) defines patient safety as "a framework of organized activities that creates cultures, processes, procedures, behaviours, technologies and environments in healthcare that consistently and sustainably lower risks, reduce the occurrence of avoidable harm, make errors less likely and reduce the impact of harm when it does occur".[6]

Globally, 1 in every 10 patients is harmed in health care and more than 3 million deaths occur annually due to unsafe care. In low-to-middle income countries, as many as 4 in 100 people die from unsafe care.[6] Looking at anaesthesia-related mortality (i.e., mortality that is caused directly by anesthesiological measures)[7], the mortality attributable primarily to anaesthesia, as reported between 1954 and 1980, was approximately ranging from 1:2500 to 1:5000.[8] However, no such nationwide reports on anaesthesia-related mortality rates and perioperative mortality rates (POMRs) are not available in Bangladesh to date.[9] We all know that anaesthesia is an essential component of any surgical system, yet it remains neglected in most lower middle income countries (LMICs); Bangladesh is no exception. Evidence showed that the optimization of perioperative processes, in which anaesthesia plays key role, has become increasingly important as anesthesiological management have an impact on patients' outcomes.[7] In anaesthesia practice, the specialty has come a long way since its establishment in Dhaka Medical College Hospital in Bangladesh in 1950s by the house surgeons operating at that time. In last few decades, there had been incredible innovations in anaesthesia, such as the introduction of sevoflurane, isoflurane, propofol, the laryngeal mask airway, pulse oximetry, HDU and ICU facilities and many more. However, in Bangladesh, being a low-resource country, there are still many challenges that the specialty must meet especially in quality of care and patient safety culture. Following some recent anaesthesia-related fatalities, concerns about anaesthesia flared up among patients, health professionals and policy makers. Therefore, different healthcare organizations, both public and private, are now looking at the resiliency analysis of the anaesthesia practice in order to improve quality and patient safety to enhance patient satisfaction and trust building. This review paper aims to discuss quality improvement and patient safety in anesthesia practice and their contributing factors, standardized practices, and strategies to facilitate safety with a focus on teamwork and communication in low-resource settings. However, the review does not seek to be exhaustive or systematic, but to highlight current areas of concern and potential solutions.

UNDERSTANDING QUALITY IMPROVEMENT AND PATIENT SAFETY CULTURE IN PRACTICE

Constitutionally, people of Bangladesh should be able to count on receiving safe, standardized and evidence based health care.[10] The culture of patient safety is multidimensional, and usually include assessment of knowledge, skill and attitude of the healthcare providers, leadership styles, collaboration and cooperation among front-line professionals and other staff, the practice of evidence-based medicine, adequacy of the use of communications channels, a capacity to learn from mistakes, a recognition of errors as system failures rather than individual failures, and a patient-centered approach.[11,12]

Evidence showed that there are significant shortcomings in anaesthesia capacity of our country include severe shortage of qualified workforce, inadequate equipment and hospital infrastructure, and insufficient access to essential medicines.[9] Therefore, the first and foremost reform should be provision of qualified anesthesiologists. Anaesthesia should be administered only by an anesthesiologist who has undergone specialist education and training or by another physician who is reasonably advanced in his/her training (e.g., EmOC training) under the supervision of an anesthesiologist.[7,9,12-15] Quality of such education and specialty training must be assessed by the curriculum and accreditation authorities.[9,16] Additional implementation plans are needed to determine feasible and cost-effective approaches to training, recruitment, and retention of anaesthesia physicians (both in urban and rural settings).[14,15,17] Moreover, recommendations have been given to prioritize and increase availability of essential resources e.g., basic infrastructural improvements like operation theatre with safety monitoring equipment, infection control measures, waste management, drugs store having and essential medicines for anesthesia and surgery at all hospitals – from Upazila Health Complex to tertiary level/ specialized hospitals.[10,13-15,17]

Hospitals should monitor their overall quality regularly. According to the World Health Organization (WHO), to understand and implement quality healthcare, health services must be: i) "Timely" which means reducing waiting times and sometimes harmful delays; ii) "Equitable" by providing care that does not vary in quality on account of gender, ethnicity, geographic location, and socio-economic status; iii) "Integrated" which means providing care that makes available the full range of health services throughout the life course; and iv) "Efficient" by maximizing the benefit of available resources and avoiding waste.[3,17,18] These all are applicable in anaesthesia practice as well. Human error and system failures continue to play a substantial role in preventable errors that lead to adverse outcomes or death in anaesthesia practice. Many of these deaths are not the result of inadequate medical knowledge and skill but occur because of problems involving communication and team management.[18-21] One more important and crucial measure is to addresses those patient safety issues by addressing behavioral skills for critical events. These skills provide tools to help the leader manage the team and to help the team work together; they include calling for help, establishing situation awareness, using checklists, and communicating effectively.[20] Effective teaching strategies are needed to teach these skills especially in team training.[12,18,20,21]

Institutional measures should be in place for collection and reporting of surgical and anesthesia metrics, such as surgical and anaesthesia-related morbidity and mortality rates and perioperative mortality rates (POMRs), and other health metrics, such as surgical infection rates;[9,22-24] there are so many clinical indicators are available in this aspect which lack of standardized and consensus definitions across systems and countries though.[24] The ideal quality management program continuously improves the standards of patient safety by gathering such data at institutional and national levels, identifying variance in practice, introducing change, and remeasuring.[24,25] Another important factor is patient engagement. In modern healthcare, the delivery of patient-centered healthcare must be responsive to individual patients' preferences, needs and values and gathering patient feedback. Therefore, many professional societies and healthcare organizations have taken the position that patient engagement and measurement of patient satisfaction are critical components of quality assessment and improvement.[13,24,26-28] Anesthesia physicians and the hospital authority should take the responsibility to make their patients learn that "anaesthesia is generally safe and effective when administered by a trained professional; however, like any medical procedure it has some risks".[26] They should encourage patients and their families to actively participate in decision-making about surgery and anaesthesia (i.e., to enhance patients' autonomy and beneficence) and gain a better understanding of how they can minimize surgical and anesthesia related risks and complications (i.e., non-maleficence).[28,29] Besides, patient safety advocacy and educational efforts can include publication of manuals/infographics, mass media campaign, and organization of seminar involving all stakeholders (e.g., on World Anaesthesia Day).[9,13,19,21,28] Recently, the Institute for Healthcare Improvement (IHI) and Safe & Reliable Healthcare (SRH) collaboratively developed the "Framework for Safe, Reliable, and Effective Care" which highlighted two foundational domains – culture and the learning system outlining what is involved with each and how they interact –

along with nine interrelated components (leadership, psychological safety, accountability, teamwork and communication, negotiation, transparency, reliability, improvement and measurement, and continuous learning); and discusses patient and family engagement[30] (Fig. 1). This framework can also be adopted in our anaesthesia practice in the country (both personal and institutional levels). One point must be noted with special importance that engagement of patients and their families is at the core of this framework; literally this is the engine that drives the focus of our professional goal to create safe, reliable, and effective care.

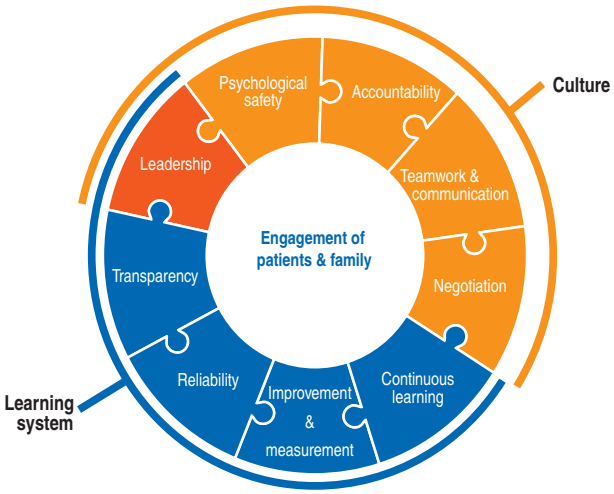

Fig. 1: *Framework for Safe, Reliable, and Effective Care at Institutional Level (source: Institute for Healthcare Improvement)*[30]

Last but not the least, healthcare providers' knowledge, attitudes, viewpoints, and behaviours in quality, and particularly their safety culture, are crucial for the transformation of healthcare organizations in order to achieve their quality targets, including patients' satisfaction.[15,31] Hence, integration of modules on quality improvement and patient safety should be incorporated into undergraduate and graduate medical education as well as in continuous professional development (CPD) education and training.[9,13,15,21] Introduction of simulation techniques in undergraduate and postgraduate medical education is also helpful to reduce harm to our patients.[15,32] In day-to-day-practice, we should follow any of the internationally recognized standard guidelines for safe practice of anesthesia.[13,33-42] Those guidelines signify sincere efforts and contributions of anaesthesiology to ensure patient safety as this group of professionals group promotes the institutionalisation and legitimisation of patient safety as a topic of their professional concern.

To summarize, we would like to emphasize on a worthy point that quality of health care and policy does not solely depend on measurement instruments and tools, rather it revolves on how much quality awareness is present among health care professionals, staff, residents, and managing authorities. We have to work together focusing on continuous improvement, a better understanding of patient outcomes, and delivery of the highest quality of care through education and training, research, audit, incident reporting, and the setting of standards.

SOME IMPORTANT MEASURES IN PERIOPERATIVE ANESTHESIA PRACTICE

In professional practice and patient care, we should remember the medical dictum "*primum non nocere*", which means "first do no harm", as stated by Hippocrates. Many international standards and best practice guidelines have been developed that cover professional aspects; facilities and equipment; medications and intravenous fluids; monitoring; and the conduct of anesthesia;[13,33-42] those are intended to provide guidance and assistance to anesthesia providers, their professional organizations, hospital and facility administrators, and governments for maintaining and improving the quality and safety of anesthesia care in their communities, both urban and rural settings. Adopting from those guidelines, some of the crucial measures in anaesthesia practice are described below:[13,33-42]

A) Pre anaesthesia measures: Pre-anaesthesia check-up is a pre-condition for safe anaesthesia. Prior to administration of any type of anaesthesia, the patient must be checked up by an anesthesiologist. In pre-anesthesia check-up the following are done:

1. Documentation of the condition(s) for which surgery is needed.
2. Patient history and physical examination. Specifically in elderly patients, physiological changes due to ageing are important in anaesthetic considerations. Preoperative examination should include use of the Comprehensive Geriatric Assessment, frailty, nutritional and cognitive assessments.[43]
3. Investigations in laboratory, imaging and others, as necessary.

4. Set questionnaire to be answered by patient which includes medication history – all information about prescription medications (due to comorbidities like diabetes, hypertension, thyroid disorder, etc.), over-the-counter medications and vitamins/supplements and allergies, if any. Drug regimen may require some modifications in anticipation of surgery.
5. Explaining possible events and outcomes to patient (and his/her family) and then obtaining "informed" consent.[29]
6. Categorical evaluation is necessary based on the classification of the American Society of Anesthesiologists (ASA), which categorizes patients into different risk groups on the basis of pre-existing systemic disorders or their physical condition.[44]
7. Adherence to perioperative fasting guidelines (as required fasting period involves assessment of the patient's current physical and nutritional status) is an important factor in the prevention of postoperative nausea and vomiting as well as pulmonary aspiration and its associated sequelae.
8. Perioperative risk determination and based on that development of an appropriate perioperative care plan are necessary.

B) Par operative measures: The anaesthesia workspace is a complex environment that includes the patient, the surgical bed/table, the anaesthesia machine, the intravenous (IV) pole(s) with attached infusion devices, a cart with clean supplies, and medications stored within the cart or a separate medication station. Anaesthesia professionals interact with the patient and multiple components of the anaesthesia workspace during routine anesthesia practice. Given the complexity of such environment, hand washing, and decontamination procedures are essential to reduce the risks of infection. Anesthetics and other medications e.g., the details of drugs used – dosage, timing and route of administration along with description of any side effects or reactions should be carefully monitored. Using ultrasound technology increases safety in regional anaesthesia that it affords the anesthesiologist the real time ability to visualize neural structures, needle advancement, and local anesthetic spread.[45,46] Airway management (procedure, the size and type of any artificial airway used, and a description of any airway problems encountered as well as its solution) and par operative breathing monitoring (anaesthesia circuit, gas flows, and ventilation techniques) are very important. Intravenous perfusion and blood transfusion (if needed) should be properly recorded. Periodic assessment and monitoring of respiratory function, cardiovascular function, and neuromuscular function should be done. A detailed description of any complications or problems encountered should be included in the hospital record.

C) Postoperative measures: These are equally critical to ensure safety of the patient and help to lead to an uneventful discharge of the patients from the hospital. Though anaesthesia-specific mortality is very low, anaesthesia management can impact the overall incidence of perioperative complications; the majority of perioperative complications and deaths occur postoperatively on the ward. Postoperative management of the patient includes periodic assessment and monitoring of respiratory function, cardiovascular function, neuromuscular function, mental status, temperature, pain, nausea and vomiting, fluid assessment, urine output and voiding, and drainage and bleeding. Proper management with monitoring of patient status, infection prevention, rational use of antibiotics, postoperative analgesia with opioids, local anesthetics, or their combination can reduce the risks of such mortality.

Finally, some standardized practices should be adopted that include use of checklists, structured handover reports and clarifying information about any adverse events/error in the hospital records.[2,8,25] Moreover, developing effective communication techniques and facilitating teamwork must be in place to demonstrate better performance and improved perioperative outcomes.[2,12,25] We know that we are not immune to adverse events, but we must learn the knack of converting those occasional setbacks into enhanced resilience in our practice and organizational culture.

CONCLUSION

Patient safety is fundamental to the provision of health care in all settings. However, avoidable adverse events, errors and risks associated with health care remain major challenges for patient safety globally. A culture of patient safety seeks ways to improve safety and protects patients, healthcare providers, and above all, institutions. Besides, quality initiatives

require evaluation of practices. If we cannot measure it, we cannot improve it. All stakeholders need to be involved in the planning and evaluation of the practices/protocols that we implement in near future in our anaesthesia practice. Moreover, national body of anesthesiologists may come forward to make a standardized practice guideline based on evidence. We should remember that by prioritizing, developing, and sustaining an organizational culture focused on ensuring quality and safety, we can drive the future of healthcare to a place where patients and those who care for them are free from harm and trusted partners healthcare revolution in the country. It is not only one of many priorities, but also the overriding ethical imperatives for all stakeholders in healthcare services.

REFERENCES

1. World Health Organization (WHO). Delivering quality health services: A global imperative for universal health coverage. Geneva, Switzerland: World Health Organization, Organization for Economic Cooperation and Development, and The World Bank; 2018.
2. Quality Improvement Secretariat (QIS). Ministry of Health & Family Welfare, Govt. of the People's Republic of Bangladesh. National strategic plan for patient safety in Bangladesh: Listen, learn, develop and act. Dhaka, Bangladesh: Ministry of Health & Family Welfare, Govt. of the People's Republic of Bangladesh and United States Agency for International Development (USAID); 2018.
3. World Health Organization (WHO). Handbook for national quality policy and strategy – A practical approach for developing policy and strategy to improve quality of care. Geneva, Switzerland: World Health Organization; 2018.
4. Manzanera R, Moya D, Guilabert M, Plana M, Gálvez G, Ortner J, et al. Quality assurance and patient safety measures: A comparative longitudinal analysis. Int J Environ Res Public Health. 2018;15(8):1568.
5. American College of Healthcare Executives (ACHE). Leading a culture of safety: A blueprint for success. Boston, MA, USA: American College of Healthcare Executives and Institute for Healthcare Improvement; 2017.
6. World Health Organization (WHO). Global patient safety action plan 2021–2030: Towards eliminating avoidable harm in health care. Geneva, Switzerland: World Health Organization; 2021.
7. Gottschalk A, Van Aken H, Zenz M, Standl T. Is anesthesia dangerous? Dtsch Arztebl Int. 2011;108(27):469-74.
8. Aitkenhead AR. Injuries associated with anaesthesia. A global perspective. Br J Anaesth. 2005;95(1):95-109.
9. Meadows JW, Al Imran TMT, LeBrun DG, Mannan MI, Sharraf S, Gaznavee ZZ, et al. Anesthesia infrastructure and resources in Bangladesh. Anesth Analg. 2020;130(1):233-9.
10. Legislative and Parliamentary Affairs Division. Ministry of Law, Justice and Parliamentary Affairs. Govt. of the People's Republic of Bangladesh. The Constitution of the People's Republic of Bangladesh. Dhaka, Bangladesh: Government Printing Press, Govt. of the People's Republic of Bangladesh. 2019.
11. Canadian Patient Safety Institute (CPSI). The safety competencies: Enhancing patient safety across the health professions. 2nd ed. Edmonton, AB, Canada: Canadian Patient Safety Institute; 2020.
12. Peden CJ, Campbell M, Aggarwal G. Quality, safety, and outcomes in anaesthesia: what's to be done? An international perspective. Br J Anaesth. 2017;119(suppl 1):i5-i14.
13. Gelb AW, Morriss WW, Johnson W, Merry AF, Abayadeera A, Belîi N, et al. World Health Organization–World Federation of Societies of Anaesthesiologists (WHO-WFSA) International Standards for a Safe Practice of Anesthesia. Anesth Analg. 2018;126(6):2047-55.
14. Shahbaz S, Howard N. Anaesthesia delivery systems in low and lower-middle-income Asian countries: A scoping review of capacity and effectiveness. PLOS Glob Public Health. 2024;4(3):e0001953.
15. Gaba DM. Anaesthesiology as a model for patient safety in health care. BMJ. 2000;320(7237):785-8.
16. Nurunnabi ASM, Parvin S, Rahim R, Begum M, Ghosh S, Sweety AA, et al. Quality assurance scheme (QAS) of undergraduate medical education in medical colleges of Bangladesh: Past, present and future. Mugda Med Coll J. 2022;5(2):104-9.
17. Khan FA, Merry AF. Improving anesthesia safety in low-resource settings. Anesth Analg. 2018;126(4):1312-20.
18. Chidester TR. Creating a culture of safety. In: Ruskin KJ, Stiegler MP, Rosenbaum SH. Quality and safety in anesthesia and perioperative care. Oxford, UK: Oxford University Press; 2016.

19. Bajwa SJ, Jindal R. Quality control and assurance in anesthesia: A necessity of the modern times. Anesth Essays Res. 2014;8(2):134-8.

20. Burden AR, Cooper JB, Gaba DM. Crisis resource management and patient safety in anesthesia practice. In: Ruskin KJ, Stiegler MP, Rosenbaum SH. editors. Quality and safety in anesthesia and perioperative care. Oxford, UK: Oxford University Press; 2016.

21. Hetimiller ES, Martinez EA, Pronovost PJ. Quality improvement. In: Miller RD, editor. Miller's Anesthesia. 7th ed. Philadelphia, PA, USA: Churchill Livingstone; 2010.

22. Peden CJ, Moonesinghe SR. Measurement for improvement in anaesthesia and intensive care. Br J Anaesth. 2016;117(2):145-8.

23. Haller G, Stoelwinder J, Myles PS, McNeil J. Quality and safety indicators in anesthesia: A systematic review. Anesthesiology. 2009;110(5):1158-75.

24. Benn J, Arnold G, Wei I, Riley C, Aleva F. Using quality indicators in anaesthesia: Feeding back data to improve care. Br J Anaesth. 2012;109(1):80-91.

25. Dutton RP. Quality improvement and patient safety organizations in anesthesiology. AMA J Ethics. 2015;17(3):248-52.

26. Anesthesia Patient Safety Foundation (APSF). Patient guide to anesthesia & surgery. Available from: https://www.apsf.org/patient-guide (Accessed January 5, 2023).

27. Smith AF, Mishra K. Interaction between anaesthetists, their patients, and the anaesthesia team. Br J Anaesth. 2010;105(1):60-8.

28. Becker AM, Shapiro FE. Patient-centered care: Improving patient safety in anesthesia through patient engagement. ASA Newsletter. 2015;79(5): 10-2.

29. Van Norman GA, Rosenbaum S. Ethical aspects of anesthesia care. In: Miller RD, editor. Miller's Anesthesia. 7th ed. Philadelphia, PA, USA: Churchill Livingstone; 2010.

30. Frankel A, Haraden C, Federico F, Lenoci-Edwards J. A framework for safe, reliable, and effective care. White Paper. Cambridge, MA, USA: Institute for Healthcare Improvement and Safe & Reliable Healthcare; 2017. Available from: http://www.ihi.org/resources/Pages/IHIWhitePapers/Framework-SafeReliable-Effective-Care.aspx (Accessed January 19, 2023).

31. Kazamer A, Ilinca R, Nitu A, Iuonu AM, Bubenek-Turconi SI, Sendlhofer G, et al. A brief assessment of patient safety culture in anesthesia and intensive care departments. Healthcare (Basel). 2023;11(3):429.

32. Nurunnabi ASM, Haroon K, Mohammad T, Hasan MM, Tripura KK, Sadeque SP, et al. Simulation based teaching and learning in clinical education. Bangladesh J Neurosurgery. 2023;13(1):24-8.

33. Mellin-Olsen J, Staender S, Whitaker DK, Smith AF. The Helsinki Declaration on Patient Safety in Anaesthesiology. Eur J Anaesthesiol. 2010;27(7): 592-7.

34. Mellin-Olsen J, O'Sullivan E, Balogh D, Drobnik L, Knape JT, Petrini F, et al. Guidelines for safety and quality in anaesthesia practice in the European Union. Eur J Anaesthesiol. 2007;24(6):479-82.

35. Royal College of Anaesthetists. Chapter 9: Guidelines for the Provision of Anaesthesia Services for an Obstetric Population 2024. In: Guidelines for the Provision of Anaesthetic Services. Available from: https://www.rcoa.ac.uk/gpas/chapter-9 (Accessed February 22, 2023).

36. Royal College of Anaesthetists. Chapter 10: Guidelines for the Provision of Paediatric Anaesthesia Services 2024. In: Guidelines for the Provision of Anaesthetic Services. Available from: https://www.rcoa.ac.uk/gpas/chapter-10 (Accessed February 22, 2023).

37. Committee on Standards and Practice Parameters; Apfelbaum JL, Connis RT, Nickinovich DG; American Society of Anesthesiologists Task Force on Preanesthesia Evaluation; Pasternak LR, et al. Practice advisory for preanesthesia evaluation: an updated report by the American Society of Anesthesiologists Task Force on Preanesthesia Evaluation. Anesthesiology. 2012;116(3):522-38.

38. Mohanty S, Rosenthal RA, Russell MM, Neuman MD, Ko CY, Esnaola NF. Optimal perioperative management of the geriatric patient: a best practices guideline from the American College of Surgeons NSQIP and the American Geriatrics Society. J Am Coll Surg. 2016;222(5):930-47.

39. Apfelbaum JL, Silverstein JH, Chung FF, Connis RT, Fillmore RB, Hunt SE, et al. Practice guidelines for postanesthetic care: an updated report by the American Society of Anesthesiologists Task Force on Postanesthetic Care. Anesthesiology. 2013; 118(2):291-307.

40. Disma N, Asai T, Cools E, Cronin A, Engelhardt T, Fiadjoe J, et al Airway management in neonates and infants: European Society of Anaesthesiology and Intensive Care and British Journal of

Anaesthesia joint guidelines. Eur J Anaesthesiol. 2024;41(1):3-23.

41. Apfelbaum JL, Hagberg CA, Connis RT, Abdelmalak BB, Agarkar M, Dutton RP, et al. 2022 American Society of Anesthesiologists Practice Guidelines for Management of the Difficult Airway. Anesthesiology. 2022;136(1):31-81.

42. Dobson G, Chau A, Denomme J, Frost S, Fuda G, McDonnell C, et al. Guidelines to the Practice of Anesthesia – Revised Edition 2024. Can J Anaesth. 2024;71(1):8-54.

43. Bose R, Barnett SR. Preoperative assessment of the elderly patient. In: Barnett SR. editor. Manual of geriatric anesthesia. New York, NY, USA: Springer; 2013.

44. Abouleish AE, Leib ML, Cohen NH. ASA provides examples to each ASA Physical Status Class. ASA Newsletter. 2015;79(6):38-49.

45. Sites BD, Antonakakis JG. Ultrasound guidance in regional anesthesia: State of the art review through challenging clinical scenarios. Local Reg Anesth. 2009;2:1-14.

46. Neal JM. Ultrasound-guided regional anesthesia and patient safety: An evidence-based analysis. Reg Anesth Pain Med. 2010;35(2 Suppl):S59-67.