ChatGPT in anesthesiology practice – A friend or a foe

The term "GPT" refers to the neural network learning model known as Generative Pre-Trained Transformer (GPT), which enables machines to perform NLP (natural learning process) tasks.[1] ChatGPT is a chatbot with artificial intelligence that can handle any text-based task. ChatGPT can generate enormous quantities of code much faster and possibly more accurately than humans. ChatGPT can react to a wide range of requests in a human-like manner, making it an ideal tool for healthcare applications. ChatGPT is transforming the way healthcare providers care for their patients, and these findings suggest that big language models could be effective in anesthesiology practice and, possibly, clinical decision-making. We searched its database and found out how it can be helpful to anesthesia providers and also tried to explore its downsides as summarized in Table 1.

While ChatGPT is a fascinating tool, it is still too early to rely on it for all medical content needs. The tool has limitations that make obtaining accurate information difficult at times. ChatGPT is deficient in contextual knowledge, individualization, human touch, therapeutic experience, data protection, and natural language interpretation. Anesthesiologists must present all relevant information to ChatGPT in order to receive the most accurate and applicable advice, and they must personalize their care plan to the unique needs of each patient. It is imperative that anaesthesiologists should use their own clinical judgement and experience to confirm and interpret ChatGPT's recommendations. Furthermore, it cannot personalize its responses to technological issues such as outages, glitches, and failures can have a detrimental impact on the user experience. Anesthesiologists require a method for dealing with these issues swiftly and efficiently during a crisis situation. Although ChatGPT's recommendations are based on data analysis and patterns, it lacks the clinical expertise and knowledge of a professional anesthesiologist. Anesthesiologists must use their clinical expertise and experience to evaluate and understand ChatGPT's suggestions. ChatGPT's recommendations are based on patient data. Anesthesiologists must follow best practices for data security and the preservation of patient privacy and confidentiality. ChatGPT should be used in conjunction with clinical discretion and expertise by anesthesiologists, and they should be conscious of its potential limits. Despite its outstanding capabilities, GPT-3 is not a perfect model and occasionally fails to read complex queries or context-specific language correctly. As a result, one may receive responses that are confusing or unrelated to their inquiry. Providers should have strict data protection and privacy policies in place to avoid data breaches or other forms of unauthorized access.

Table 1: Chat GPT- usefulness and downsides for anaesthesiologists

Anesthesia practice	What it claims, ChatGPT can provide	Lacunae/limitations found by authors
Pre-operative management		
Preoperative Evaluation:	• Can provide recommendations for preoperative patient optimization, including blood pressure control, glycemic control, and pulmonary function optimization. • Can aid in enhancing patient outcomes and decreasing the risk of perioperative complications.	It doesn't provide any specific guidance to manage medications before surgery and suggest medications that may need to adjust their dosages in the days leading up to surgery, under the guidance of their healthcare provider.
Anesthesia Choice:	• Based on patient's medical history, surgical procedure, and personal preferences, it can assist in selecting the most suitable anesthesia technique, benefits, and drawbacks of various anesthesia techniques	Choice of anesthesia for an uncontrolled comorbid patient will depend on a variety of factors and should be made on a case-by-case basis. It is important for the anesthesia team to work closely with the patient and their healthcare provider to develop an individualized plan that takes into account the patient's overall health and specific needs.
Choice of Medication and Dosage:	• Can assist in choosing the correct medication and dosage for a patient. • Provide information regarding potential drug interactions and contraindications	It is important to note that the choice of agent and dose will vary depending on the individual patient's needs and medical history, and should be determined by a qualified anesthesia provider.
Patient Education:	• Help educate the patient on the risks and benefits of the anesthesia procedure. • Help alleviate the patient's anxiety or concerns and increase patient satisfaction.	As an AI language model, it cannot provide personalized medical advice. However, it can give you some general information about the risks and benefits of anesthesia procedures in general
Communication:	• Facilitate communication between the anesthesia team and other healthcare team members, such as the surgeon, nursing staff, and primary care physician.	ChatGPT can only provide several strategies that can be used to facilitate communication; however it cannot facilitate communication with other healthcare providers
Perioperative management		
Patient Risk Assessment:	• Prior to surgery, ChatGPT can assist in assessing the patient's risk and identifying possible comorbidities that may impact anesthetic management. • Provide recommendations on the anesthetic management plan, including the selection of anesthesia technique, drug, and dosage.	As an AI language model, it cannot provide personalized medical advice or prescribe specific anesthesia techniques or medications.
Intraoperative Monitoring and management	• During surgery, ChatGPT can assist in monitoring the patient's vital signs and providing the anesthesia team with real-time updates. • Clinicians can request that ChatGPT provide alerts and reminders for critical events like hypotension, hypoxia, and tachycardia. • ChatGPT can also assist with drug dosage calculations and drug administration.	However, on using this function, it prompted several alerts and reminders like automated monitoring systems, early warning systems, or communication tools that can be used to monitor critical events during surgery but real time monitoring is lacking in the current model
Postoperative Pain Relief:	• ChatGPT can assist with postoperative pain management strategies, recommendations on the most suitable analgesic agents, dosages, and administration routes. • Additionally, ChatGPT can identify potential drug interactions and contraindications.	As an AI language model, it cannot provide personalized medical advice or prescribe specific anesthesia techniques or medications.
Anaesthesia Documentation:	• During the perioperative period, ChatGPT can facilitate record keeping. • ChatGPT can document the anesthesia plan, drug administration, monitoring of vital signs, and any other pertinent information. • This can assist in ensuring accurate documentation and regulatory compliance.	On asking ChatGPT to facilitate record keeping, it provided some tips to help anesthesia providers with record keeping during anesthesia: Use a standardized format, document all relevant information, review and write, etc. however repository for storing records is lacking
ICU		
Patient Observation:	• Monitoring the patient's vital signs and laboratory values is facilitated by ChatGPT, ChatGPT can help with a patient's medical history, laboratory results, and imaging studies, and it will provide real-time updates on the patient's condition. • Provide alerts and reminders for critical events such as hypotension, hypoxia, and tachycardia.	However, on using this function, it prompted that there are several alerts and reminders like automated monitoring systems, early warning systems, or communication tools that can be used to monitor critical events during surgery
Ventilator Management:	• Can assist with mechanical ventilation management. Based on the patient's respiratory status and lung mechanics, ChatGPT can provide recommendations for ventilator settings such as tidal volume, respiratory rate, and positive end-expiratory pressure (PEEP).	It is important to consult with a qualified healthcare professional, such as an anesthesiologist or pulmonologist, to determine the optimal ventilator settings for a specific patient, as each case may be unique and require individualized management.

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	• Additionally, ChatGPT can assist with the weaning process and provide direction on when and how to extubate the patient.	
Sedation and Analgesia Administration:	• ChatGPT can assist in the administration of sedation and analgesia to critically ill patients. • Additionally, ChatGPT can provide information regarding potential drug interactions and contraindications.	It is important to consult with a qualified healthcare professional, such as an anesthesiologist, to determine the optimal sedative and analgesia, as each case may be unique and require individualized management.
Infection Prevention:	• ChatGPT can assist with ICU infection management. ChatGPT provides recommendations for antibiotic selection, dosage, and duration of treatment based on the clinical condition and microbiological culture results of the patient.	General recommendations are provided without any specific references
Pain management		
Evaluation of Pain:	• ChatGPT can help evaluate the patient's pain. • ChatGPT can provide recommendations on pain assessment instruments, such as visual analogue scales and numerical rating scales, as well as guidance on the interpretation of pain score results.	General recommendations only
Analgesic Medication Administration:	• ChatGPT can offer guidance regarding the administration of analgesics. • ChatGPT provide recommendations on the optimal route of administration, frequency of dosing, and any particular monitoring requirements.	It is important to consult with a qualified healthcare professional, such as an anesthesiologist, to determine the optimal sedative and analgesia, as each case may be unique and require individualized management.
Management of Adverse Reactions:	• ChatGPT can help manage the adverse effects of analgesic medications. • How to manage common side effects like nausea, vomiting, constipation, and respiratory depression. • ChatGPT can be a valuable pain management tool, offering assistance and support in pain assessment, selection of analgesic agents, dosage calculation, administration of analgesic agents, and management of side effects.	It is important to consult with a qualified healthcare professional, such as an anesthesiologist, as each case may be unique and require individualized management.
Choice of Analgesic Drugs:	• ChatGPT can assist in selecting the most effective analgesics for the patient. • ChatGPT recommend non-opioid and opioid analgesic agents based on the patient's medical history, comorbidities, and pain severity. • Additionally, ChatGPT can provide information regarding potential drug interactions and contraindications.	It is important to consult with a qualified healthcare professional, such as an anesthesiologist, to determine the optimal sedative and analgesia, as each case may be unique and require individualized management.
Formula for Dosage Calculation:	• Determine the correct dosage of analgesics. • Recommendations on the appropriate dosage of analgesic agents based on the patient's age, weight, renal function, and other variables.	It is important to consult with a qualified healthcare professional, such as an anesthesiologist, as each case may be unique and require individualized management.
Decision Assistance:	• Real-time decision support during patient care. • Advice on the appropriate anesthetic technique, medication dosage, or management of complications during anesthesia.	ChatGPT can suggest a technique but it does not consider nonavailability of equipment in low-resource settings. It can suggest gold standard/recommended technique but what about the expertise required to perform that procedure. Treating physician may not be well versed with the suggested option.
Palliative care		
Symptom Management:	• Symptoms such as pain, dyspnea, nausea, vomiting, anxiety, and depression can be managed with ChatGPT. • Advice on the most effective medications, dosages, and administration methods for managing these symptoms.	It is important to treat the underlying cause rather than only focus on symptoms. Nausea and vomiting can be secondary to acute pain as in acute appendicitis and treatment must consider history and symptoms both.
Bereavement Support:	• ChatGPT can offer bereavement support to the family of a deceased patient. • Advice on how to communicate with the patient's family after death, for information on grief and bereavement support resources, and for assistance in arranging follow-up care.	There is a difference between advice how to communicate and actual communication. Good communication is a skill that is learned with practice, experience, and human interactions and machines seldom fail to do that effectively.
Advance Directives:	• Can assist with care planning in advance. • Guidance on how to discuss advance directives, goals of care, and end-of-life decisions with the patient and family. • Additionally, ChatGPT can provide resources and assistance for completing advance care planning documents.	There can be cultural differences according to diverse geographical locations. There are different cultural beliefs in different communities and different legal aspects related to advanced directives in different countries.

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Additional assistance to anesthesiologists		
Education:	• Anesthesiologists can utilize ChatGPT's educational resources to remain updated on the most recent research, guidelines, and best practices. • One can request articles, podcasts, or videos on specific anesthesia-related topics, such as airway management, regional anesthesia, or anesthesia for particular surgical procedures.	Apart from theoretical knowledge, skill development is equally important. One cannot just watch videos or read articles and become an expert until it is combined with practical demonstration or hands-on training.
Quality Assurance:	• By providing data analytics and insights, ChatGPT can support quality improvement initiatives. • One can request that ChatGPT analyze data on adverse events related to anesthesia, identify patterns or trends, and recommend interventions to reduce the incidence of adverse events.	Knowing the incidence of adverse events can be helpful to some extent but recommendations need to be adhered to strictly.
Research:	• Can assist with anesthesia-related research endeavors, e.g., literature review, data analysis, and manuscript writing • Can be a valuable resource for anesthesiologists engaged in education, decision support, quality improvement, and research.	When assisting a scientist in producing a research article, the key disadvantages of GPT-like models such as ChatGPT are that they lack subject expertise, rely on the quality of the input data, are unable to check for errors, and lack originality and comprehension of ethical problems. GPT-like models can generate language that is coherent and grammatically correct but it may lack the nuance and context that a human expert would.

Conclusion

ChatGPT can be incredibly useful for anesthesiologists, especially for dosing, obtaining assistance in retrieving research materials, or getting guidance for performing certain procedures. It can save time for scholars, particularly those who are new to publishing articles. It can also be a useful tool for non-native English speakers to improve their writing. ChatGPT in anesthesiology should be used with caution due to lack of backed evidence, incomplete information, lack of recent advancement in knowledge since its data dates back to 2021, inability to handle images, low performance, and potential plagiarism. It needs to be properly evaluated with backed recommendations and referencing to prevent any negative impact of its potential misuse.

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Conflicts of interest
There are no conflicts of interest.

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