

*Editorial*

# Artificial intelligence and machine learning in healthcare: Scope and opportunities to use ChatGPT

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Artificial intelligence (AI) and machine learning are an area of active research interest and its role is continuously evolving.<sup>[1-3]</sup> The ChatGPT has been explored as an AI tool, compared with the human responses and it is found that the response of ChatGPT to treatment options for some neurosurgical conditions was shorter, more challenging to read, and had fair quality compared to longer, easier-to-read text, and good quality.<sup>[3]</sup> At the same time it was noted that approximately 70% of the cited references were wrong, and 33% were falsified entirely in the ChatGPT responses.<sup>[3]</sup>

In reference to the low-and-middle-income countries (LMIC) viewpoint, a series of questions to the ChatGPT and matched answers on different scorings have been evaluated.<sup>[3]</sup> It is complicated to answer the question, “What is the best treatment option for me.” The treatment option for any particular neurosurgical disease might be relevant in the educated population and has active participation in the decision-making process. While in LMIC countries and countries like India with different cultural habits, patients often lack medical information and largely depend on the physician to provide the best management option. What is the best management for an individual depends on the patients, physician, skillset, facilities available, financial aspects, disease factors, and some unknown factors. Now, all these are not likely to be answered by the ChatGPT tools, and short answers to a complex question might result in more confusion and anxiety and mislead the patient. This brings us to the issue of what is the best evidence for LMIC countries? LMICs and low-income countries have significantly less number of neurosurgeons per lakh population than high-income countries. Notwithstanding the limitations and caution ChatGPT finds its potential in LMIC where patients may look in the ChatGPT when it is challenging to meet

the neurosurgeon in person.<sup>[3-5]</sup> In addition to the treatment options, ChatGPT is also likely to provide empathy and reduce the anxiety of patients when they receive the diagnosis of a neurosurgical illness.<sup>[5,6]</sup>

In a study where patients received the diagnosis using the AI tool, 40.5% were uncomfortable. In comparison, only 31% were comfortable even when the accuracy of the AI diagnostic tool was 90%.<sup>[7]</sup> This was because there was no explanation of the rationale even when the diagnostic tool was accurate. Surprisingly, in the same study, when the patients were asked about their views on the potential implications of AI in health care, the majority responded “don’t know,” when the AI tool played a minor role in the diagnostic. In contrast, the majority were uncomfortable when the diagnostic accuracy was 98% but lacked explanation.<sup>[7]</sup> This indicates an essential human behavior seen in the patient-doctor communication relationship that builds faith and trust. Patients are more likely to have more confidence in the information available on the AANS website than the ChatGPT tool because the data are humanoid. The number of patients who responded to a survey with positive feedback on using AI in healthcare dropped significantly when they chose AI for their treatment. Many refused AI-based diagnosis and treatment.<sup>[8]</sup> This also paves the way for future research from the patient’s perspective and improvement in AI tools to make them more humanoid in interaction.

AI tools have higher computing abilities and can retrieve and present a large number of data in a shorter time than human intelligence.<sup>[9]</sup> As neurosurgical procedures often produce morbidity and functional impairment, AI tools may prove to be more helpful when supervised by humans and when it is complimentary to a human explanation of treatment options to neurosurgery patients. A technical viewpoint that also

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must be considered while using ChatGPT is that missing, erroneous, or insufficiently trained data might prevent the tool from generalizing beyond its original population. As is seen in the present paper, the cited references were falsified and inaccurate in large numbers, and even the case reports from prominent journals were cited. This depends on the training parameters set, and such technical details need to be discussed between the neurosurgical community and data scientists to design correct training modules. On the other hand, the information provided on the AANS website is written by humans who have explored and assessed the evidence from the wide variety of literature available. It has been found that the ChatGPT scored higher in the content domain, like definition, while lower in the issues and structure domain and lacks in bibliography.<sup>[6]</sup> The authors recommended adding bibliography sources, visible rating scores, and outputs restricted to the peer-published reports.<sup>[6]</sup>

As with the other significant technological advancement in medical science and neurosurgery, the same is likely the target with AI. "AI" is the science and engineering of having computers act in ways that, until recently, we believed required human intelligence, according to Andrew Moore, dean of computer science at Carnegie Mellon University. It is essential to remember that this definition is dynamic because the moving aim is considered human intellect. As human intelligence develops, what was formerly easily categorized as AI is now recognized as a necessary skill. A simple calculator or abacus, for instance, would have once been considered an example of AI; however, as time has passed, human intelligence has improved to the point where it can now understand complex calculations and issues. Consequently, what constitutes AI likewise evolves with time. Therefore, the limitations mentioned by the authors in the present paper can be addressed in future developments to use AI tools like ChatGPT better. More important is to discuss how to make the best use of these AI tools and improve on their deficiencies and the cautions that need to be exercised. A combined crowd innovation and AI approach rapidly produced automated algorithms that can replicate the skills of a highly trained physician for a critical task has the potential to improve care globally by transferring the skills of expert clinicians to under-resourced health-care settings.<sup>[10]</sup>

Several authors, scientists, statesman, and influential people have expressed their opinion on AI in general terms and the use of AI in the field of medical science. Not all were against the use of AI or supporting them. Elon Musk warned at MIT's AeroAstro Centennial Symposium regarding the demons that AI can be and urged for an oversight on the use of AI on national and international levels. On the other hand, Larry Page mentioned that AI would be the advanced version of Google in a way that it would understand exactly what a human wants and would deliver it. AI in neurosurgery has

been employed mainly in the diagnostics and therapeutics arm, and several articles have been published. Finally, like any technology, AI-based technology is a double-edged sword. If applied for good reasons, it will be a blessing for the humanity. It can bring positive changes to humanity with great societal benefit. As said in Brihadaranyaka Upanishad (4.4.5),

**काममय एवायं पुरुष इति। स यथाकामो भवति तत्कृतुर्भवति।  
यत्कृतुर्भवति तत्कर्म कुरुते। यत्कर्म कुरुते तदभिसंपद्यते॥**

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