EDITORIAL

Artificial Intelligence in Clinical Settings: Improving the practice of medicine and surgery

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A lot of people use the term medical technology refer to a wide range of resources that can help doctors give patients and society an improved standard of life by finding problems earlier, preventing complications, simplifying treatments, making them more effective, and cutting down on the length of hospital stays.[1] In the past, medical technologies were mostly standard medical devices like implants, prosthetics and stents[2]. But cell phones, wearable tech, detection devices, and technology for communication have wholly transformed medical by letting clinicians carry around minimal tools driven by artificial intelligence (AI), such as apps. AI has changed the way medical technology works, and most people think of it as the part of the computer science field that can solve hard problems and find many uses in areas with lots of data but only a little theory[3].

A new area of medicine called augmented medicine is growing thanks to the progress made in intelligent medical technologies. This is the application of novel medical devices to make different parts of clinical practice better[4]. The food and drug administration (FDA) had a variety of AI-based algorithms in the previous ten years, indicating that they could be employed. AI-based technology enables enhanced medicine, but so can a variety of other digital resources. These include surgical guiding systems for computerised surgery and virtual reality continuous tools for managing pain, behavioural disorders, and surgery[5]. Even though enhanced medicine works well for individuals, it can be met via resistance from healthcare workers, especially doctors. Four reasons that have been talked about a lot should be given for this. First, people aren't ready for the promise of digital medicine because they need more basic and ongoing training in the field. Second, the early digitization of healthcare operations, which was a long way from the promise of improved medicine, resulted in a large increase in administrative workload, primarily due to electronic medical records. This has been identified as being one of the primary reasons for stress among physicians. Third, people are becoming increasingly concerned about the likelihood of AI replacing clinicians, even though most research suggests that AI will eventually help doctors be more intelligent. Fourth, there needs to be a clear legal framework around the world that says who is responsible if someone follows or doesn't follow algorithmic suggestions. This means that doctors who use AI could face legal consequences[6,7,8].

By making more minor cuts than traditional surgery, minimally invasive surgery reduces the pain and stress that come with surgery. It has been shown that video-assisted thoracoscopic surgery cuts down on hospital stays and problems that happen after surgery for big lung resections. Robotic-assisted surgery opened up new options by giving the surgeon seven degrees of freedom to move the wrist within the chest cavity and a high-resolution three-dimensional view. The system helps doctors by making each step of the procedure more precise and getting rid of any shaking that might happen during the procedure[9,10]. The daVinci Surgical System is often called robotic surgery in a more broad sense.

When AI was first used in health, it was to find atrial fibrillation early on. In 2014, the FDA approval for its smartphone application, which lets watch ECG on a smartphone and find atrial fibrillation[11]. It has been said that figuring out how to read pulmonary function tests could be a good way to use AI in pulmonary medicine. In a recent study it was found that AI-based software helps people make better decisions and gives more accurate interpretations of lung function test results[12]. Continuous glucose tracking lets diabetics see their interstitial glucose levels in real time and gives them information on how and why their blood glucose levels are changing. Based on repeated measurements, an AI created by IBM to improve their Sugar and aid their customers better in avoiding hypoglycemia episodes[13]. AI has been employed in a variety of clinical nephrology applications. For example, it has been demonstrated to be beneficial in predicting the reduction in glomerular filtration rate in persons with polycystic kidney disease and in indicating the probability of acquiring progressive IgA nephropathy[14]. There are many ways that AI can be used in clinical situations to help the field of gastroenterology. Gastroenterologists use convolutional neural networks and other deep learning models to examine pictures taken by endoscopy and ultrasonography and find structures that don't look good[15]. Epilepsy and intelligent seizure tracking devices are new and exciting technologies that could improve seizure management by allowing constant monitoring while the person walks around[16].

One of the biggest problems with using AI in health in the coming years will be ensuring that the new ideas and tools work in real life. Many studies have already been conducted on the usefulness of AI, and the results look good. However, some well-known and often-reported problems with these studies make it harder to prove their accuracy. We are going to discuss a few of these problems and suggest ways to get around them. Second, studies demonstrating AI applications in healthcare settings have been shown to be limited and may have selecting and ranging bias, which implies that models are designed to fit a specific set of facts optimally (over-fitting) but do not produce the same outcomes in other types of data. Third, there is little research that compares AI to therapists using the same data sets. Even when they do, sceptics argue that AI is less effective at identifying problems than specialized doctors should be.

Today, healthcare workers are in a unique position to greet the digital revolution as well as be the primary agents of change. However, medical education must be completely rethought in order to provide future leaders with the necessary competencies. Thus, AI is showing promise in many areas of health and could completely change how things are done every day. Because of how the algorithm is made, the model will be fully customized to match the clinical education of the institution.

REFERENCES

1. Etienne H, Hamdi S, Le Roux M, Camuset J, Khalife-Hocquemiller T, Giol M, et al. Artificial intelligence in thoracic surgery: past, present, perspective and limits. EurRespir Rev. 2020 Aug 18;29(157):200010.
2. Bajwa J, Munir U, Nori A, Williams B. Artificial intelligence in healthcare: transforming the practice of medicine. Future Healthc J. 2021 Jul;8(2):e188-e194.
3. Davenport T, Kalakota R. The potential for artificial intelligence in healthcare. Future Healthc J. 2019 Jun;6(2):94-98.
4. Poalelungi DG, Musat CL, Fulga A, Neagu M, Neagu AI, Piraianu AI, Fulga I. Advancing Patient Care: How Artificial Intelligence Is Transforming Healthcare. J Pers Med. 2023 Jul 31;13(8):1214.

5. Bohr A, Memarzadeh K. The rise of artificial intelligence in healthcare applications. Artificial Intelligence in Healthcare.2020:25-60
6. Krishnan G, Singh S, Pathania M, Gosavi S, Abhishek S, Parchani A, et al. Artificial intelligence in clinical medicine: catalyzing a sustainable global healthcare paradigm. Front ArtifIntell. 2023 Aug 29;6:1227091
7. Grech V, Cuschieri S, Eldawlatly AA. Artificial intelligence in medicine and research - the good, the bad, and the ugly.Saudi J Anaesth. 2023 Jul-Sep;17(3):401-406.
8. Al Kuwaiti A, Nazer K, Al-Reedy A, Al-Shehri S, Al-Muhanna A, Subbarayalu AV, et al. A review of the role of artificial intelligence in healthcare. J Pers Med.2023;13(6):951.
9. Gupta A, Singla T, Chennatt JJ, David LE, Ahmed SS, Rajput D. Artificial intelligence: A new tool in surgeon's hand. J Educ Health Promot. 2022 Mar 23;11:93.
10. Kim Y, Park JY, Hwang EJ, Lee SM, Park CM. Applications of artificial intelligence in the thorax: a narrative review focusing on thoracic radiology. J Thorac Dis. 2021 Dec;13(12):6943-6962

11. Koulaouzidis G, Jadczyk T, Iakovidis DK, Koulaouzidis A, Bisnaire M, Charisopoulou D. Artificial Intelligence in Cardiology-a narrative review of current status. J Clin Med. 2022 Jul 5;11(13):3910.
12. Chauhan NK, Asfahan S, Dutt N, Jalandra RN. Artificial intelligence in the practice of pulmonology: the future is now. Lung India. 2022 Jan-Feb;39(1):1-2
13. Gubbi S, Hamet P, Tremblay J, Koch CA, Hannah-Shmouni F. artificial intelligence and machine learning in endocrinology and metabolism: the dawn of a new era. Front Endocrinol (Lausanne). 2019 Mar 28;10:185.
14. Bellocchio F, Zhang H. Editorial: Artificial intelligence in nephrology. Front Nephrol. 2023 Sep 6;3:1270769.
15. Kroner PT, Engels MM, Glicksberg BS, Johnson KW, Mzaik O, van Hooft JE, et al. Artificial intelligence in gastroenterology: A state-of-the-art review. World J Gastroenterol. 2021 Oct 28;27(40):6794-24.
16. Vinny PW, Vishnu VY, Padma Srivastava MV. Artificial Intelligence shaping the future of neurology practice. Med J Armed Forces India.2021;77(3):276-282.