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Letter to Editor

# Artificial Intelligence (AI): applications and ethical issues with an emphasis on emergency medicine

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## Dear Editor,

The emergence of "Artificial Intelligence" (AI) dates back to 1955. It is a broad term that refers to using computers to mimic human intelligence, such as decision-making, reasoning ability, generalization, etc. with minimal human intervention (1). AI technology is impacting our lives in many ways, from an education perspective to research and health care. For instance, in Emergency Medicine, AI is expected to significantly influence Emergency Medicine with its potential uses such as predicting patient outcomes, detecting early signs of deterioration through vital sign monitoring, and analyzing clinical images (2,3). In a similar vein, AI technology is used for a variety of medical purposes, including machine learning, robotics, medical diagnostics, medical statistics, and biology. In general, the world of medicine is undergoing major changes as the use of AI technology is advancing at a breakneck pace, from diagnosing diseases to manufacturing new drugs (4). To the best of our knowledge, the application of AI in medicine remains a hot topic of great interest to researchers and is constantly being developed and refined. However, the use of AI can have ethical concerns to consider. Here we touch on some practical aspects and ethical considerations of AI technology in medicine. Some areas of AI use are shown in Table 1.

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**Table 1.** Various applications of AI technology

| Area | Application |
|---|---|
| **Medical Education** | AI supports medical student learning by providing personalized experiences and improved outcomes. AI can equip medical students with the knowledge and skills they need to improve patient outcomes through the application of AI techniques used in various areas of medical education (5). |
| **Emergency Medicine** | The use of AI in Emergency Medicine is inevitable. The vital signs of patients can be monitored by algorithms, providing an exact early warning system for cardiovascular instability or deterioration. Also, rapid screening, triaging, and preliminary diagnosis of imaging and blood test results can be obtained by AI technology (6). |
| **Cancer Diagnosis** | AI technology in cancer diagnosis by applying machine learning algorithms can detect breast cancer with high accuracy (7). |
| **Prediction of Disease Progression** | AI has proven to be a useful tool for quantitative assessment of various diseases. Machine learning algorithms can predict with high accuracy how likely a patient with cardiovascular disease will need to be hospitalized for a heart complication (8). |
| **Prediction of Drug Side Effects** | AI has the potential to assess drug interactions and potential side effects. AI-based DDI prediction techniques and machine learning algorithms as well as deep learning are the techniques used accordingly. They can predict with high accuracy which patients will develop serious complications after taking anti-anxiety drugs (9). |
| **Prediction of Disease Complications** | Machine learning models can be used as potential predictive tools for disease complications. Machine learning models can be used to identify key factors for alerting physicians to early diagnosis of depression in high-risk stroke patients (10). |
| **Medical Decision Making** | AI technology helps doctors make better medical decisions. One study showed that machine learning algorithms could predict with high accuracy which breast cancer patients will get the best results from Herceptin treatment (11). |
| **Surgery** | A significant contribution of AI in the field of surgery is for surgeons due to AI capabilities to help them contribute to new AI developments. Surgeons can integrate AI into modern practice. In this regard, they should partner with data scientists to capture data across phases of care and to provide clinical context. In this regard, AI in surgery can revolve around topics such as machine learning, artificial neural networks, natural language processing, and computer vision (12). |

The above-mentioned applications are just some of the issues that artificial intelligence technology can address in various fields. We should bear in mind that as AI continues to evolve, we can expect to see more uses of this technology in the course of time. The following section discusses key ethical issues related to the use of artificial intelligence in health sciences. Paying particular attention to the issues raised is highlighted in every medical discipline; however, it is especially important in emergency medicine due to its sensitivities and characteristics. Given the widespread use of this technology in health sciences, the following ethical conclusions about the use of AI in medical sciences can be drawn.

*** Retrieval and use of Medical Information**

Using medical data to train machine learning algorithms can improve disease diagnosis and help develop better treatments. However, medical data must be used with respect to patient privacy (13).



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*** Importance of Transparency**

Validating machine learning algorithms requires transparency about their training methods and performance. Additionally, care must be taken that the training data are carefully selected so that the training is unbiased (14).

*** Interactions Between Patients and Technology**

The use of smart technology in healthcare can reduce interactions between patients and doctors. To prevent this problem, artificial intelligence should be designed to improve patient-physician interaction (15).

*** Ignorance of the Doctor's Decisions**

Artificial intelligence helps doctors make better decisions about patient care. However, the final decision should always rest with the physician, and artificial intelligence should not be placed in a decision-making position on the physician's behalf (16). Overall, the use of artificial intelligence in emergency medicine is increasingly progressing and can increase the effectiveness of treatments and improve patient health (17,18).

However, when using artificial intelligence in medicine, it is important to ensure that ethical issues, including patient privacy, are considered. Transparency about training methods, the effectiveness of machine learning algorithms, and the accurate selection of information for training should also be considered. Ultimately, the doctor must decide how to treat the patient. Artificial intelligence should not make these decisions for patients. As artificial intelligence evolves and ethical standards are continually updated, it becomes important to consider and communicate AI ethical concepts. Both artificial intelligence and the ethical thinking that guides it are constantly evolving, so emphasizing and communicating ethical concepts in AI is a necessary, ongoing process.

## Conflict of Interest

There is no conflict of interest to be declared.

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