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Response to the letter

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Artificial intelligence: A new era of technological advancement in oncology care

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“Necessity is the mother of invention.” Till date, the oncologist relies on his experience, memory, judgment, and tumor board discussion for decision-making and deciding the treatment algorithm. It is surely the need of hour in the field of oncology to develop a computer-assisted model that can rationalize and streamline tons of scientific literature and suggest data-driven treatment options. Once a fiction but now a reality: Artificial intelligence (AI) refers to the ability of a machine to learn a group of iterative, “self-learning” techniques, which discover relationships within data that can evolve and often be performed faster overtime. AI has made appearance in the field of treatment and precision oncology. Since the past 5 years, there is a tremendous increase in publications related to machine learning and deep learning.

AI is a big tree with many branches such as expert systems, neural networks, deep learning, machine learning, automatic programming, genetic algorithms, natural language processing, and robotics. Some of the companies which are spearheading this project and using AI in health care are Google DeepMind, IBM Watson, Verily, and 3Scan. It has currently found its way in identifying at-risk population, early detection of cancer/cancer screening, predicting chemotherapy toxicities, dosage error reduction softwares, clinical trial participant identifier, virtual nursing assistants, and robot-assisted surgery. AI components in imaging machines would reduce the workload and drive greater efficiency in the radiology field. It is proposed to tailor radiotherapy treatment plans to individual patients using historical radiation data. AI can classify digital photos and be useful in classification of photomicrographs to a pathologist, skin lesions to a dermatologist, and polyps during colonoscopy to a gastroenterologist. In the field of molecular and translational oncology, where big data handling, library preparation, bioinformatics, and computer-based algorithms place a major role, AI will be a boon to connect molecular scientist and clinical oncologist.

There are many limitations of AI such as requirement of very large data set for setting of a reliable hierarchy of the most significant predictive features and validity, reproducibility in independent datasets from similar patient populations, resistance by patient to give access to their intimate medical histories, and integration of different types of data (e.g., clinical, genomic, histological, imaging, demographic, and epidemiological). IBM Watson, one of the pioneers of AI in oncology also has a disclaimer that the generated report is intended to assist clinicians in making decisions and the treating doctor has to exercise his/her professional judgment for the use of the result to his patient.

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There are still many unanswered questions today in AI. Based on the progress and limitations stated above, there will be many future challenges to AI in oncology such as ethical concerns, safety, interdisciplinary development between various oncology services, social and medicolegal concerns. While no AI may replace physician, but in the next decade,

the physicians, who have adapted AI in their clinical practice, may replace physicians who have not.

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