COMMENTARY

Artificial Intelligence in Cancer Medicine: The Future of Cancer Care?

Marcus Vetter[1]

[1] Head of Center Oncology and Hematology, Cantonal Hospital Baselland (KSBL), Liestal, Switzerland

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Artificial intelligence (AI) refers to the development of computer systems that can perform tasks that traditionally require human intelligence. It involves the creation of algorithms that enable machines to learn from and adapt to data, make decisions and perform various cognitive tasks. AI can be broadly categorized into two types: narrow AI and general AI. Narrow AI, also known as weak AI, is designed to perform specific tasks within a limited domain. Examples of narrow AI include voice assistants like Siri or Alexa, image recognition systems and recommendation algorithms used by online platforms. General AI, on the other hand, aims to possess broader cognitive capabilities across a wide range of tasks.

In medicine, AI was initially met with concerns about the privacy of the patients and healthcare professionals, as well as potential diagnostic and treatment failures. However, AI has since made significant contributions to cancer care, revolutionizing various aspects of cancer detection, diagnosis, treatment and research.

AI applications in cancer medicine encompass a wide range of areas. In image analysis and radiology, AI algorithms can analyze medical images, such as mammograms, computed tomography (CT) scans and magnetic resonance imaging (MRI), to detect early signs of cancer, assist in tumor segmentation and help radiologists in making accurate diagnoses. Moreover, in pathology and histology, AI can assist pathologists in analyzing tissue samples and identifying cancerous cells, enhancing accuracy and efficiency in cancer diagnosis. AI algorithms can also predict patient outcomes based on histopathology images and molecular data.

AI further plays a crucial role in precision medicine and treatment selection. By analyzing large amounts of patient data, including genomic information, clinical records and treatment outcomes, AI can identify patterns and guide personalized treatment decisions. AI algorithms can suggest optimal treatment options and predict patient responses to specific therapies. In addition, AI can be used in drug discovery and development, expediting the process by analyzing vast amounts of molecular data and identifying potential drug candidates. AI models can also predict drug efficacy, toxicity and identify drug combinations for more effective cancer treatment. Finally,

AI can aid in patient monitoring and support by assisting in the monitoring of vital signs, symptoms and treatment responses, enabling early detection of adverse events and personalized supportive care.

Implementing every AI tool in clinical care may be challenging. Although patients still prefer a human healthcare profession, AI can serve as a valuable support system for healthcare professionals, including physicians, nurses, pathologists and surgeons.

In the field of oncology, there is a significant opportunity to leverage bioinformatics and AI to develop new treatments from scratch, saving money, time and complexity. Ultimately, the primary objective is to improve patients' care, address their needs and enhance cancer prognosis.

In conclusion, AI-based algorithms can improve cancer diagnosis and therapy across various domains of cancer medicine and research. When used to improve patient outcomes and ensure patient and caregiver safety, AI presents numerous opportunities. Even ultra-individualized cancer care becomes a possibility. AI can also aid in research and drug development to benefit patients and researchers. However, it is key to address potential disadvantages and establish guidelines for the responsible use of AI in the future.

PD Dr Marcus Vetter

Conflict of interest

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Author Contributions

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SUPPLEMENTARY MATERIALS

Figure 2: Placeholder

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