Journal of Health and Rehabilitation Research 2791-156X JHRR

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Editorial

Role of Artificial Intelligence in Grading and Prognosis of Prostate Cancer

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Conflict of Interest: None.

Malik NM., et al. (2024). 4(2): DOI: https://doi.org/10.61919/jhrr.v4i2.891

ABSTRACT

Artificial Intelligence (AI) and Machine Learning (ML) are increasingly influencing the medical field, particularly in the diagnosis and prognosis of prostate cancer. AI technologies facilitate complex tasks in identifying and characterizing prostate cancer through image-based analyses, including histopathology and MRI. These advancements are enhancing evaluation methods and improving patient outcomes by incorporating additional data such as demographic factors and experimental markers into risk prediction models, increasing the accuracy of prostate cancer prognosis from 60% to 80%. ML, a subset of AI, leverages large datasets to improve predictions regarding cancer susceptibility, recurrence, and survival rates. Despite its potential, AI still requires significant human input in its development and faces various challenges before it can fully integrate into clinical practice.

Keywords: Artificial Intelligence, Cancer Prognosis, Prostate Cancer.

INTRODUCTION

Artificial Intelligence (AI) refers to the stimulation of human intelligence processes by machines. Its purpose lies in its capacity to engage in complex tasks that traditionally necessitate human intelligence. Its use is incessantly encouraging the positive utilization of technology in field of medicine. Investigations into artificial intelligence augmenting delineation of prostatic carcinoma are advancing at an accelerated pace, harboring the capacity to expedite every facet of the extant normative diagnosis conduit. Notwithstanding the voluminous compendium of scholarly treatises encircling the application of artificial intelligence in the discernment of prostatic malignancies, the preponderance of these methodologies have not attained a state of readiness for integration into clinical praxis. Artificial intelligence also holds potential in streamlining the evaluation of prostate cancer's characteristics and severity through image-based analysis, including histopathology, MRI, and biomarker assessments. AI is poised to enhance these monitoring methods and stands as a vital resource for urological pathologists and the broader urology field, as advancements in technology continue to bolster patient outcomes over time. Artificial intelligence also has a role in creating a classification system for prostate cancer risk stratification. The National Comprehensive Cancer Network (NCCN) guidelines currently use a combination of tumor size, lymph involvement, metastasis, Gleason score, and PSA level, while on the other hand AI with traditional statistics is likely to include demographic factors and experimental markers like Bcl-2 and P53 in risk prediction. This approach increased the accuracy of predicting prostate cancer from 60% to 80%, highlighting the value of incorporating more data into models(1).

A more specific concept, namely Machine Learning (ML), a subtype of artificial intelligence is increasingly used in healthcare, particularly for cancer prognosis. By analyzing large datasets, ML models can predict patient survival rates and have significantly improved the accuracy of cancer susceptibility, recurrence, and survival predictions. A published article discusses how advanced machine leaning techniques, when combined with feature engineering and the addition of new features, can enhance the predictive models for prostate cancer(2). ML is highlighted as a valuable tool that can leverage the believed correlations for predictive purposes in clinical settings, even before more advanced models are developed. This approach can potentially aid in the early prediction and treatment of prostate cancer. Currently, AI continues to evolve and progress, yet it remains reliant on human involvement for its development. In certain aspects, AI's capabilities can astonishingly rival those of specialists, yet there are still hurdles and constraints to overcome(3).

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