ABSTRACT

Current uses, emerging applications, and clinical integration of artificial intelligence in neuroradiology.

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Artificial intelligence (AI) is a branch of computer science with a variety of subfields and techniques, exploited to serve as a deductive tool that performs tasks originally requiring human cognition. AI tools and its subdomains are being incorporated into healthcare delivery for the improvement of medical data interpretation encompassing clinical management, diagnostics, and prognostic outcomes. In the field of neuroradiology, AI manifested through deep machine learning and connected neural networks (CNNs) has demonstrated incredible accuracy in identifying pathology and aiding in diagnosis and prognostication in several areas of neurology and neurosurgery. In this literature review, we survey the available clinical data highlighting the utilization of AI in the field of neuroradiology across multiple neurological and neurosurgical subspecialties. In addition, we discuss the emerging role of AI in neuroradiology, its strengths and limitations, as well as future needs in strengthening its role in clinical practice. Our review evaluated data across several subspecialties of neurology and neurosurgery including vascular neurology, spinal pathology, traumatic brain injury (TBI), neuro-oncology, multiple sclerosis, Alzheimer's disease, and epilepsy. AI has established a strong presence within the realm of neuroradiology as a successful and largely supportive technology aiding in the interpretation, diagnosis, and even prognostication of various pathologies. More research is warranted to establish its full scientific validity and determine its maximum potential to aid in optimizing and providing the most accurate imaging interpretation.