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Artificial Intelligence as a Diagnostic Tool

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The modern era of regenerative medicine has given us Artificial Intelligence (AI) with its vast cumulative knowledge, analytical depth of thinking and accurate diagnostics. Its application in diagnostic imaging data collection, image superimposition, de-pixelation and real time clinical corelation is far superior than the most experienced human mind. Clinical decision support systems are actively under development which use algorithms to analyse medical imaging, capable of interpreting data ranging from conventional X rays to complex MRIs [1]. Now combine this thought with state-of-the-art real time navigational robotic surgery and you get the best surgeon from any part of the world operating in a hospital near you [2].

But are we forgetting that the driving force behind a successful clinic or hospital is a "good doctor". Can we really do without them? So I guess the real question would be Experience vs Technology? Can one replace the other or is it too soon to tell?.

AI based diagnosis may come up with more findings than conventional doctors which drastically reduces accidental/coincidental findings but it could also lead to the downfall of chief complaint driven medicine. Is having a comprehensive treatment plan involving the temporo-mandibular joint more relevant than treating the migraine or the broken tooth that keeps a patient awake at night in pain? The answer may not be that simple because following AI in essence would mean accumulate every negligible finding till it leads to a syndrome as compared to treating the current complaint at face value without always finding the underlying root cause.

Medicine has never been as direct as mathematics because a negligible finding does not always turn into a ticking time bomb. A simple example would be a pin point radiolucent artifact on a tooth, could sometimes mean a speck on the film or a dead pixel rather than dental caries.

Another aspect assumes significance. If a patient visits a clinic with a vague symptom like discomfort with no clearcut radiographic finding and the doctor is uncertain on how to proceed, should AI be employed to find the problem. This has to be the Rubicon which should not be crossed. Instead of using AI to search for a problem which may or may not be there, one must use it as a diagnostic tool to confirm the problem suspected by the doctor. This rationale to formulate a diagnosis has always been the same: chief complaint, a sequential case history, clinical examination to look for signs/symptoms, differential diagnosis, using an investigation/diagnostic aid to eliminate all other differentials and come to the final diagnosis. AI can only be employed at a diagnostic level or to formulate a differential diagnosis based on case summary and epidemiology or to aid in navigational surgery.

This is, then, my view. The final decision lies in the hands of the treating doctor, but, if AI as a tool can formulate a quicker diagnosis or multiple differential diagnosis to save time and see things beyond the human eye, then I am all for it.

References

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