Artificial Intelligence in Cardiology – Beyond Image Analysis

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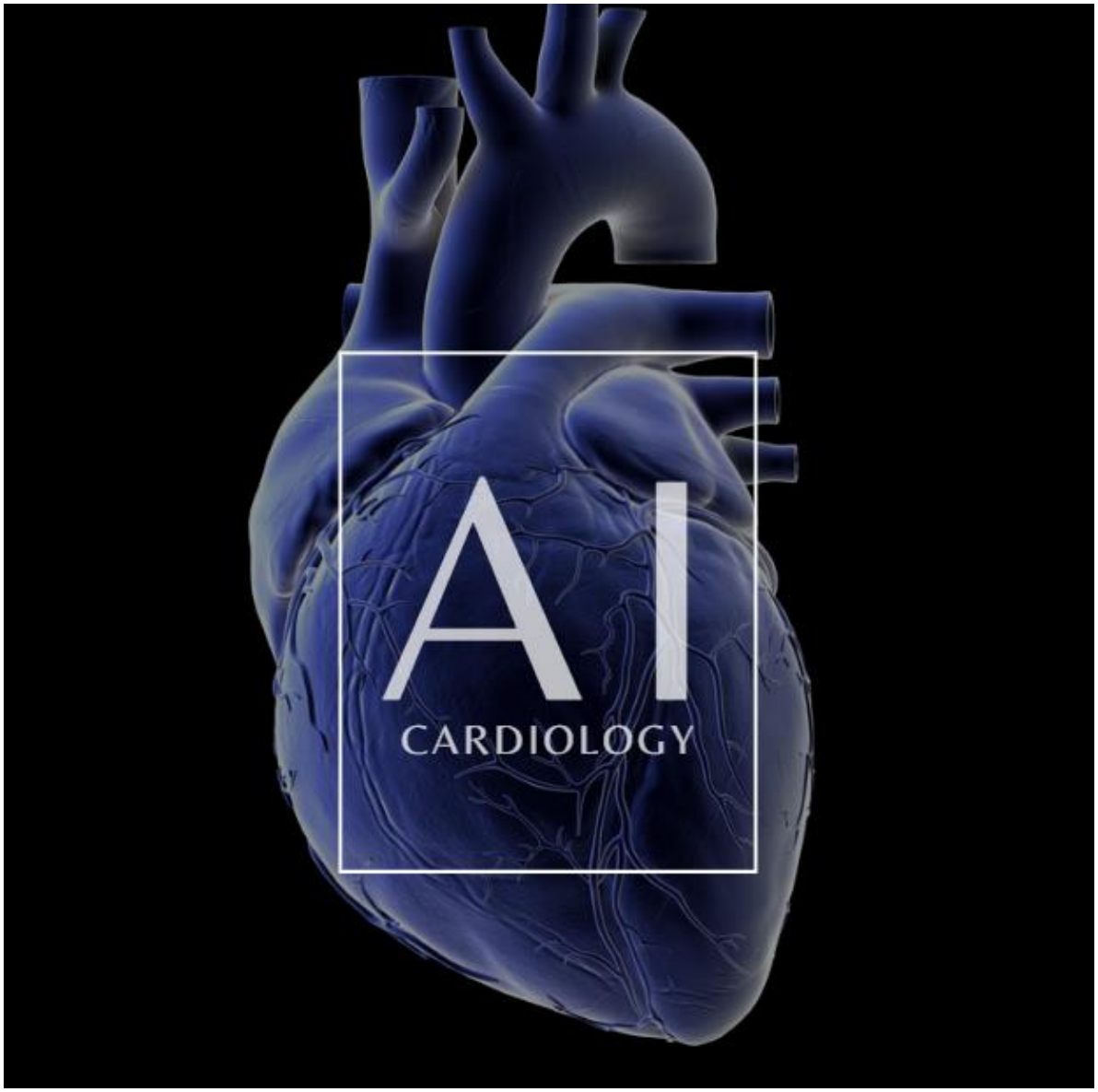

OMEGA
Medical Imaging

Artificial intelligence, commonly referred to as AI, touches almost every aspect of modern life, including medicine. AI is a game-changing technology that promises much in cardiology. In fact, AI has become a buzzword for subspecialties like image analysis. But AI should not be limited to just analysis. Its promise is much more than that. AI has proven to be highly effective in certain aspects of medical procedures, freeing the physician to focus on what's most important – their patient.

In a paper published with the Mayo Clinic in 2020 titled Artificial Intelligence in Cardiology: Present and Future, Francisco Lopez-Jimenez, MD, MSc, MBA provides a thorough review of the general principles of AI and details the current and future applications of AI in specific areas – notably, electrophysiology and interventional cardiology. With respect to interventional cardiology, Dr. Lopez-Jimenez states that it has traditionally been at the forefront of cardiovascular innovation and AI in medicine.

However, when most think of AI in medicine, particularly in cardiology, they think first of image analysis. AI does an excellent job here. The computer programs behind AI can be trained to digest and analyze huge amounts of data, huge amounts of images. AI can "learn" to process medical images and automatically recognize radiographic characteristics. In this sense, AI serves well as a complement to the physician, freeing the doctor to focus on that which AI is not well suited for – the actual practice of medicine.

But AI can do much more than image analysis. In a 2018 article, Jeffrey Golden, MD stated that AI can improve productivity by identifying features of interest in images before a human clinician reviews the data. Dr. Bresnick concluded that inserting intelligent algorithms into (medical) devices can reduce cognitive burdens on physicians and help patients receive better healthcare. AI can, for instance, determine and control certain aspects of medical procedures, freeing the physician to focus on their patient and the outcome – and not be preoccupied with processes that can be managed by artificial intelligence.

A great example of such a process is the establishment and control of the region of interest (ROI) during an interventional cardiology procedure. Like identifying features of interest in radiologic images, a region of interest can be learned and controlled by AI.

Current interventional cardiology procedures are done using a full field of view (FOV), disregarding the physician's actual ROI. This exposes the patient to more radiation and the staff to additional scatter radiation. AI-enabled technology can detect where in the anatomy

an interventional cardiologist is focused and automatically collimate to that ROI. This reduces radiation exposure to the patient and to everyone in the room.

AI image-guided ROI systems are proven to be safer than non-AI systems and are quickly becoming the new standard of care for interventional imaging. AI provides an automatic, hands-free solution to radiation protection – delivering the benefit of consistent and repeatable radiation reduction beyond what conventional, non-AI systems can provide while providing superior image quality with no change in existing workflow.

Omega systems use AI image-guided technology that automatically defines, tracks, and collimates to the procedure's ROI. For non-AI systems, this secondary collimation must be controlled manually. During a procedure, the ROI must be manually adjusted. AI technology provides a proven solution that goes beyond just filtering and truly blocks the area outside of the ROI.

Omega recently introduced an innovative new interventional cardiology system, the Soteria.AI. The system uses Omega's exclusive AI image-guided technology. State-of-the-art image processing delivers superior image quality while reducing radiation exposure by up to ~84%. This reduction is in addition to existing best practices – over and beyond ALARA.

In 2020, Ohad Oren, MD et al wrote in The Lance that artificial intelligence is a disruptive technology that has shown excellent accuracy, sensitivity, and specificity in the detection of small radiographic abnormalities – that AI has the potential to improve public health.

That potential is already being realized today – not just in image analysis, but also in the dramatic reduction of radiation exposure in interventional cardiology.

Learn more about Soteria.AI

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