Systematic Review on the usage of Artificial Intelligence in Peripheral Vascular Diseases

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**Background:** The use of Artificial Intelligence (AI) in healthcare is based on machine-learning algorithms and software to replace human cognition in the analysis of medical data. We aim to provide a systematic review on the usage of AI in peripheral vascular diseases (PVD).

**Methods:** A systematic review was conducted through the PubMed database. Search terms were focused to identify studies reporting artificial intelligence OR algorithm OR natural language processing OR machine learning OR neural networks AND peripheral vascular disease NOT robotics.

**Results:** A total of 25 articles from 1956 to 2019 were included. These represented empirical work from qualitative, quantitative and mixed-methods approaches, with mainly AI software usage in PVD. The studies examined the application of AI software in the identification of risk factors and screening (2 studies), diagnosis (13 studies), management (2 studies) and the assessment of the complications and severity of PVD (7 studies). There was also a study comparing 3 different models in the diagnosis of PVD. Out of the 25 articles, the AI software had shown positive results in their respective domains in 24 articles. Risk factors for PVD were identified and was utilized by the AI software to screen for asymptomatic PVD in the general population and the positive predictive value for the AI was twice that of the Inter-Society Consensus (ISC) screening criteria which is the current universal screening score. The AI software was able to compile and interpret the results to generate a diagnosis of PVD with high specificity and sensitivity according to the consistently high diagnostic accuracy findings from 12 of the articles on PVD diagnosis. The AI was also able to generate a management algorithm with multiple treatment routes based on the patient’s profile.

**Conclusions:** Currently, AI is helpful to aid in the patient journey of PVD patients from screening to management. However, more research and development are required
before it can be widely applied to assist doctors in the management of patients with PVD.

**Author Disclosures:** L. Lau: None; Z.J. Lo: None; Q. Hong: None; E. Yong: None, L. Zhang: None; S. Chandrasekar: None; G.W.L. Tan: None.