

Potential applications of AI and machine learning in diagnosis, treatment planning, and Follow-up of venous disease: a literature review

Jaskaran Singh Bhangu, Rhadika Rewal, Gowrypalan Ganenthira and Keioni Essex
Swansea University Medical School

Background: Venous disease, including chronic venous insufficiency, deep vein thrombosis, varicose veins, and venous ulcers, significantly impacts patients' quality of life and healthcare systems. Accurate diagnosis, appropriate treatment selection, and close monitoring are vital for effective management.

Aims: This literature review synthesises current evidence on the potential applications of artificial intelligence (AI) and machine learning (ML) in the diagnosis, treatment planning, and follow-up of venous disease.

Methods: A comprehensive search of Google Scholar and PubMed identified relevant studies published within the last five years. The search strategy included keywords such as "artificial intelligence," "machine learning," "venous disease," "diagnosis," "treatment planning," and "follow-up." Studies were included if they focused on AI/ML applications in venous disease diagnosis, treatment, or monitoring.

Results: 15 studies were identified, exploring AI/ML use in image analysis, risk prediction, treatment decision support, and disease monitoring. These demonstrated AI/ML's potential for automated detection of venous abnormalities, predicting post-thrombotic syndrome risk, selecting optimal endovenous ablation techniques, and monitoring venous ulcer healing.

Conclusions: The studies highlight growing interest in AI/ML for venous disease management. However, further research is needed to develop tailored solutions, address challenges, and validate technologies for clinical use. Interdisciplinary collaboration is crucial to realise AI/ML's full potential in improving patient outcomes.

