320 Augmented Reality in Vascular and Endovascular Surgery: A Scoping Review

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Introduction: Technological advances have transformed vascular intervention over recent decades. Augmented reality (AR) is a subject of growing interest within surgery, with potential to improve the clinicians’ understanding of 3D anatomy and their processing of real-time information. The aim of this review was to summarise the fundamental concepts of these technologies and to systematically assess the literature currently applying AR to vascular surgery.

Method: A systematic literature review of ‘Medline,’ ‘Scopus’ and ‘Embase’ was performed according to PRISMA guidelines. Studies were selected by a blinded process between two investigators and assessed with data quality tools.

Results: AR technologies have had a number of applications across vascular and endovascular surgery. The majority of studies use 3D imaging (e.g.) CT angiogram derived images of vascular anatomy to augment the clinicians anatomical understanding during procedures. A wide range of AR technologies have been employed with ‘heads up’ fusion imaging and AR head-mounted displays the most commonly clinically applied. AR applications have included guiding open, robotic, and endovascular surgery while minimising dissection, improving procedural times, and reducing radiation and contrast exposure. Additionally, AR has been successfully applied to surgical training, with scope to improve technical and team communication skills.

Conclusions: AR has shown promising developments in the field of vascular and endovascular surgery, with potential benefits to surgeons and patients alike. While more technological advances are required to overcome current limitations, it is likely that AR will be a regular feature of vascular surgery clinical practice and training in the future.