



Topic Exploration Report ¹

Topic explorations are designed to provide a high-level briefing on new topics submitted for consideration by Health Technology Wales. The main objectives of this report are to:

- Determine the quantity of evidence available for a technology of interest.
- Identify any gaps in the evidence.
- Inform decisions on topics that warrant fuller assessment by Health Technology Wales (HTW).

Topic exploration report number	TER515
Topic	Optical coherence tomography angiography for detection and diagnosis of vascular diseases of the eye
Summary of findings	<p>In the diagnosis of some eye conditions, optical coherence tomography angiography is a possible non-invasive alternative to more invasive diagnostic tests such as fluorescein angiography. Evidence from two health technology assessments and one evidence review assessed the diagnostic accuracy of optical coherence tomography angiography, for age-related macular degeneration, diabetic retinopathy, or chorioretinal disease. All evidence identified focussed on diagnostic accuracy, usually in comparison to fluorescein angiography. Accuracy outcomes varied according to the specific study and conditions included.</p> <p>This initial search did not identify any evidence on outcomes after diagnosis, or on the cost effectiveness of optical coherence tomography angiography. An ongoing UK trial, due to complete in 2024, may provide more information about these aspects.</p>

¹ [Cyfieithu dogfennau HTW wedi'u cyhoeddi o'r Saesneg i'r Gymraeg](#)
Translation of published technical HTW documents from English into Welsh

Introduction and aims

Eye conditions are often diagnosed based on the interpretation of multiple imaging tests. Some of these, such as fluorescein angiography, are invasive, whilst non-invasive tests such as optical coherence tomography are not always accurate and require more confirmatory tests. Optical coherence tomography angiography is a relatively new non-invasive diagnostic tool that has been proposed as an alternative to fluorescein angiography. Health Technology Wales researchers searched for evidence on optical coherence tomography angiography for use in the diagnosis of conditions of the eye vasculature.

Evidence overview

We identified two relevant existing health technology assessments, one recent systematic review, and one ongoing UK trial, which includes a planned economic evaluation.

Health technology assessments

We identified two health technology assessments, by Instituto de Efectividad Clínica y Sanitaria (IECS, Argentina) and by Evaluación de Tecnologías Sanitarias de Andalucía (AETSA, Spain).

The assessment by IECS, published in 2022, aimed to evaluate the diagnostic performance, efficacy and safety of optical coherence tomography angiography for vascular diseases of the eye. Systematic reviews and other secondary evidence were included, focussing on diagnostic accuracy outcomes. Reviews found studied optical coherence angiography tomography for detection of choroidal neovascularization due to AMD; diabetic retinopathy, either due to disc neovascularization or retinal neovascularization; or vascular features of chorioretinal disease. Most studies compared optical coherence angiography tomography to fluorescein angiography, usually in combination with optical coherence tomography, although in one review the reference standard was more variable. Reported sensitivity and specificity of OCTA ranged from 86-92% and 86-97%, respectively. No evidence on clinical outcomes or changes to management after diagnosis was reported. The authors also searched for evidence on the cost-effectiveness of optical coherence angiography tomography, but did not identify any relevant studies.

The report by AETSA was published in 2021 and aimed to evaluate the effectiveness and safety of optical coherence tomography angiography in the identification of choroidal neovascularization in age-related macular degeneration versus fluorescein angiography. The authors included studies comparing optical coherence angiography tomography versus fluorescein angiography that reported diagnostic accuracy outcomes, and carried out their own pooled analysis. This reported a sensitivity of 85.9 % (95 % confidence interval, CI, 81.9 - 89.3 %) and a specificity of 89 % (95 % CI, 83.5 - 93.2 %).

Evidence reviews

We identified one relevant evidence review published after the health technology assessments described above. Namvar et al (2023) searched for evidence on the accuracy of optical coherence angiography tomography in diagnosis and staging of diabetic retinopathy. 44 relevant studies were identified and pooled diagnostic accuracy was estimated. For detection of diabetic retinopathy, optical coherence angiography tomography had an estimated sensitivity of 88% (95% CI: 85% to 92%) and specificity of 88% (95% CI: 85% to 91%). The diagnosis of proliferative diabetic retinopathy from non-proliferative diabetic retinopathy was also studied: optical coherence angiography tomography had a reported sensitivity of 91% (95% CI: 86% to 95%) and specificity of 91% (95% CI: 86% to 96%). It should be noted that the

Evidence overview

reference standard(s) against which optical coherence angiography tomography was assessed in the included studies are unclear.

Ongoing studies

We identified one ongoing UK trial of the diagnostic accuracy of optical coherence angiography tomography compared to fluorescein angiography for age-related macular degeneration (Balaskas, 2021)]. In this study, patients are randomised to use of either optical coherence angiography tomography or fluorescein angiography for their initial diagnosis. The primary objective of this trial is to assess whether the sensitivity and specificity of optical coherence angiography tomography in patients with a positive or suspicious optical coherence angiography tomography is non-inferior to that of fluorescein angiography for the detection of neovascular age-related macular degeneration. Secondary objectives include estimating the incremental cost per true positive detected and incremental cost per correct diagnosis. Planned recruitment is 1067 patients across 20 UK (hospital-based) centres. The trial is due to complete in 2024.

Areas of uncertainty

At this stage, the specific eye conditions of interest to any further appraisal are unclear. These could include, but are not limited to, age-related macular degeneration, diabetic retinopathy, or chorioretinal disease. Most of the evidence identified in this initial search was for age-related macular degeneration.

Where optical coherence tomography fits in the diagnostic pathway for relevant conditions requires further investigation. It is likely to be an alternative to fluorescein angiography, but its proposed use or where it can offer most value requires further investigation. For example, studies included here used these tests either in isolation or as a confirmatory test after suspicious optical coherence tomography.

We identified considerable evidence on the diagnostic accuracy of optical coherence tomography angiography, but not on other outcomes such as influence on management of any diagnosed condition, or cost effectiveness of the technology. This high-level search did not include primary studies that could cover these aspects.

We identified no evidence on the cost effectiveness of optical coherence tomography angiography, although an economic evaluation linked to a UK-based trial is in progress.

Literature search results

Health technology assessments and guidance

National Institute for Health and Care Excellence. Age-related macular degeneration. NICE guideline 82. 2018. www.nice.org.uk/guidance/ng82

This guideline makes recommendations on monitoring of age-related macular degeneration using related techniques (optical coherence tomography, fluorescein angiography) but does mention optical coherence tomography in its recommendations.

Argento F; García Marti, S; Alfie, V; Navarro, E; Augustovski, F; Ciapponi, A; Bardach, A; Pichon Riviere, A; Alcaraz A. Optical Coherence Tomography Angiography in Vascular Eye Diseases. Health Technology Assessment, Rapid Response Report N° 888 Buenos Aires, Argentina. June 2022. ISSN 1668-2793. Available in www.iecs.org.ar

AETSA. Clinical utility of optical coherence tomography angiography in exudative age-related macular degeneration management. 2021. https://www.aetsa.org/download/02_2019_AETSA_Angio_DEF_NIPOentramite.pdf

Evidence reviews and economic evaluations

Namvar E, Ahmadi H, Maleki A, Nowroozzadeh MH. Sensitivity and specificity of optical coherence tomography angiography for diagnosis and classification of diabetic retinopathy; a systematic review and meta-analysis. Eur J Ophthalmol. 2023 Nov;33(6):2068-2078. <https://doi.org/10.1177/11206721231167458>

Individual studies

Note searched due to volume of secondary evidence

Ongoing research

Balaskas, et. al. OpticAl Coherence TomograpHy Angiography for the dEtection of Neovascular Age-related Macular Degeneration: a Comprehensive Diagnostic Accuracy Study - the ATHENA study - NIHR Funding and Awards. 2021. <https://fundingawards.nihr.ac.uk/award/NIHR131432>

Date of search	November 2023
Concepts used	Optical coherence tomography angiography, eye

Proposed research question and evidence selection criteria (if selected)

Proposed Research question	What is the effectiveness of optical coherence tomography angiography for diagnosis of vascular eye conditions?
-----------------------------------	--

	Inclusion criteria	Exclusion criteria
Population	People with suspicion of, or at risk of, vascular eye conditions such as age-related macular degeneration, diabetic retinopathy	
Intervention/index test	Optical coherence tomography angiography	
Comparison/reference standard	Fluorescein angiography Any other tests of relevant (TBC)	
Outcome measures	Diagnostic accuracy Adverse events from testing Patient satisfaction or quality of life Changes to patient management or outcomes after testing Economic outcomes	

Proposed speciality	Eye
----------------------------	------------