INPLASY

# Retina and choroid alterations in obstructive sleep apnea: a systemic review and meta-analysis

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## ADMINISTRATIVE INFORMATION

**Support -** 1.National High Level Hospital Clinical Research Funding 2.Elite Medical Professionals project of China-Japan Friendship Hospital.

**Review Stage at time of this submission -** The review has not yet started.

**Conflicts of interest -** None declared.

**INPLASY registration number:** INPLASY2024120043

**Amendments -** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 12 December 2024 and was last updated on 12 December 2024.

## INTRODUCTION

**Review question / Objective** To analyze the retina, choroid and microvascular changes of obstructive sleep apnea by optical coherence tomography (OCT) or optical coherence tomography angiography (OCTA) :
(1) The thickness of the peripapillary retinal nerve fiber layer;
(2) The vessel density of peripapillary;
(3) The thickness of the ganglion cell complex;
(4) The vessel density in the macular region;
(5) The choroid thickness.

**Condition being studied** Obstructive sleep apnea (OSA) is a common disease characterized by recurrent apnea or hypopnea, resulting in hypoxemia and hypercapnia in the body, leading to secondary sympathetic activation, oxidative stress and systemic inflammation. Studies have shown that OSA is associated with an increased risk of several ocular vascular diseases, including non-arteriotic anterior ischemic optic neuropathy, glaucoma, and diabetic retinopathy, etc. Given the critical role of OSA in ocular perfusion, we aimed to assess retinal and choroid thickness and vascular density in OSA patients.

## METHODS

**Participant or population** All populations are eligible for inclusion in the review.

**Intervention** This is a review of assessment of the retina, choroid and microvascular changes in patients with obstructive sleep apnea by OCT or OCTA.

**Comparator** The obstructive sleep apnea and controls.

**Study designs to be included** The study designs include case control study, cross-sectional study and cohort study.

**Eligibility criteria** The inclusion criteria are as follows: (1) they are original articles; (2) they are studies comparing patients with obstructive sleep apnea and healthy controls; (3) OCT data were provided as mean ± standard deviation (SD).

**Information sources** The PubMed, Embase and Cochrane Library databases were searched from inception to 30 November 2024 for studies evaluating retinal and choroidal changes between obstructive sleep apnea patients and healthy controls using optical coherence tomography (OCT) or optical coherence tomography angiography (OCTA).

**Main outcome(s)**
(1) The thickness of the peripapillary retinal nerve fiber layer;
(2) The vessel density of peripapillary;
(3) The thickness of the ganglion cell complex;
(4) The vessel density in the macular region;
(5) The choroid thickness.

**Quality assessment / Risk of bias analysis** The Newcastle-Ottawa Scale will be used to assess the quality of individual studies by two independent..

**Strategy of data synthesis** The Stata Software is used for analysis. Mean differences (MDs) and its 95% confidence interval (CI) are calculated for continuous estimates. Heterogeneity among studies are performed using the $\chi^2$ statistic test and $I^2$ statistic test. A fixed-effect model is employed when no significant heterogeneity existed among studies; otherwise, the random-effect model is used. Funnel plot asymmetry was further assessed using Egger's linear regression test about the meta analysis which is above five researchs.

**Subgroup analysis** All the meta-analyses will be performed in subgroups by ethnicity or device if possible.

**Sensitivity analysis** Sensitivity analysis will be performed to identify and eliminate the source of the heterogeneity of all the meta-analyses.

**Country(ies) involved** China.

**Keywords** Sleep Apnea, Obstructive;OCT; retina;choroid.

**Contributions of each author**
Author 1 - Mengyu Han - Author 1 drafted the manuscript.
Email: hanmengyu0301@126.com
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