

# Ocular ischemic syndrome

*By Azareli Garcia, MD*



# Introduction

Ocular ischemic syndrome (OIS) is a rare, but vision-threatening condition associated with severe **carotid artery occlusive disease** leading to ocular hypoperfusion.



# Epidemiology

Mean age of 65 years, rare before 50.

No racial predilection.

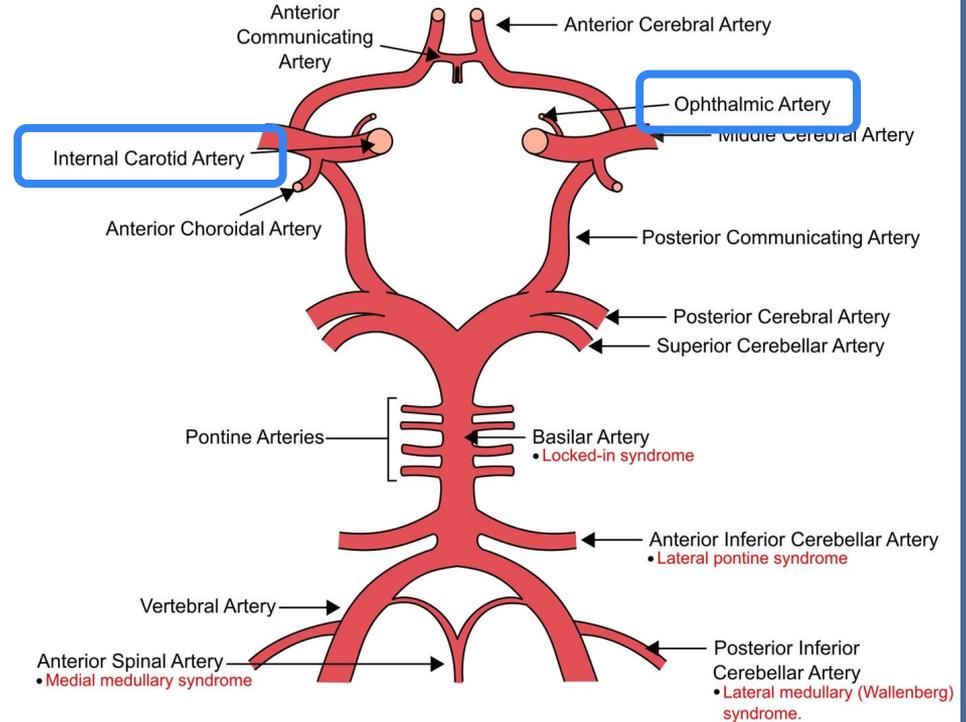
Men are affected twice as often as women.

Bilateral involvement may occur in up to 22% of cases.

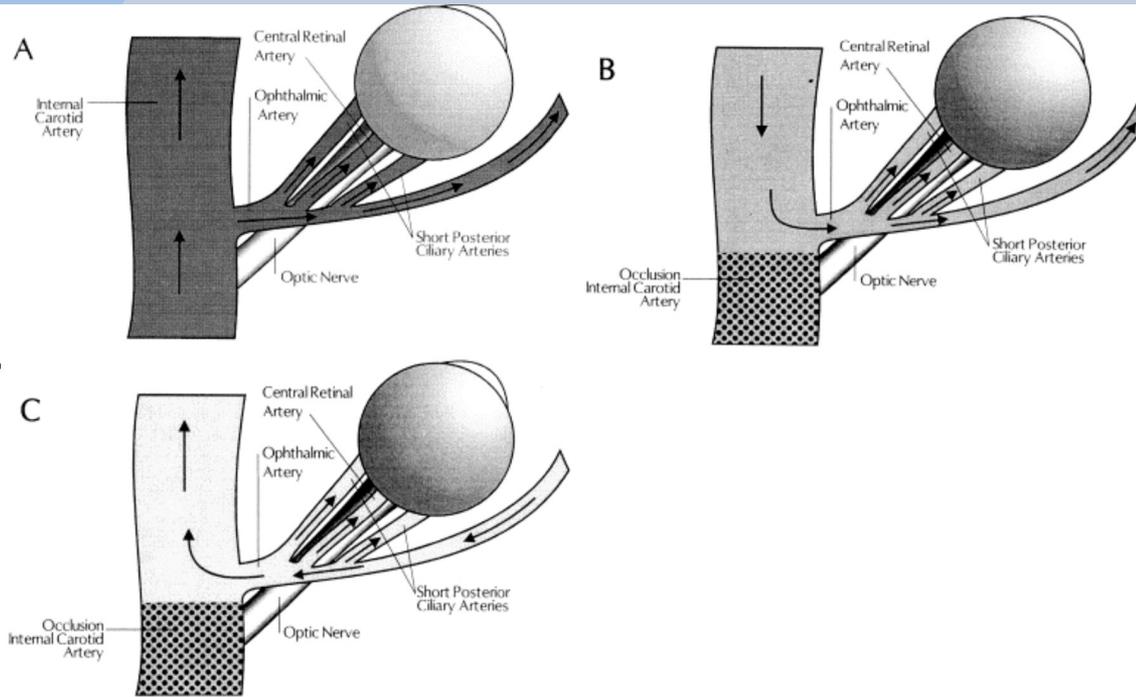
Incidence estimated at 7.5 cases per million people per year.

# Arterial blood supply

## Circle of Willis



# Pathogenesis



**Figure 2.** Blood flow in the ophthalmic artery (OA) and its branches. (A) in a normal individual; (B) in a patient with internal carotid artery occlusion and collateral circulation via the circle of Willis (forward ophthalmic artery flow) (Figure 3); and (C) in a patient with internal carotid artery occlusion and collateral circulation via the ophthalmic artery (reversed flow). *Reproduced with permission from Costa et al.*<sup>[16]</sup>

# Symptoms and signs

OIS may initially present with constitutional rather than ocular symptoms.

Decrease in visual acuity in OIS may be severe, with acute or subacute presentation.

Visual fields on presentation can vary greatly.



A history of transient visual loss is present in 10–15% of patients.

Pain is present in 40% of cases. (increased IOP or ischemic)

Ischemic pain begins gradually and is a dull, constant ache in the affected eye, over the orbit, upper face, and temple. (“ocular angina”)

# Signs

Conjunctival and B
Corneal edema an
Corneo-scleral me
Corneal hypoesthe
Spontaneous hyph
Iris atrophy
Fixed semi-dilated
with relative affer
Anterior and poste
Uveal ectropion
Rubeosis iridis (Fig
Neovascular glauc
Iridocyclitis (cell, f
Asymmetric Catar



Slit-lamp photograph showing rubeosis iridis.

Table 1. Ophthalmic

# Diagnosis

Fluorescein angiogram

Indocyanine green (ICG) angiography

Electroretinography

Visual-evoked potentials

Ophthalmodynamometry



19 sec

24 sec

49 sec

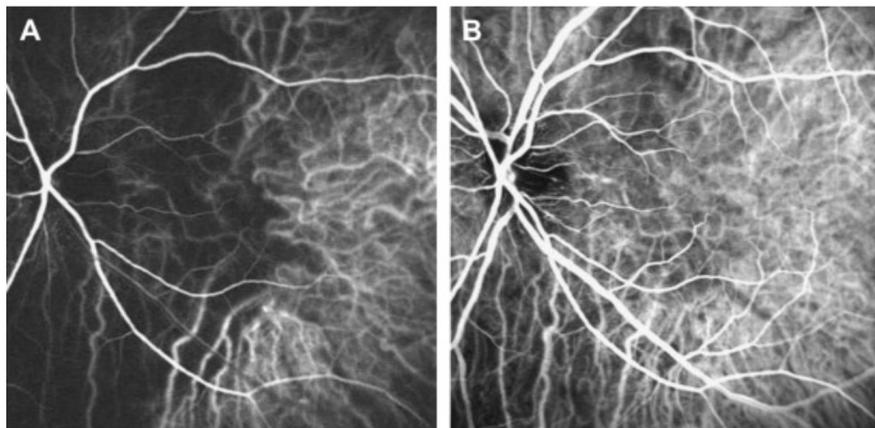


Figure 5. Indocyanine green angiography in ocular ischemic syndrome (OIS). A: Choroidal hypofluorescence corresponding to the main posterior watershed zone between the medial and lateral posterior ciliary arteries. B: Filling of the choroidal watershed zone is delayed, with some part of it remaining hypofluorescent 10 seconds later. *Reproduced with permission from Mendrinos et al. 2010* <sup>[20]</sup>

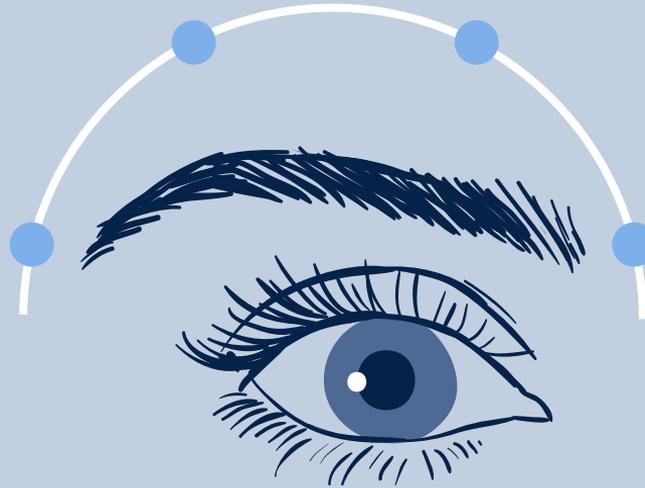
# Imaging Methods for the Evaluation of Carotid Occlusive Disease

Color Doppler Imaging of  
Retrobulbar Vessels

Magnetic Resonance Angiography and  
Computed Tomographic Angiography

Carotid Duplex  
Ultrasound

Carotid  
Arteriography



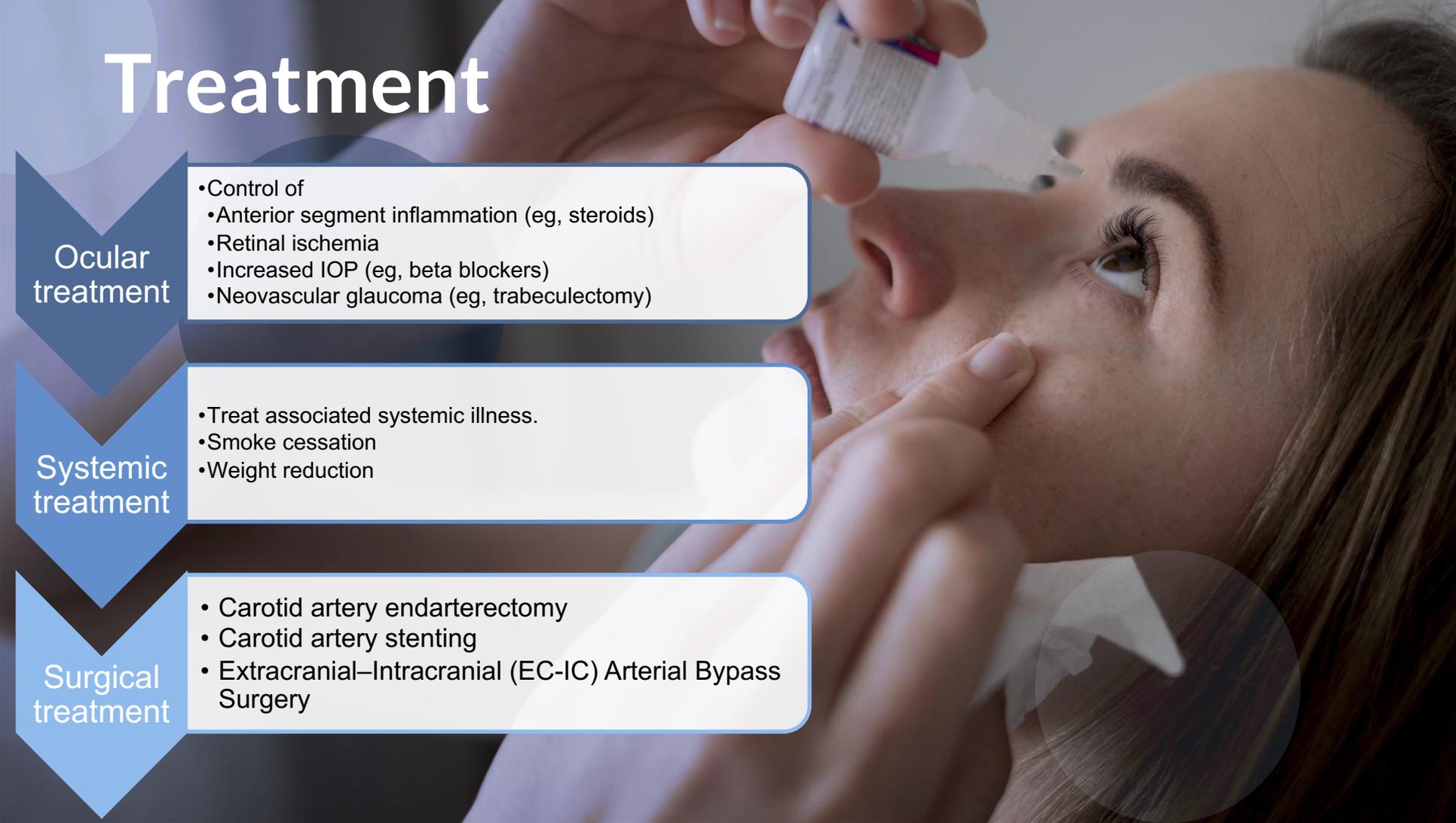
The differential diagnosis of ocular ischemic syndrome, diabetic retinopathy and central retinal vein occlusion [3,4].

	Ocular ischemic syndrome	Diabetic retinopathy	Central retinal vein occlusion
Age	50s to 80s	Variable	50s to 80s
Laterality	80% unilateral	Bilateral	Usually unilateral
<b>Posterior segment signs</b>			
Retinal veins	Dilated but not tortuous	Dilated and beaded	Dilated and tortuous
Hemorrhages	Dot and blot, mid-periphery, in deeper retina layers	Dot, blot in deeper retina layers and flame-shaped in in nerve fiber layer	Flamme-shaped in in nerve fiber layer
Microaneurysms	In midperiphery	In posterior pole	Variable
Hard exudates	Absent	Common	Rare
Optic disk	Normal	Diabetic papillopathy (rarely)	Swollen
Retinal arteria perfussion pressure	Decreased	Normal	Normal
<b>Fluorescein angiography</b>			
Arterio-venous transic time	Prolonged	Usually normal	Prolonged
Choroidal filling	Delayed, patchy	Normal	Normal
Retinal vessel staining	Arteries > veins	Usually absent	Veins > arteries

# Differential diagnosis



# Treatment

A close-up photograph of a woman with long brown hair applying eye drops to her right eye. She is looking upwards and to the right. Her hand is holding a small white plastic bottle with a blue cap. The background is a soft, out-of-focus grey.

## Ocular treatment

- Control of
  - Anterior segment inflammation (eg, steroids)
  - Retinal ischemia
  - Increased IOP (eg, beta blockers)
  - Neovascular glaucoma (eg, trabeculectomy)

## Systemic treatment

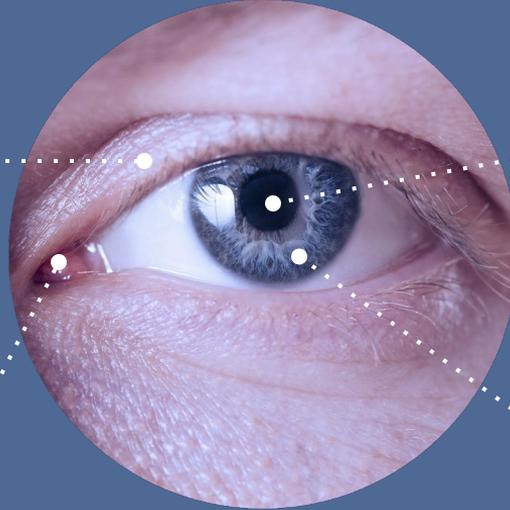
- Treat associated systemic illness.
  - Smoke cessation
  - Weight reduction

## Surgical treatment

- Carotid artery endarterectomy
- Carotid artery stenting
- Extracranial–Intracranial (EC-IC) Arterial Bypass Surgery

# Prognosis

Up to 50% of patients who present with OIS will have vision at count fingers (CF) or less within one year.



## Rubeosis iridis

Progression to CF or worse in 80% of those who presented with NVI

## Mortality rate for patients with OIS is 40% at 5 years

Leading cause of death being cardiovascular disease, usually myocardial infarction (67%), followed by cerebral infarction (19%).

## Development of neovascular glaucoma

Associated with hypertension, diabetes, and dyslipidemia.

# Thank you.

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