

المؤتمر السنوي الدولي للجمعية الرمدية المصرية  
INTERNATIONAL CONGRESS OF THE

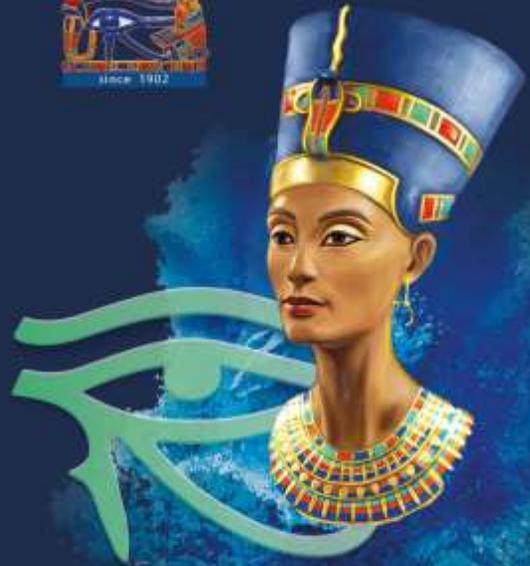
EGYPTIAN OPHTHALMOLOGICAL SOCIETY

**EOS 2023**



**Normal Tension Glaucoma**

*Who Needs  
Neuro imaging ?*



## Facts about NTG

- A disease of elderly patients >60 yrs
- Progressive optic neuropathy without high IOP

### Shocking statistics

50% of POAG had IOP < 21 mmHg at initial examination

- Japan : 2/3 of POAG experience NTG

**EOS 2023**



## Pathogenesis of NTG



### Vascular Insufficiency

- A variety of cardiovascular abnormalities have been described in patients with NTG
- Reduced peripapillary blood flow
- Nocturnal systemic hypotension
- Association of migraine and peripheral vascular diseases
- Sleep apnea

## Immune related theory

- Elevated antibodies to retinal proteins
- 30% NTG were found to suffer from autoimmune disorders



## NTG Masquerades

- **A) Large physiological cup :**
  - average vertical disc diameter is 1.7 -1.8 mm
- **B) Disorders of the optic nerve (cong or acquired)**
  - compressive lesion on the ON (<50 Y. old )
  - optic nerve drusen
  - optic nerve coloboma or pit
  - ION



## NTG Masquarades

- **C) High pressure glaucoma**

- Tonometric error / thin cornea
- undetected POAG (diurnal IOP fluctuation )
- intermittent angle closure



## Glaucomatous Vs Non glaucomatous

- **A detailed history is mandatory**

- Age
- Laterality
- Presence of neurological symptoms
- Chronicity and pattern of visual loss
- History of shock or severe low blood pressure
- Family history



## Glaucomatous Vs Non glaucomatous

- Visual Acuity :

Patients with non – glaucomatous cupping have central vision loss . Color vision defect

- Optic disc characteristics :

pallor of the neuroretinal rim is highly specific for non glaucomatous cupping

- Visual field findings :

Neurological VF respect the vertical meridian



## What will you base your judgement on ?

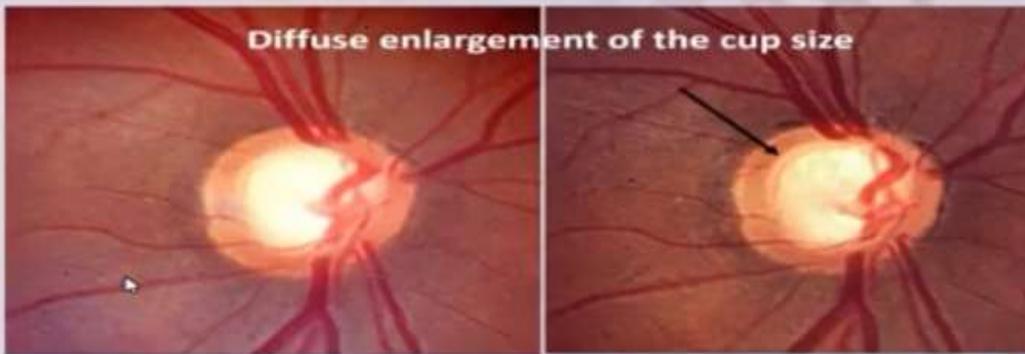
- Baseline examination , documentation and follow up

Localized RNFL loss associated with a notching



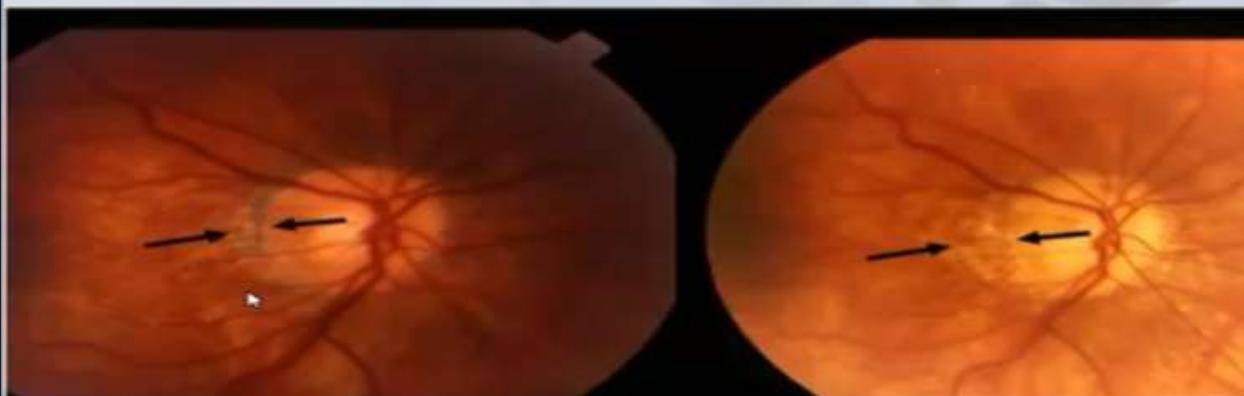
5 Months

### Generalized Rim Thinning

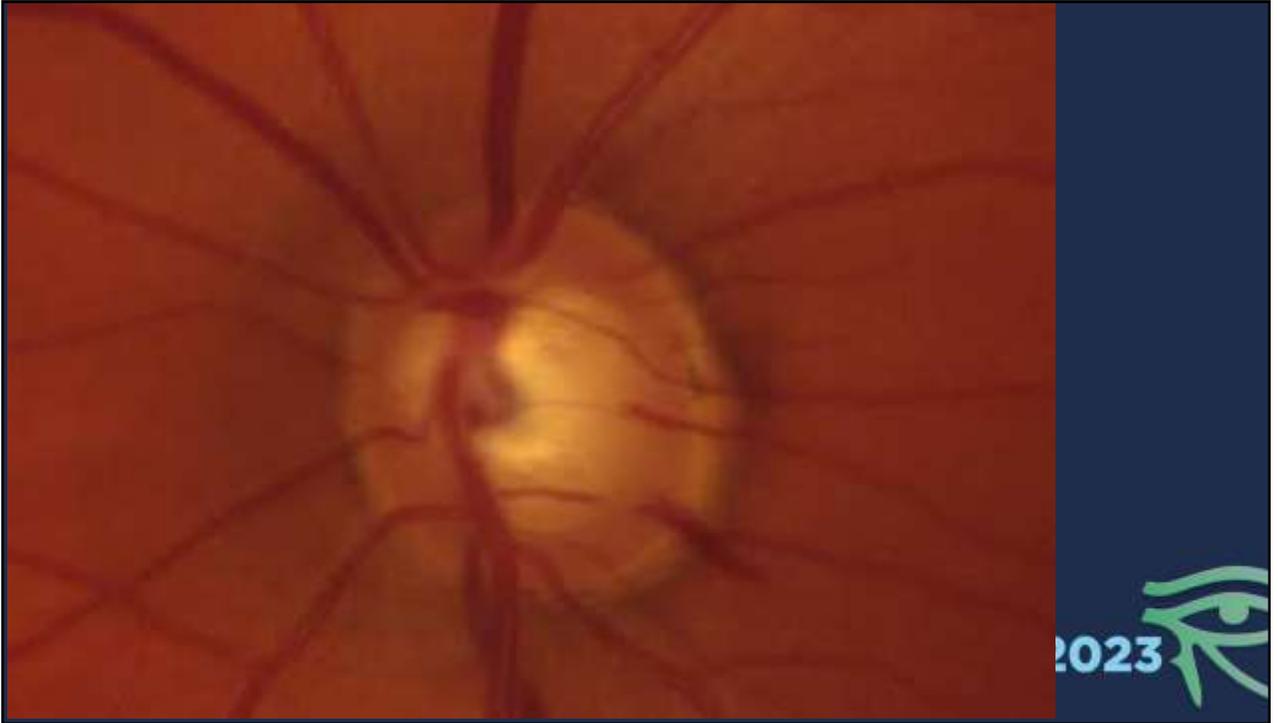


EOS 2023

### Enlargement of the Beta zone & Disc Hemorrhage



EOS 2023



## What will you base your judgement on ?

### • Investigations

- Visual field : shows special characteristics:
  - Appear more advanced than POAG
  - deeper ,steeper and closer to fixation than POAG
- OCT NFL: Thinning





## Who needs neuroimaging?



EOS 2023



## NTG and Neuroimaging

• **There are warning signs that should prompt ordering MRI /CT :**

1. Age :<50 years
2. Unilateral cases
3. Central vision loss / Rapid deterioration
4. Color vision defect
5. Pale neuroretinal rim
6. Neurological field( respect vertical meridian )
7. Other cranial neuropathies

EOS 2023



**CRANIAL NERVE PALS - EXAM FINDINGS**

	← LOOK RIGHT	LOOK STRAIGHT	LOOK RIGHT →
<b>NO PALSY</b>			
<b>RIGHT 3RD NERVE PALS</b>			
<b>RIGHT 4TH NERVE PALS</b>			
<b>RIGHT 6TH NERVE PALS</b>			

**EOS 2023**

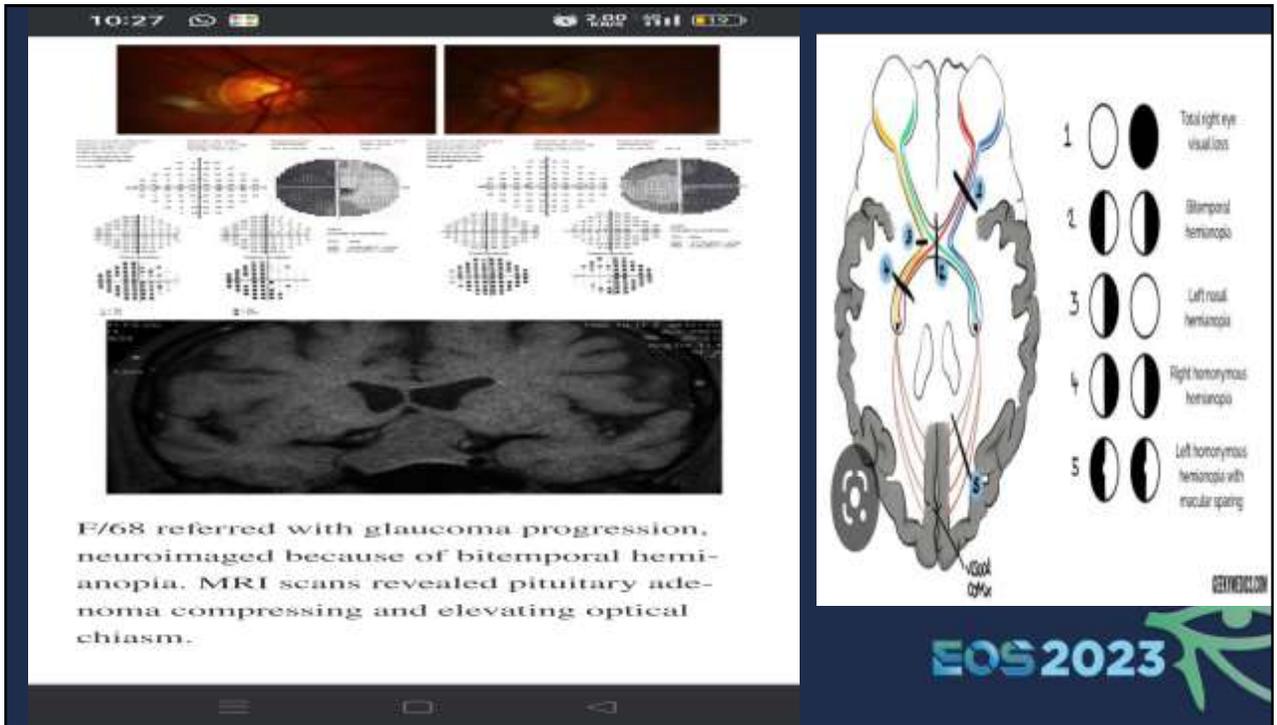
**Remaining neuro-retinal rim is pale (between the dotted lines)**

**Remaining neuroretinal rim is of normal color (between the dotted lines)**

**Peripapillary atrophy**

**Non-glaucomatous**

**Glaucoma**



10:27 2.89

E/68 referred with glaucoma progression, neuroimaged because of bitemporal hemianopia. MRI scans revealed pituitary adenoma compressing and elevating optical chiasm.

1 Total right eye visual loss  
2 Bitemporal hemianopia  
3 Left nasal hemianopia  
4 Right homonymous hemianopia  
5 Left homonymous hemianopia with macular sparing

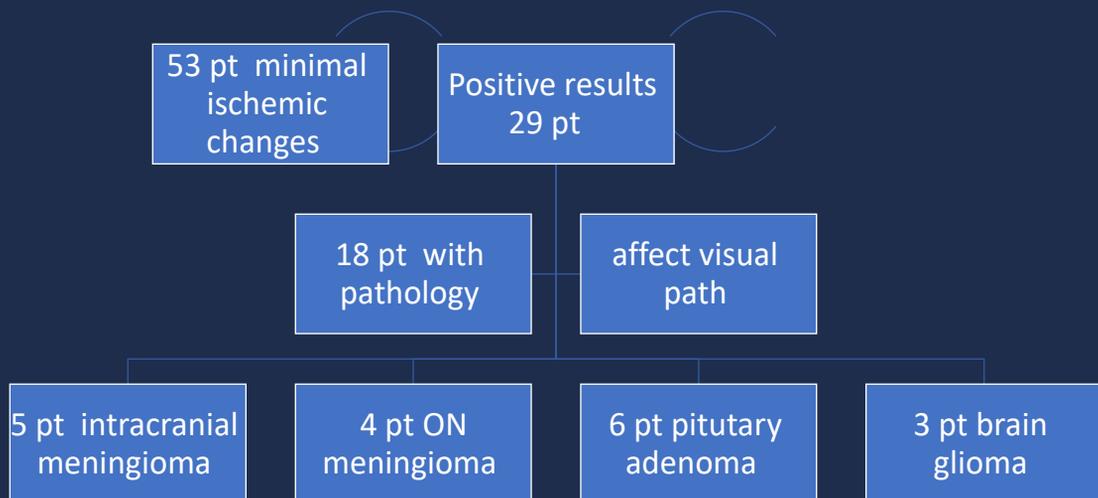
EOS 2023

PMCID: PMC7450348 | PMID: 32908924

**Results of Neuroimaging in Patients with Atypical Normal-Tension Glaucoma**

Ewa Kosior-Jarecka,<sup>1</sup>  
Dominika Wróbel-Dudzińska,<sup>1</sup>  
Radostaw Pietura,<sup>2</sup> Anna Pankowska,<sup>2</sup>  
Beata Szczuka,<sup>2</sup> Iwona Żarnowska,<sup>3</sup>  
Urszula Łukasik,<sup>1</sup> and  
Tomasz Żarnowski<sup>1</sup>

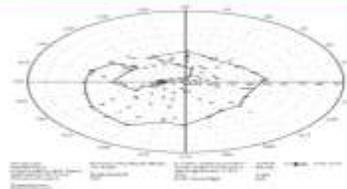
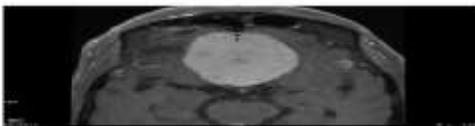
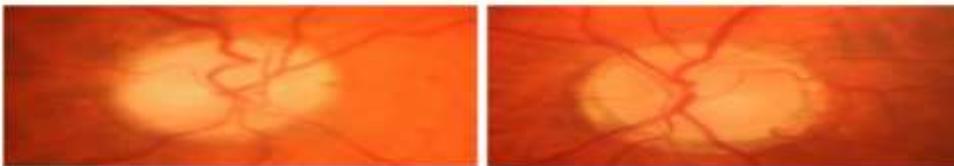
The studied group consisted of 126 NTG patients who met at least one of the following criteria: unilateral NTG, damage in the visual field (VF) inconsistent with optic disc appearance, fast VF progression, worsening of visual acuity, predominant optic disc pallor rather than optic disc excavation, diagnosis under the age of 50, and scotoma in VF restricted by a vertical line. The patients included in the research underwent MRI scans of the brain and both orbits.

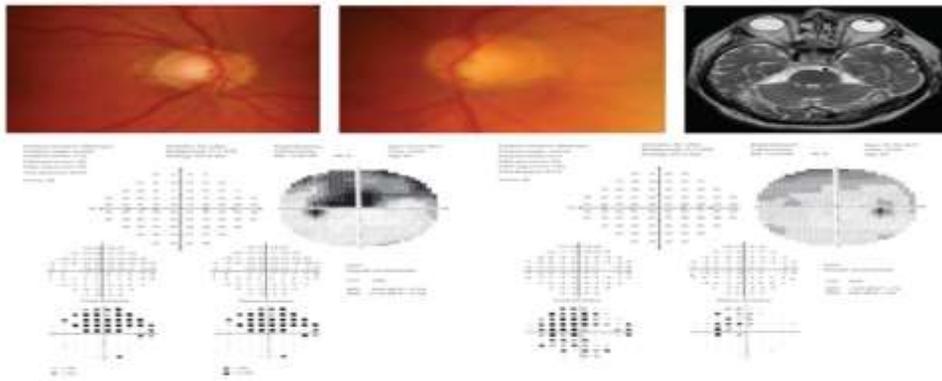


In the case of worsening BCVA or fast VF progression, the frequency of positive results was the highest (50% and 40%), whereas in the case of diagnosis at a young age and unilateral involvement, neuropathology was the rarest (0% and 6.9%).



**M/68 with positive history of glaucoma. The reason for neuroimaging was the decrease in BCVA from BE: RE from 0.8 to no light perception and LE from 0.8 to counting fingers up to 1.5 m with IOP at the level of 8-10 mmHg. MRI scans showed intracranial meningioma with the diameter 5.5 cm.**





**Figure 3**

M/82 neuroimaging was performed because of unilateral NTG. MRI scanning revealed 4 mm hypophyseal adenoma which did not compress the visual pathway.

## NTG and Neuroimaging

- There is **debate** over whether to perform neuroimaging in **typical NTG** or not:
- On one hand : many studies showed that routine neuroimaging has no diagnostic value in typical cases of NTG and should be requested only in cases that are atypical and vision threatening
- On the other hand , fewer studies recommended neuroimaging for all typical NTG patients and found it cost – effective



## Take A Home Message

- ✓ NTG is a disease of elderly pt above 60 yrs with bil optic neuropathy IOP <21mmhg
- ✓ Keep NTG masquarads in your mind
- ✓ Do not miss criteria of atypical NTG
- ✓ MRI brain in A typical NTG is mandatory after a detailed assess of clinical state as intracranial compressive lesions are an important DD

EOS 2023



THANK  
you