Is NTG different from POAG?

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Subset of POAG
Ganglion cell injury

Connective tissue structure within ONH

Ganglion cell susceptibility

Vascular nutrition of ONH

Intraocular pressure

Optic neuropathies

Pressure dependent

Pressure independent

Exfoliation  POAG  NTG  Ischemic

Other

Increased disc susceptibility to IOP

Is NTG a real entity?

AAO Preferred Practice Pattern
Primary Open Angle Glaucoma
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Does not use the term Normal or Low Tension Glaucoma
LET ME BEGIN WITH A SIMPLE, DECLARATIVE conclusion: ocular hypertension and low-normal-tension glaucoma are not clinical entities. They are meaningless statistical constructs that have done more to confuse the diagnosis and management of primary open-angle glaucoma (POAG) than they ever did to enhance it. It is time these terms were put to permanent rest.

History of terminology

- Magic number – 21
- Mean IOP among subjects without glaucoma 15 -16 mm Hg ± 2.5 mm Hg
- Less than 2% of the general population was expected to have an IOP greater than 21 or 22 mm Hg
- UNCOMMON IOP became ABNORMAL IOP
Terminology

• Three entities based on arbitrary cut-off of 21
  – Open angle glaucoma
  – Low tension glaucoma
  – Ocular hypertension

• Diagnosis of POAG solely based on typical glaucomatous optic nerve damage irrespective of IOP
• Risk of glaucoma increases with increasing IOP BUT no single IOP value that distinguishes eyes with and without POAG
Clinically speaking…

- Large overlap between NTG and POAG
- NTG may include eyes with
  - Past elevations in IOP
  - Thin corneas confounding GAT readings
  - Higher IOP outside office hours
  - Higher IOP in supine position

Differences between NTG and POAG

- Numerous studies published with conflicting results
- Most define NTG based on the arbitrary IOP cut-off without regard to CCT or diurnal/supine IOP measurements
Visual field in NTG

- Defects described as denser, steeper and closer to fixation
  - Caprioli and Spaeth. AJO 1986;102:402-4

- Other studies show no difference

- Difference only in one hemifield
  - Araie M.Ophthalmology 1993; 100:1808-14
30 year old Indian male
Baseline untreated IOP – 23/25
CCT 546/550

Optic disc in NTG

- Increased susceptibility to IOP related damage
- No particular disc appearance that is exclusively associated with NTG
- Focal ischemic and senile sclerotic (diffuse, shallow cup) reported as more common
VM

• 57 y.o Russian male
• Diagnosed with glaucoma 1 month ago, highest IOP – 16 OU. Travatan started
• Medical history – Gout, Migraine, meds prn only
• Exam
  – VA 20/25 20/20
  – IOP 13 13
  – CCT 543 544
Optic disc in NTG

• More frequent disc hemorrhages
  – May indicate poor control since substantial IOP lowering difficult to achieve
Optic disc in NTG

• Peripapillary atrophy described as more common in NTG presumably due to local microvascular insufficiency

  Buus and Anderson DR Ophthalmol 1989;96:16-18

• Other studies find no difference in PPA when matched for degree of damage


Ocular blood flow in NTG

• Patients with nocturnal B.P dip of > 20% had higher incidence of VF progression than those with physiological dips (10-20%). Tokunaga et al Jpn J Ophthalmol 2004

• Increased C-reactive protein in NTG when compared to controls. Leibovitch et al. J Glaucoma 2005
Ocular blood flow and NTG

- Several vascular factors have been studied
  - Nocturnal hypotension
  - Autonomic dysregulation (diurnal heart rate and BP variability)
  - Peripheral vasospasm
  - Abnormal optic nerve head microcirculation (various methods)

More similarities than differences

Is management different?
Past history

• Careful history/obtain records to elucidate
  – Causes of past elevation in IOP
    • Steroid use
    • Intraocular surgery
    • Exfoliation (may not be obvious after cataract surgery)
  – Past vascular insult
    • Severe systemic hypotension

IOP

• Multiple IOP measurements to obtain baseline
  – Modified diurnal curve
  – Consider supine IOP measurement
Other factors

- Evaluate potential non-IOP dependent factors
  - Nocturnal hypotension (modifiable at present only in those on antihypertensive treatment)
  - Sleep apnea

Treatment

- Similar to POAG
  - IOP reduction is the mainstay
  - In CNTGS, 30% IOP reduction was associated with visual field stability in 80% of eyes
  - Laser trabeculoplasty less effective with lower baseline IOPs
- Neuroprotection?
Summary

• NTG is a subset of POAG in which the trigger for optic nerve damage occurs at lower IOPs
• Currently, lowering IOP continues to be the main treatment