



# Pression artérielle et glaucome

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**Bruxelles**

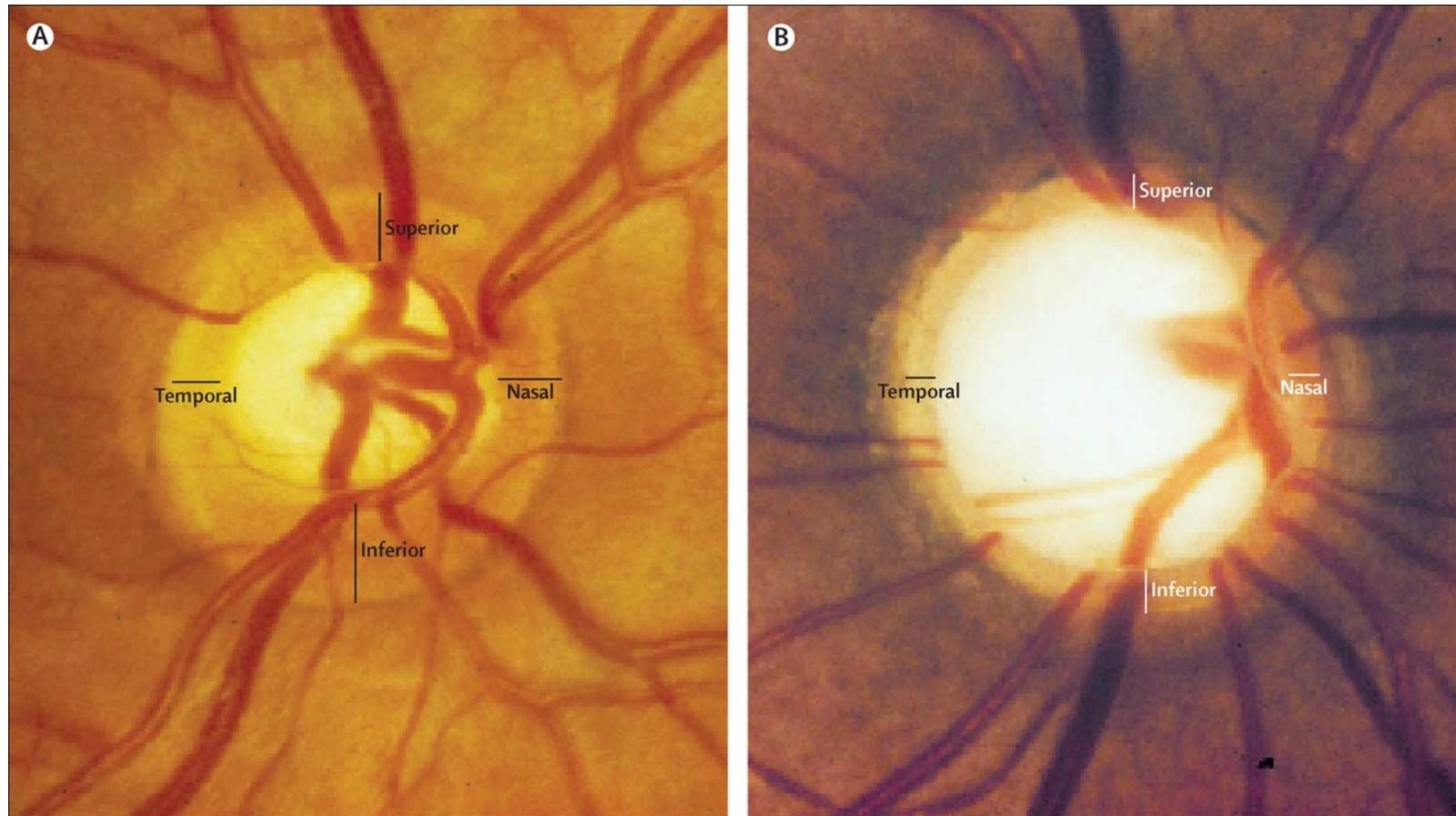
*L'auteur déclare n'avoir aucun conflit d'intérêt concernant les données de sa communication*

# Pression artérielle et glaucome

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- Pression artérielle et glaucome : pourquoi ?
- HTA → glaucome ?
- Dipping → progression du glaucome ?
- Anti-HT et pression intra-oculaire
- Que faire ?

## Glaucoma : optic neuropathy leading to ↓ visual field



Jonas JB et al. Lancet 2017 ; 390 : 2083-93

## Risk factors for primary open-angle glaucoma (POAG)

Increased IOP

Age

Severe myopia

Ethnicity

...

Arterial hypertension

Diabetes mellitus

Body mass index

...

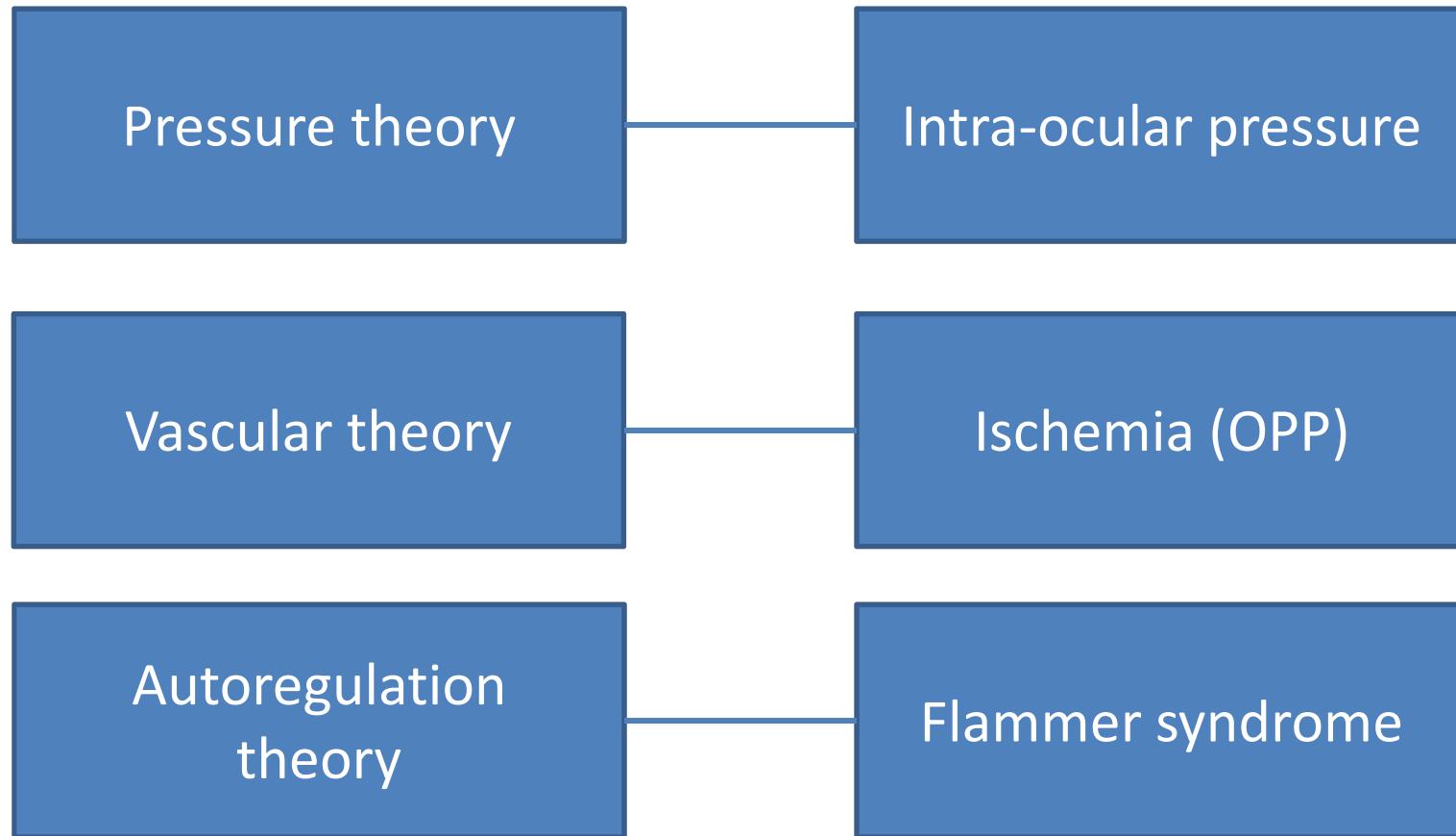
# Physiopathologie du glaucome

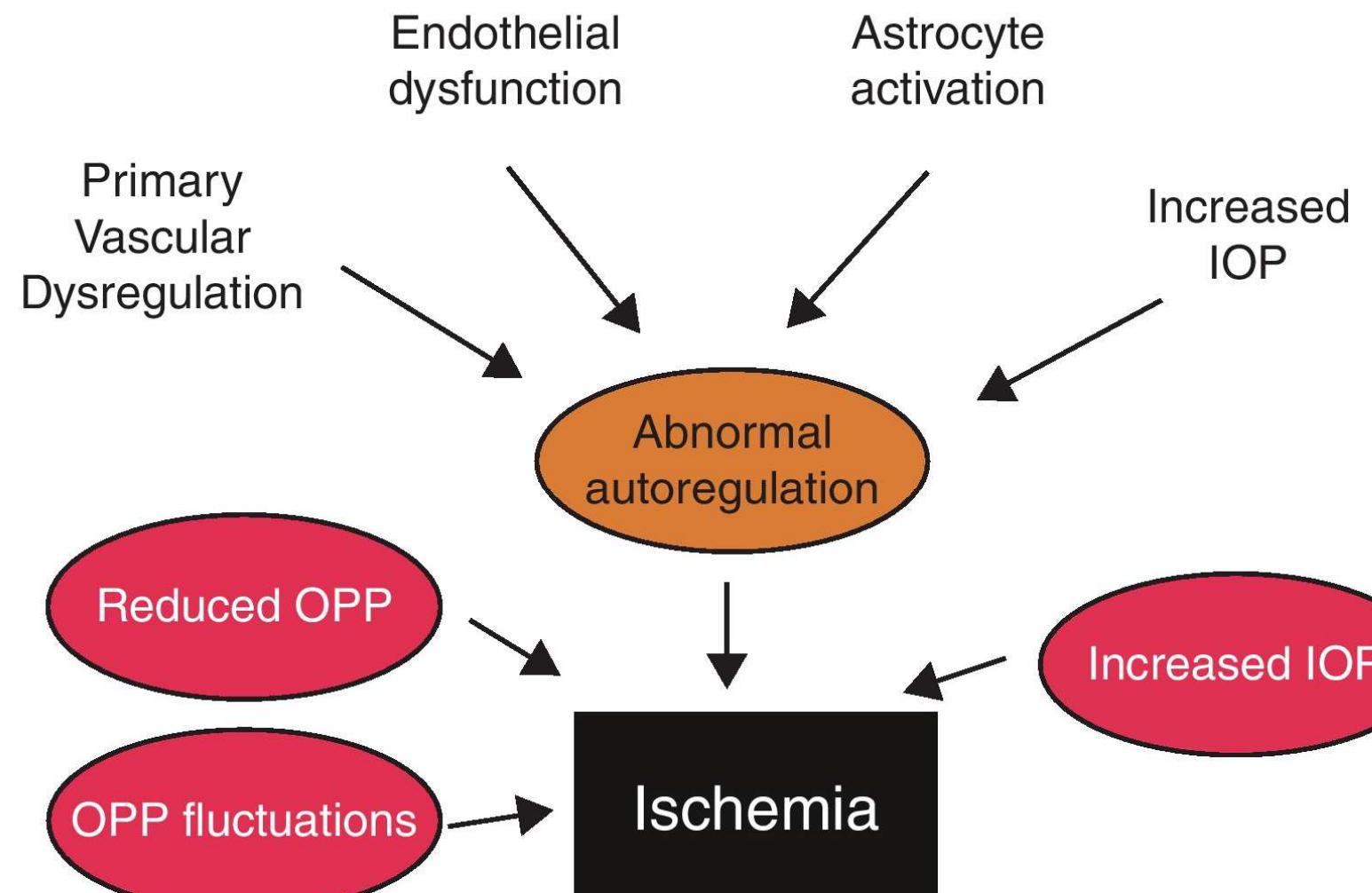
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- Ce n'est pas que la pression intraoculaire :
  - Glaucome à PIO normale
  - Progression ↘ CV malgré ↘ PIO sous traitement
- Donc, c'est plus compliqué !

# BP and glaucoma : why ?

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Current Opinion in Pharmacology

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# Glaucome : critères de jugement

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P intraoculaire

Surrogate end-point

P artérielle

Neuropathie optique

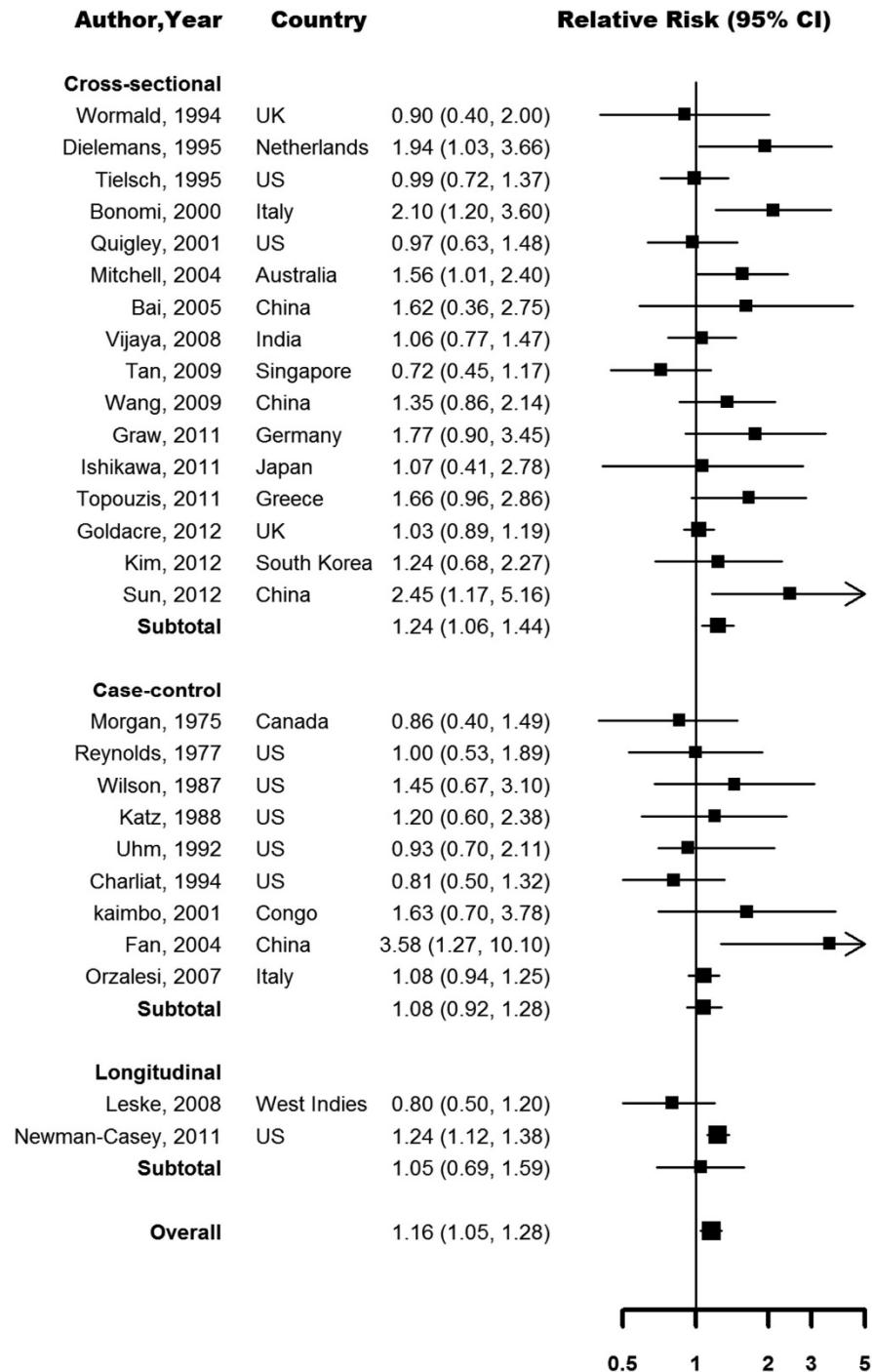
Intermediate  
end-point

HVG

Champ visuel

Hard end-point

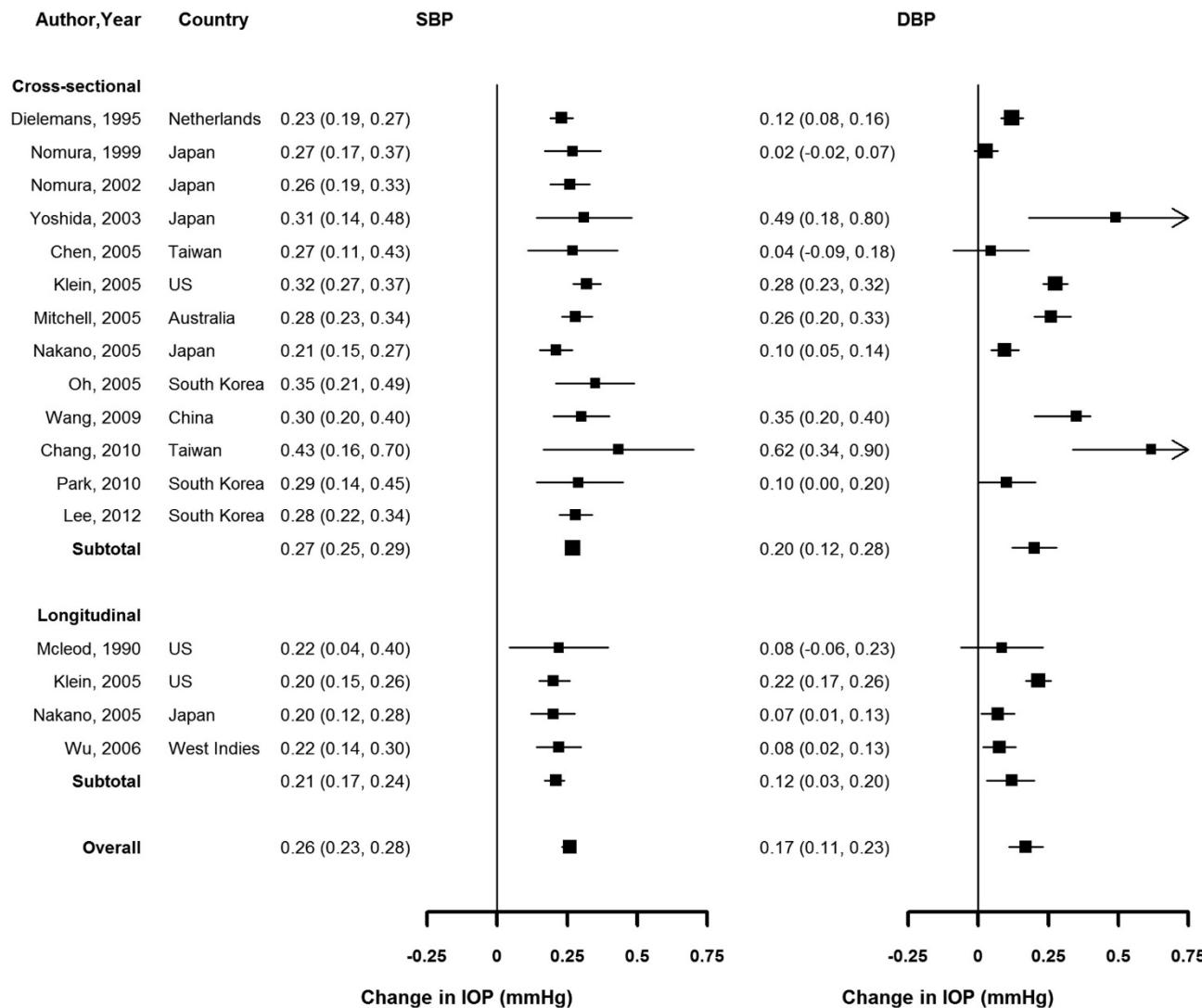
Morbi-mortalité



L'HTA augmente (modérément) le risque de glaucome

Zhao D et al.  
Am J Ophthalmol 2014 ; 158 : 615-627

## Increase in IOP associated with $\geq 10$ mm Hg SBP or 5 mm Hg DBP



# L'HTA augmente (modérément) le risque de glaucome

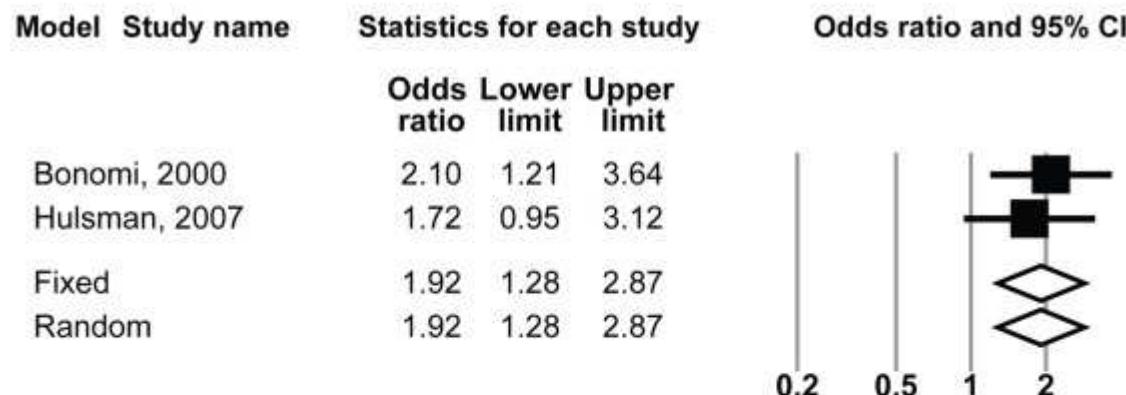
Model	Study name	Statistics for each study			Odds ratio and 95% CI
		Odds ratio	Lower limit	Upper limit	
	Tielsch, 1995	0.99	0.72	1.37	
	Bonomi, 2000	1.40	0.90	2.19	
	Quigley, 2001	0.97	0.63	1.49	
	Ramakrishnan, 2003	1.00	0.50	2.00	
	Mitchell, 2004	1.56	1.01	2.41	
	Vijaya, 2005	1.02	0.60	1.74	
	Suzuki, 2006	1.67	1.14	2.44	
	Hulsman, 2007	1.29	0.92	1.81	
	Leske, 2008	1.36	0.97	1.91	
	Vijaya, 2008	1.10	0.71	1.71	
	Wang, 2009	1.35	0.86	2.13	
	Tan, 2009	0.72	0.45	1.16	
	Garudadri, 2010(1)	0.97	0.45	2.08	
	Garudadri, 2010(2)	1.20	0.65	2.21	
	Ishikawa, 2011	1.07	0.41	2.79	
	Topouzis, 2011	1.43	0.70	2.92	
	Sun, 2012	2.45	1.17	5.15	
Fixed		1.22	1.09	1.36	
Random		1.22	1.08	1.37	



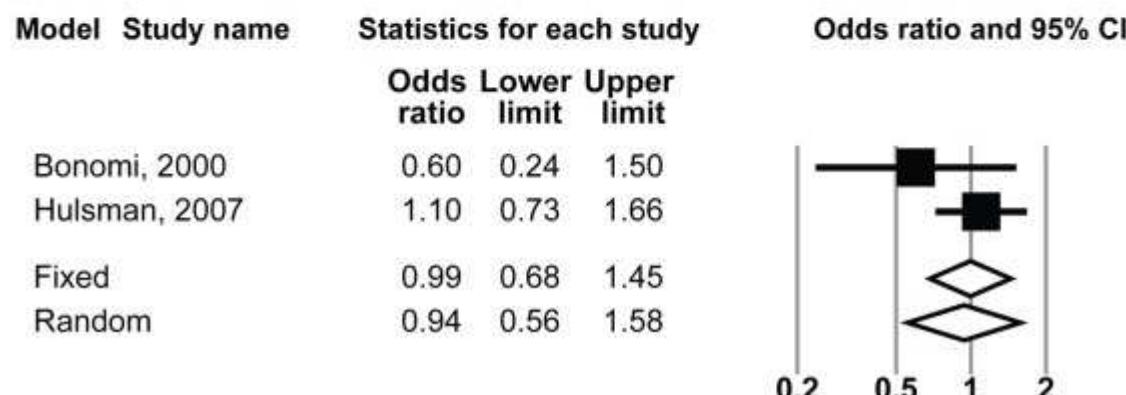
Arterial HT increases the risk of HT glaucoma (A) but not that of NT glaucoma (B)

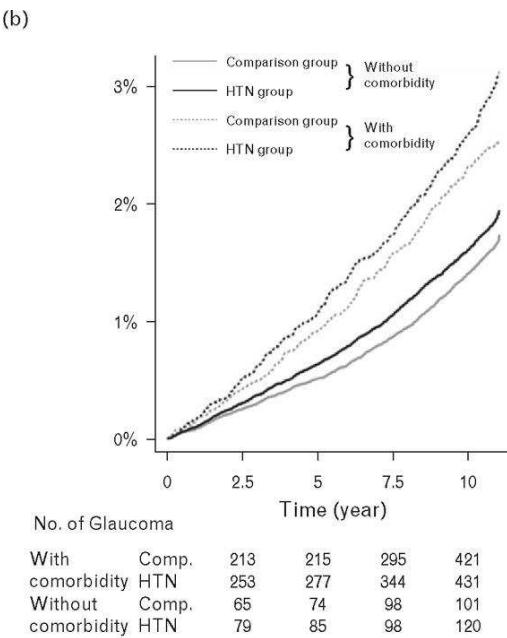
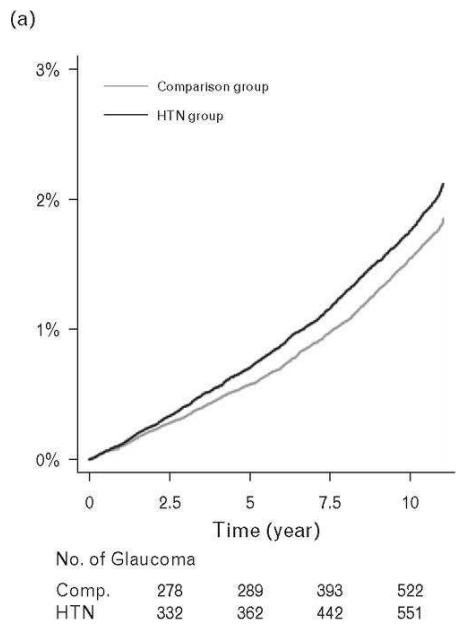
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A

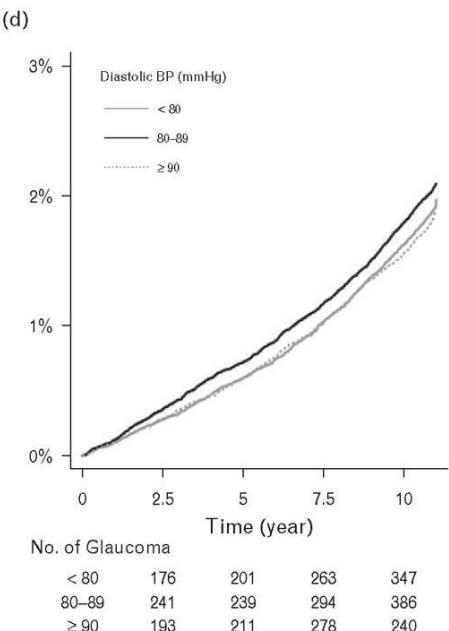
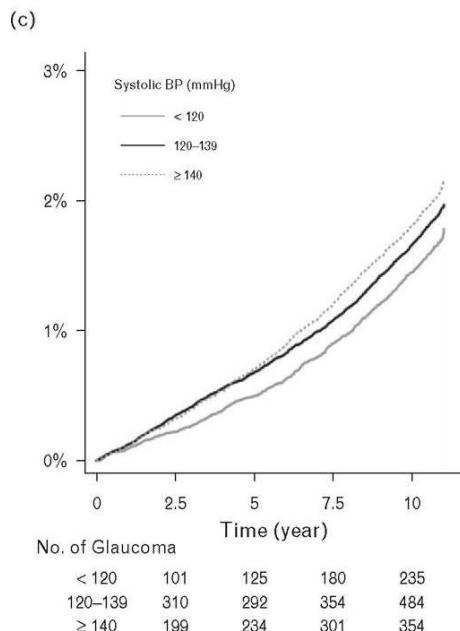


B





**Adjusted HR 1.16**  
95 % CI 1.09 – 1.24



## HT and glaucoma prevalence : possible mechanisms

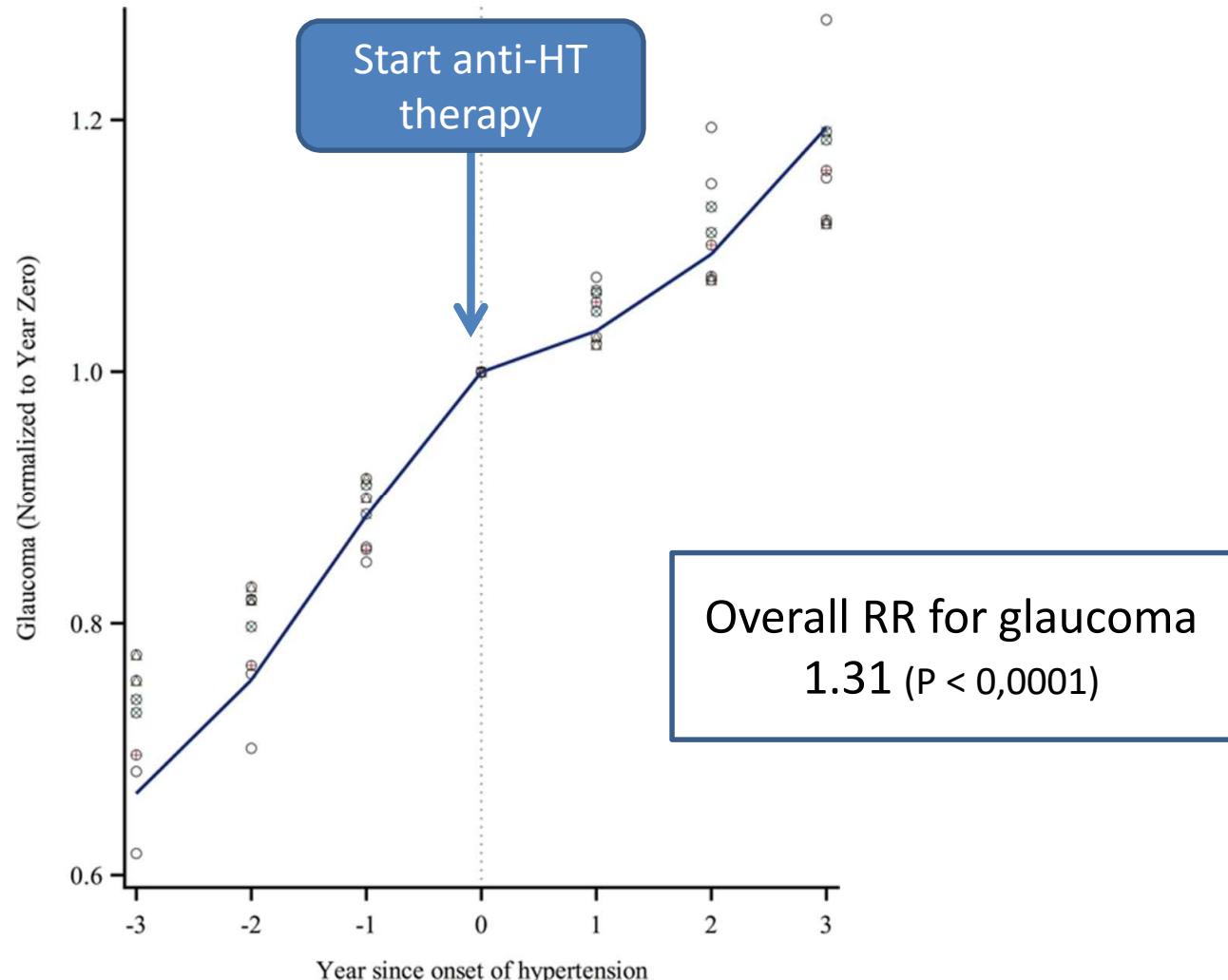
- ↗ aqueous production < HT-related ↗ ciliary body perfusion
- ↘ optic nerve perfusion < microvascular narrowing
- ↘ auto-regulation optic nerve perfusion
- HT therapy ↘ optic nerve perfusion

Zhao D et al. Am J Ophtalmol 2014

Bae HW et al. PloS One 2014

RimTH et al. J Hypertens 2017

## Discontinuity in glaucoma development at time of HT (data 1996 – 2012, n = 41,235)



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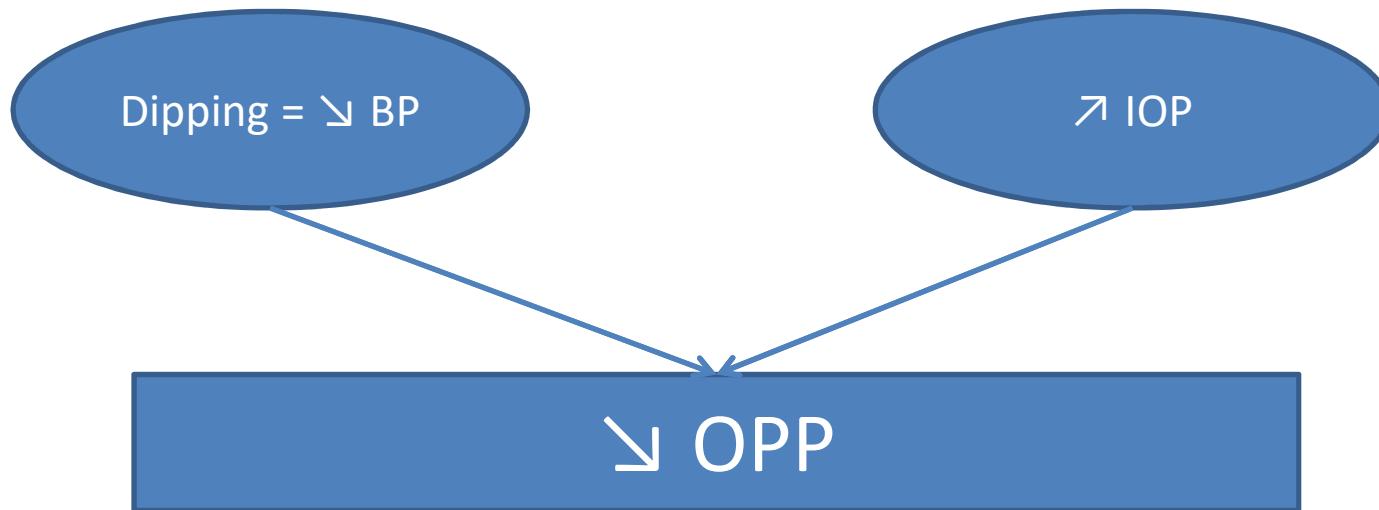
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# Ocular perfusion pressure = BP - IOP

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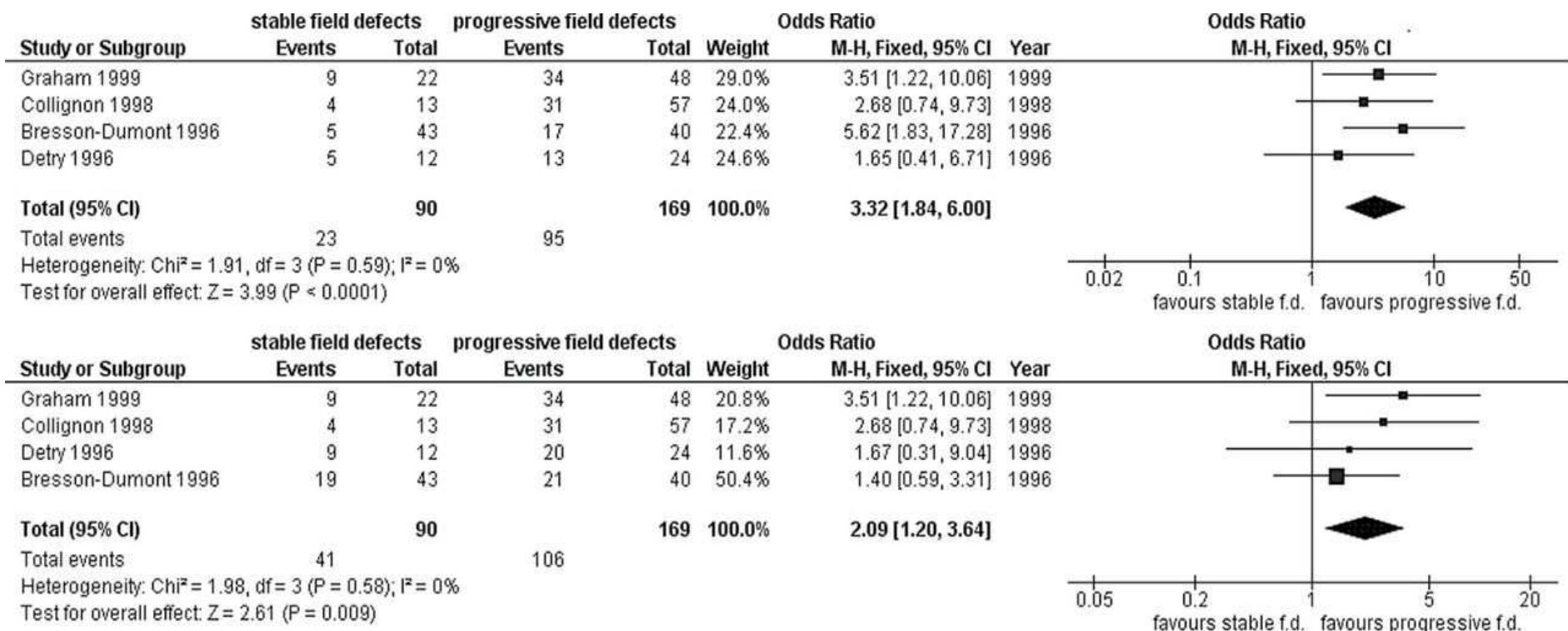


Asleep ... supine

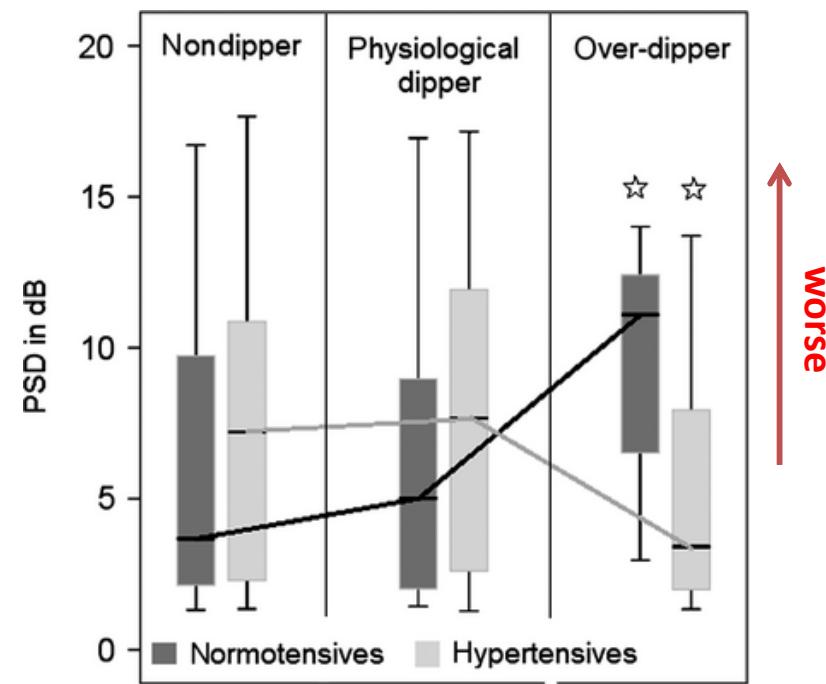
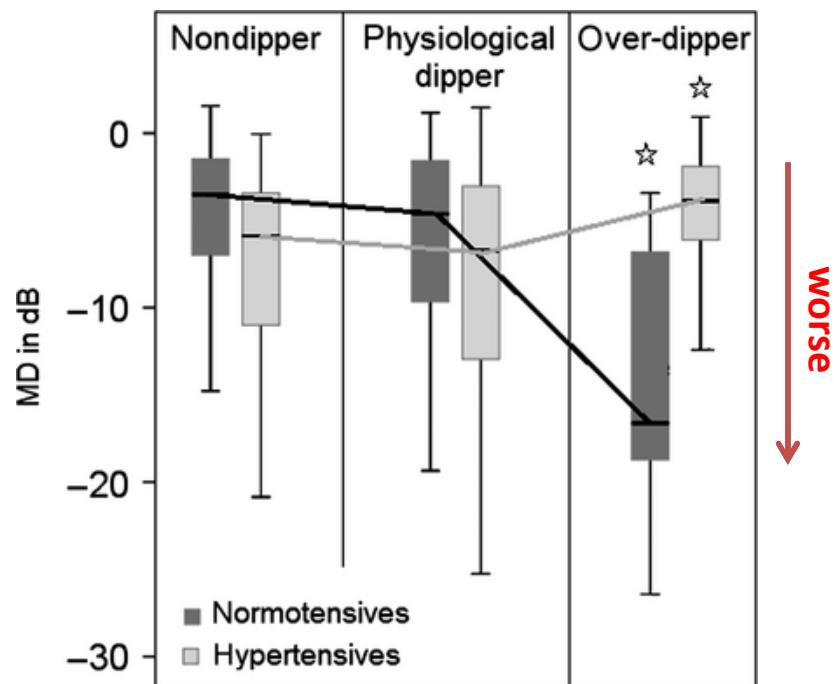


# OR for ↓ VF over 2 years with nocturnal dips > 10 % (SBP or DBP)

## Systematic review and meta-analysis



# Nocturnal extreme dippers (> 20 %) have more VF loss : only patients with normal daytime BP



NT = 112  
HT = 202

Pillunat KR et al. Acta Ophtalmol 2015 ; 93 : e621-26

Nocturnal extreme dippers (> 20 %) have more VF loss : only patients with normal daytime BP

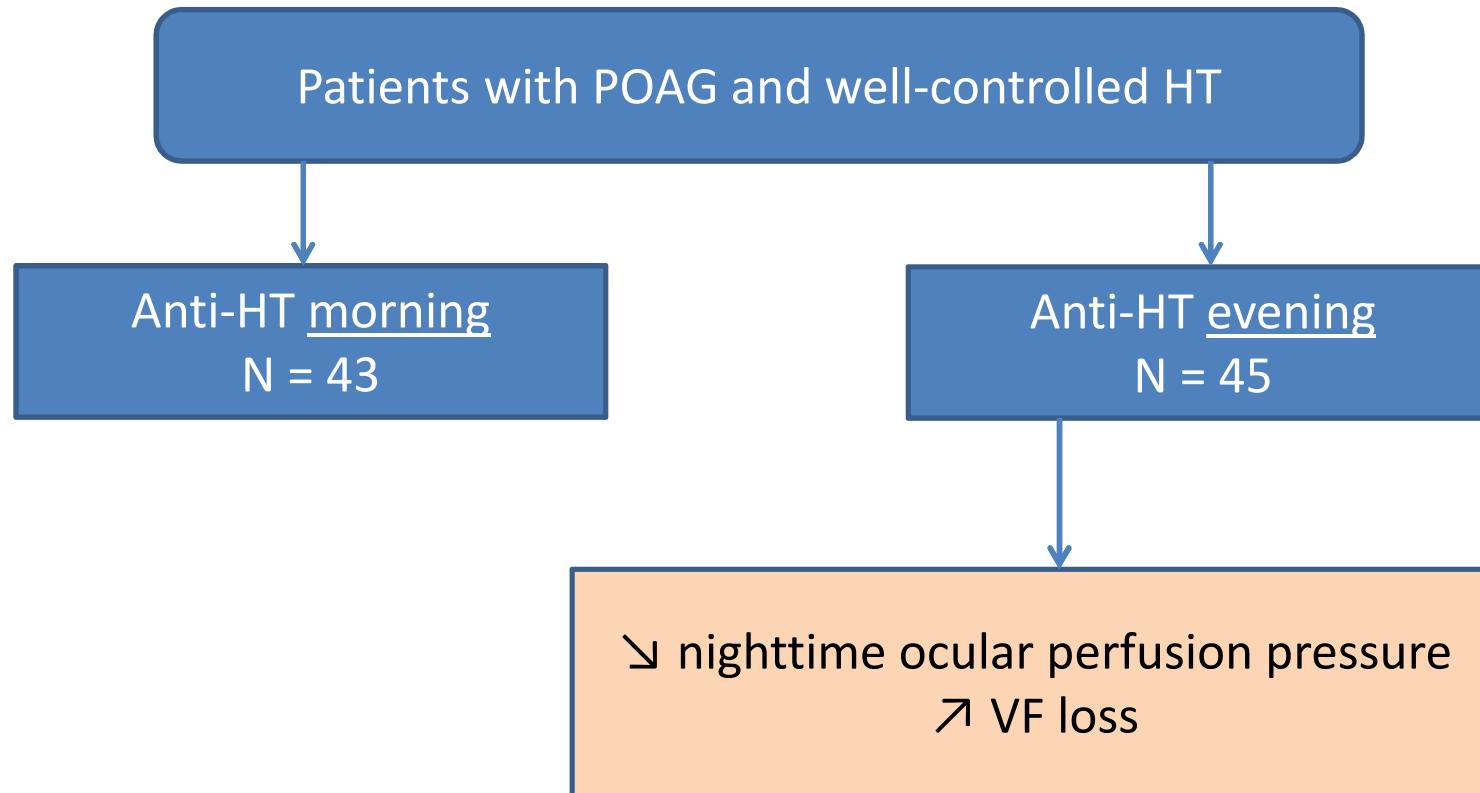
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Daytime normotension (n = 112)		
	Day	Night
SBP (mm Hg)	125	113
DBP (mm Hg)	75	66
Daytime hypertension (n = 202)		
	Day	Night
SBP (mm Hg)	149	129
DBP (mm Hg)	85	73

« Dresden safety range » = mean nocturnal BP 65 – 90 mm Hg  
(Mean IOP = 15 mm Hg)

# Evening anti-HT intake worsens POAG evolution

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## Anti-HT and IOP

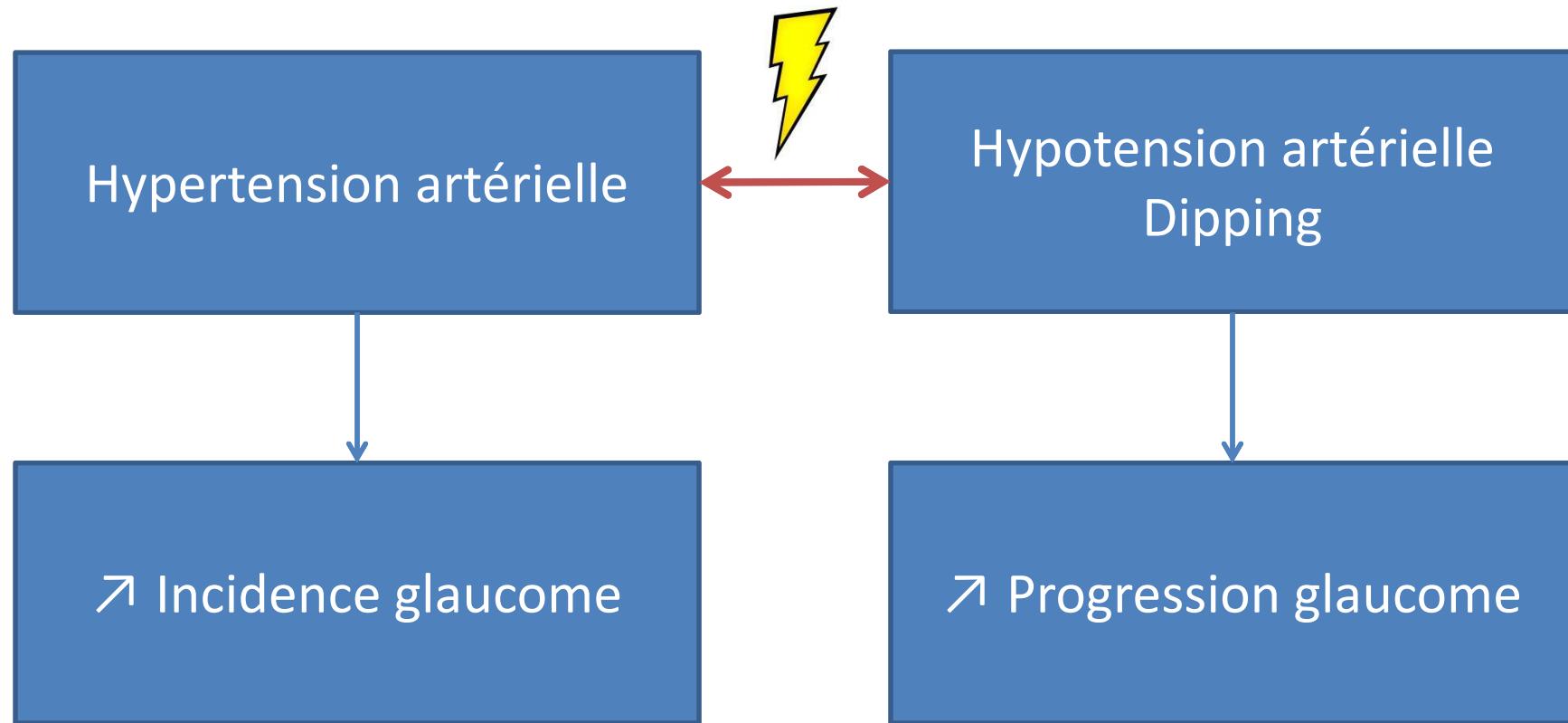
EPIC-Norfolk Eye Study Ophthalmology 2014	7 093	≠ glaucoma therapy	B Blockers ↓ Nitrates ↓
Singapore Epidemiology of Eye Diseases Study JAMA Ophthalmol 2017	10 033	Glaucoma + ...	B Blockers ↓ ACEI ↗
Gutenberg Health Study Br J Ophthalmol 2017	13 527	Population ≠ glaucoma therapy	Non selective B Blockers ↓ (trend)
National Danish Registry Hypertension 2017	40 235	Glaucoma and HT therapy	All (≠ hydralazine)

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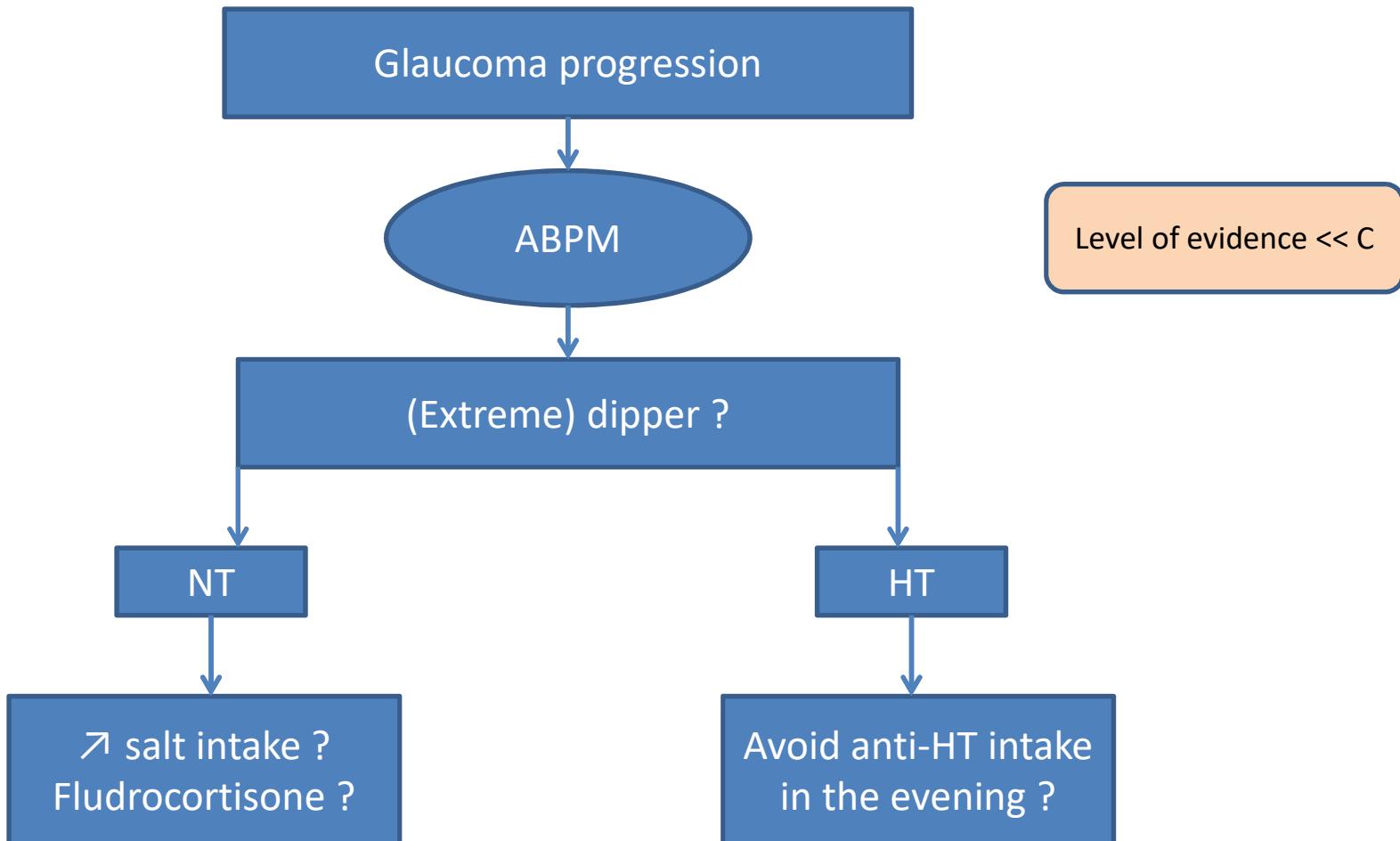
# Pression artérielle et glaucome : conclusion (1)



Levine RM et al, Curr Cardiol Rep 2017 ; 19 : 109

Martin-Du Pan R et al, Rev Med Suisse 2016 ; 12 : 1518-1521

# Pression artérielle et glaucome : conclusion (2)



Adapted from Levine RM et al, Curr Cardiol Rep 2017 ; 19 : 109

HTA = ↑ risque CV  
HTA contrôlée = ↓ risque CV



# Merci pour votre attention

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