



Efficacy of Pneumotrabeculoplasty in Primary Open Angle Glaucoma and Ocular Hypertension

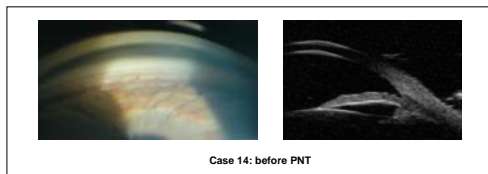
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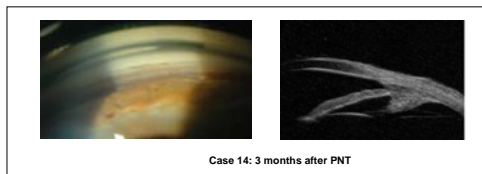
Purpose: To evaluate the efficacy and safety of Pneumotrabeculoplasty (PNT) in the treatment of Primary Open Angle Glaucoma (POAG) and Ocular Hypertension (OH)

Materials & Methods: From June 2005 to September 2006, 25 eyes of 19 patients, affected by bilateral POAG or OH were treated by PNT. All patients aged more than 65 years, had visual acuity 1.0, refraction $\leq \pm 2D$, IOP between 20 and 25 mmHg (with two topical therapies), C/D < 0.6, MD < 12 dB (24-2 full threshold, Humphrey visual field). Exclusion criteria were: presence of other ocular pathologies or therapies, previous ocular para-surgical or surgical treatments, alterations of the anterior chamber angle, retinal periphery and optic nerve. Patients with diastolic blood pressure < 70 mmHg, previous vascular occlusion and other circulatory pathologies were also excluded. In topical anaesthesia, with the patient in supine position, a disposable plastic suction ring, connected to a vacuum pump (PNT Unit 1000-Coronado, Ophthalmic International Inc, Fountain Hills, Arizona, USA) was applied on the eye. Vacuum, settled to 20 inches, was applied for 60 seconds, and then the ring removed; the procedure was repeated after 5 minutes. The whole treatment was repeated after 1 week. All patients give informed consent.

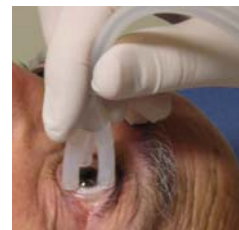
Pre-operative treatment was diclofenac eyedrops (TID) for 2 days; after the treatment, the patients received topical treatment with diclofenac (TID) and tobramycin (TID) for 7 days and tetrazoline (TID) 2 days. Hypotonizing therapy was always continued. Patients were treated in one eye (that with higher IOP, in the right one if equal), and fellow eye was used initially as control; following, PNT was performed in 6 fellow eyes with IOP not controlled by medical therapy (in 1 after 3 months, and in 5 after 6 months). The following parameters were evaluated after 1 week and 1, 3, 6 and 9 months: intraocular pressure, visual acuity, visual field, anterior and posterior segment findings, anterior chamber angle (by gonioscopy and UBM). At each visit, two consecutive IOP measurements were performed, and the mean value was considered; if IOP differed by more than 2 mmHg, a third measurement was taken and the median was considered.



Case 14: before PNT



Case 14: 3 months after PNT



Results: Mean follow-up was 8.2 ± 2.2 months. Compared to baseline value, the IOP reduced significantly (ANOVA $p=0.000$) in PNT treated eyes ($p<0.01$ Tukey-Kramer test at each time point), while no significant change was seen in control eyes. (fig 1) Compared with baseline values, the mean IOP decrease and the number of eyes with IOP decrease $\geq 20\%$ were respectively:

at 1 week :	-4.4 \pm 2.3 mmHg	(-19.1 \pm 10.1%)	15/25 eyes (60%)
at 1 month:	-4 \pm 1.6 mmHg	(-17.5 \pm 6.9%)	13/25 eyes (52%)
at 3 months:	-3.9 \pm 2.1 mmHg	(-17.2 \pm 9.2%)	12/25 eyes (48%)
at 6 months:	-3.7 \pm 1.7 mmHg	(-15.9 \pm 6.7%)	6/19 eyes (32%)
at 9 months:	-3.2 \pm 1.7 mmHg	(-13.9 \pm 7.2%)	3/11 eyes (27%).

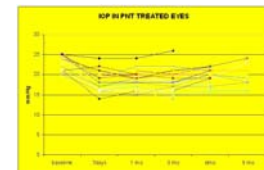
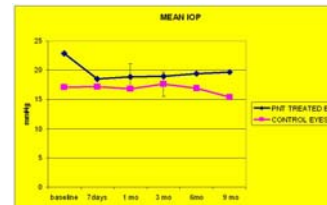
In eyes with clinically significant IOP reduction, the hypotonizing effect lasted 4.2 ± 2.9 months; after 9 months 8/11 PNT treated eyes had IOP ≤ 20 mmHg without additional therapy.

One eye with no effect on IOP received ALT, and two eyes additional medical therapy. After the treatment no patients had visual acuity reduction and ocular inflammation; in 5 eyes a sub-conjunctival hemorrhage was found. No posterior segment changes and visual field progression were detected after the treatment. No changes were found in anterior chamber angle.

Conclusions: Pneumotrabeculoplasty is an easy and well tolerated technique allowing a significant IOP reduction (Avalos 2005, Bucci 2005), probably by an increase of outflow. After 3 months an IOP decrease > 20% was found in nearly 50% of the eyes; in none of the cases was possible to reduce the number of hypotonizing drugs. In patients with mild visual field damage, no progression was found, according with data obtained after LASIK (Whitson 2003, Dementev 2004, Ozdamar 2005). Further studies should clarify the mechanism of action of PNT, the features of responders patients, and the efficacy and safety of retreatments.

References:
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 Bucci Mg, Cerofolini M, Oskone F, et al. Pilot study to evaluate the efficacy and safety of pneumatic trabeculoplasty in glaucoma and ocular hypertension. Eur J Ophthalmol 2006; 15:347-352
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patient	age	gender	diagnosis	therapy	IOP PNT TREATED EYE					IOP CONTROL					Height	Systolic	diastolic	
					Baseline	1 week	1 mo	3 mo	6 mo	9 mo	Baseline	1 week	1 mo	3 mo				6 mo
1	70	M	POAG	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	22	170	120	80
2	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
3	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
4	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
5	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
6	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
7	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
8	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
9	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
10	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
11	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
12	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
13	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
14	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
15	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
16	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
17	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
18	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
19	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
20	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
21	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
22	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
23	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
24	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
25	70	M	OH	timolol 0.5% 2x	22	18	18	18	18	18	22	22	22	22	170	120	80	
MEAN					22.4	18.2	18.2	18.2	18.2	18.2	22.4	22.4	22.4	22.4	170	120	80	
ST DEV					1.8	2.8	2.1	2.8	2.1	2.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	



	N	months					
		Baseline	1 mo	3 mo	6 mo	9 mo	9 mo
PNT TREATED EYES	MEAN	22.4	18.2	18.2	18.2	18.2	18.2
	ST DEV	1.8	2.8	2.1	2.8	2.1	2.2
CONTROL EYES	MEAN	17.0	17.0	17.0	17.0	17.0	17.0
	ST DEV	1.0	1.0	1.0	1.0	1.0	1.0

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