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Research Paper

RELATIONSHIP BETWEEN LONG-TERM USE OF INTRANASAL STERIOD ON VISUAL ACUITY AND VERTICAL CUP DISC RATIO

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Abstract

To determine the relationship between intra nasal steroids and visual acuity /vertical cup disc ratio in patients treated with intranasal steroids in University of Port Harcourt Teaching Hospital, Nigeria. This was a prospective study conducted in the Ophthalmology and Otolaryngology clinics of the University of Port Harcourt Teaching Hospital. The study comprised of 80 study subjects on intra nasal steroids for the treatment of allergic rhinitis in the Otolaryngology clinic of the hospital, these subjects also served as control. The Visual Acuity and the Optic Nerve Head (Vertical Cup Disc Ratio) assessment of the patients were evaluated before they commenced the use of intra nasal steroids therapy. Study participants had their visual acuity evaluated once a month over 3 months and their Vertical Cup Disc ratio re-assessed after 3 months of steroid medication. Patients on other forms of steroids as well as risk factors for glaucoma were excluded. Data analysis was performed using the IBM statistical Package of Social Sciences (SPSS) version 25. Statistical significance was set at 0.05. There were 160 eyes of 80 subjects in this study comprising 41 males and 39 females (M: F = 1.1:1). The visual Acuity and Vertical Cup Disc Ratio changes in both eyes were not statistically significant over the 3 month study period. This study shows no statistically significant changes in the visual acuity and Vertical Cup Disc Ratio of eyes of patients on intra nasal steroid therapy over a 3-month period.

Key words: Intra Nasal Steroids; Visual Acuity; Vertical Cup Disc Ratio.

INTRODUCTION

Intranasal steroid use is wide spread due to high prevalence of allergic rhinitis. Its local side effects such as nasal irritation are well known but its potential effects on vision as less well known [1]

Central serous chorioretinopathy has been reported in susceptible individuals following use of intra nasal steroids and individuals using these drugs should be alerted to the possible relationship [1, 2]

Intra nasal steroids may also be linked to long term elevation of intra ocular pressure especially in susceptible individuals [3] and if not checked over time may result in glaucoma [4].

Prolonged use of corticosteroids is a significant risk factor for the development of posterior sub capsular cataract [5]

There is paucity of data on the relationship between intra nasal steroids and visual acuity as well as its effect on vertical cup disc ratio. The purpose of this study is therefore to generate much needed data and contribute to knowledge in this regard.

METHODOLOGY:

This was a prospective study conducted in the Ophthalmology and Otolaryngology clinics of the University of Port Harcourt Teaching Hospital.

All the Study-participants gave a verbal consent to participate while there were at liberty to exit from the study at any point. Ethical clearance was obtained from the University of Port Harcourt Research Ethics Committee.

The study comprised of 80 study subjects on intra nasal steroids for the treatment of allergic rhinitis in the Otolaryngology clinic of the hospital.

The Visual Acuity and the Optic Nerve Head (Vertical Cup Disc Ratio) assessment of the patients were evaluated before they commenced the use of intra nasal steroids therapy.

Study participants had their visual acuity evaluated at baseline using a literate Snellen Visual acuity chart, a comprehensive ocular examination at the slit lamp biomicroscope looking out for lens changes, media changes and fundal pathologies, this was repeated once a month over 3 months while their vertical cup disc ratio (VCDR) was assessed at baseline and re-assessed after 3 months of steroid medication via +78 D dilated slit lamp biomicroscopy.

Patients on other forms of steroids, those with media opacities as well as risk factors for glaucoma were excluded.

Data analysis was performed using the IBM statistical Package of Social Sciences (SPSS) version 25. Statistical significance was set at 0.05.

All the assessments were done by one ophthalmologist to avoid intra-observers' error. Analysis of data was performed using IBM Statistical Package of Social Sciences version 25. Means and standard deviation were used to summarize numerical data while categorical data were presented as frequencies and proportions. The differences in means were compared between the pre-treatment and post-treatment ocular parameters using paired t-test statistics. Statistical significance was set at an alpha level of 0.05.

RESULTS

The study comprised of 80 patients who received 0.05% (50 micrograms) fluticasone propionate intra-nasal spray for allergic rhinitis. The mean age of the study-participants was 23.04 ± 1.25 years. Age range was 18 to 38 years. There was no statistical difference between the ages of both genders in the study population (p-value=0.072)

Table 1 Age and Gender characteristics of patients in the study population

Age Group (yrs)	Gender		Total (%)	P-value
	Male (%)	Female (%)		
11-20	5 (6.3)	10 (12.5)	15 (18.8)	0.072
21-30	35 (43.7)	27 (33.8)	62 (77.5)	
31 and Above	1 (1.2)	2 (2.5)	3 (3.7)	
Total	41 (51.2)	39 (48.8)	80 (100)	

Table 2. Comparison of visual acuity (VA) findings expressed in the Right Eye at Baseline and different time periods of intra-nasal spray medication

Time Period Visual Acuity	Baseline Total=80 n (%)	I Month Total=80 n (%)	2 Months Total=80 n (%)	3 Months Total=80 n (%)	Paired t-Test	p-value
6/4	10 (12.5)	2 (2.5)	- (0)	- (0)	1.542	0.463
6/5	32 (40.0)	40 (50.0)	30 (37.5)	40 (50.0)	0.069	0.966
6/6	30 (37.5)	34 (42.5)	44 (55.0)	30 (37.5)	2.196	0.334
6/9	8 (10.0)	4 (5.0)	6 (7.5)	8 (10.0)	1.484	0.476
6/12	- (0)	- (0)	- (0)	2 (2.5)	0.194	0.909

Table 3. Comparison of visual acuity (VA) findings expressed in the Left Eye at Baseline and different time periods of intra-nasal spray medication

Time Period Visual Acuity	Baseline Total=80 n (%)	I Month Total n (%)	2 Months Total n (%)	3 Months Total n (%)	Paired t-Test	p-value
6/4	4 (5.0)	4 (5.0)	2 (2.5)	- (0)	0.258	0.879
6/5	46 (57.5)	34 (42.5)	30 (37.5)	32 (40.0)	1.176	0.556
6/6	30 (37.5)	40 (50.0)	42 (52.5)	38 (47.5)	1.394	0.498
6/9	- (0)	2 (2.5)	6 (7.5)	8 (10.0)	1.469	0.480
6/12	- (0)	- (0)	- (0)	2 (2.5)	1.500	0.472

Table 4. Comparison of VCDR findings in the Right Eye among intra-nasal spray recipients at baseline and 3-month follow-up

Time Period VCDR	Baseline Total=80 n (%)	3 Months of intranasal spray use Total=80 n (%)	Paired t Test	p-value
0.3	40 (50.0)	34 (42.5)	0.013	0.993
0.4	32 (40.0)	34 (42.5)	0.003	0.998
0.5	8 (10.0)	12 (15.0)	0.080	0.961

Table 5. Comparison of VCDR findings in the Left Eye among intra-nasal spray recipients at baseline and 3-month follow-up

Time Period VCDR	Baseline Total=80 n (%)	3 Months of intranasal spray use Total=80 n (%)	Paired t Test	p-value
0.3	40 (50.0)	38 (47.5)	0.002	0.999
0.4	32 (40.0)	30 (37.5)	0.003	0.998
0.5	8 (10.0)	12 (15.0)	0.080	0.961

DISCUSSION:

The safety and efficacy of intra nasal corticosteroids (INCS) are well known but little is known about its effect on ocular structures. In a meta-analysis Valenzuela et al [6] concluded use of INCS was not associated with a significant risk of elevating Intra ocular pressure (IOP) or developing a posterior sub capsular cataract in patients with allergic rhinitis.

This was in contrast to a case report by Liu A et al who reported bilateral posterior sub capsular cataracts in a young healthy patient with a history of long term nasal steroid use[7] , Jie Jin Wang et al [8] also concluded that high long term risks of posterior sub capsular and nuclear cataracts development exist for users of combined inhaled and

oral corticosteroids while RG Cumming et al [8] reported a causal association in adults between use of inhaled corticosteroids and risk of posterior sub capsular cataract.

Visual acuity from a technical standpoint is limited by diffraction, optical aberrations and photoreceptor density in the eye. [9]

Diffraction and optical aberrations can result from corneal and lens changes while photoreceptor changes result from retina changes.

Central Serous Chorioretinopathy is a non-inflammatory serous detachment of the neurosensory retina usually at the macula. The pathogenesis is not fully known but it may be due to a combination of leakage from retinal pigment epithelium (RPE) and dysfunctional RPE ion-pump function. This rare ocular condition has been linked with intra nasal steroid use [1, 2, 10, 11]

Our study did not show any statistically significant changes in the visual acuity or changes in Vertical Cup Disc Ratio of right or left eyes of patients on intra nasal steroid therapy between baseline and over a 3-month(90 day) period.

In a study comparing ocular safety of once daily fluticasone furoate (110µg) over 2 years there was no significant association with lens opacities, intra ocular pressure elevation, changes in baseline visual acuity as well as VCDR in treatment groups [12]

Likewise, in a study in Malaysia, Mohd et al[13] compared VCDR and IOP changes in patients on INCS and controls and concluded that though there was significant increase in IOP, no significant changes were noted in VCDR in patients using INCS and controls.

CONCLUSION:

This study did not show any statistically significant changes in the visual acuity and Vertical Cup Disc Ratio of eyes of patients on intra nasal steroid therapy over a 3-month period.

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