EFFECTS OF SULPHADOXINE AND PYRIMETHAMINE ON PHORIA AND NEAR POINT OF CONVERGENCE

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ABSTRACT

Sulphadoxine and pyrimethamine are components contained in anti malaria drugs like Fansidar®, Maloxine®, Amalar® Malariech® and others. They are contained in 500mg of sulphadoxine and 25mg of pyrimethamine. They catalyse the critical stages in the biosynthesis of folic acid. The research was carried out to determine the effect of sulphadoxine and pyrimethamine on habitual lateral phoria (HLP) and near point of convergence (NPC). One Hundred volunteers of either sex and age range of 18-29 were used for the research while the visual parameters tested were the HLP at far and near and NPC before the intake of Fansidar®. These parameters were also determined 4hours post ingestion of Fansidar®. The analysis revealed that the intake of Fansidar® decreased the NPC by 13. 3%, caused no change in the LP at far in 70% of the subjects and 60% at near. Statistical analysis using Z-test showed no significant effect ($p<0.05$).

KEYWORDS: Sulphadoxine, Pyrimethamine, Near point convergence, Habitual lateral phoria, Malaria.

INTRODUCTION

Over the years the drug choice for treatment of malaria has been quinine[1] and its derivatives like Aminodiaquine®, chloroquine®, camoquine® but of late has been found to be associated with systemic effects such as itching and ocular side effects like chloroquine amblyopia, quinine retinopathies, poor visual acuity, defective colour vision, scotoma and in extreme cases blindness.[2] This probably accounts for reasons why eye care practitioners defer to see patients with malaria.

Presently, people suffering from malaria resort to use of Fansidar®, Maloxine®, Antimal® and Amalar® composed of (500mg of sulphadoxine 5, 6 dimethoxy -4 pyrimdinyl sulfanilaride) and 25mg of pyrimethamine (2,4, diamino-5p chorophenyl 6-ethyl pyramidine), which are folic acid antagonists. These inhibit the activities of Dihydrofolate reductase and Dihydrofolate Syntheses.

The consumption of these drugs is at high rate that even without malaria being diagnosed, people take them as a prophylactic for malaria.

Any substance that will affect the function of the sympathetic and parasympathetic nervous system will affect phoria and near point of convergence (NPC) because the intrinsic muscles of the eye are innervated by the autonomic nervous system.

The peak plasma level for pyrimethamine (approximately 60mg/l) is reached about four hours post administration of the drug. The volume of distribution for sulphahdoxine and pyrimethamine is 0.41/kg and 2.3kg respectively.[3]

When the drug is taken as prophylactic there is mean steady plasma concentration of about 0.5mg/l for pyrimethamine and 9.8mg/l for sulphadoxine for 4 hours and 7 weeks respectively. The plasma protein binding is about 90% for both sulphadoxine and pyrimethamine, both of them cross the placental barriers and pass into breast milk. About 5% of sulphadoxine appears in the plasma as acetylated metabolite and about 2-3% as the Gluoromide while pyrimethamine is transformed into several unidentified metabolite[3].

Anti-malarial drugs like chloroquine, hydroxychloroquine and amodiaquine affect both ocular structures and their function examples are deposit in the corneal epithelium, causing edema and decreased corneal sensitivity and chloroquine keratopathy[4]. Diplopia due to paresis (incomplete paresis) of extra ocular muscles has been reported with alcohol chlorpromazine, meprobamate (anti-anxiety) and anti-malarial.[4]

Sound knowledge of the possible effect of such drugs on the visual system is important for eye care practitioners because they may be confronted with ocular problems posed by it. The aim of this paper therefore is to evaluate the effect of sulphadoxine and pyrimethamine on phobia and NPC.

MATERIALS AND METHOD

Hundred volunteers within 18-29 years of age, comprising of both sexes were used in the study. They are healthy subject with no obvious history of systemic or refractive error and under no therapy or medication.

Informed verbal consent was obtained from each of the subjects. Exhaustive case history was done on the subjects to rule out systemic and ocular conditions that will affect their visual functions. Ophthalmoscopy was performed to rule out any abnormality, visual acuities at distance (6m) and near (40cm) were determined using respective Snellen charts.

HPL and NPC values were determined using Standard Optometry tests. These values serve as the control. The drug (Fansidar®) composed of 500mg sulphadoxine and 25mg of pyrimethamine was administered as a prophylactic to each of the subject. After 4hours (effective period of the drug) the HLP and NPC were again measured at intervals of 15 minutes each for 4 times for the same subject and recorded. The results obtained were presented in tables and subjected to statistical analysis.

RESULTS

Table 1 showed slight peak increase in exophoria after 30 minutes after which it decreases to its baseline. In table 2, the effect on HLP at near showed peak increase of exophoria after 45 minutes post ingestion of drug with percentage change of 18.2% after which it decreased to mean baseline.

Peak increase in NPC was noticed after 45 minutes and the percentage change was 3% of the mean change after which it gradually decreased towards the normal with increase in time (see table 3).

DISCUSSION

The result of the research revealed slight change in HLP at far and with the NPC. The peak effect was noticed after 30 minutes post Fansidar® ingestion for HLP at far and after 45 minutes for near HLP and for NPC. The changes were also found to be reversible. 26.6% of the subject showed an increase in NPC (inferring a decrease in convergence) while 13.3% reported a decrease. In the HLP of the subjects at far and near, 70% of the subjects showed no change at far while 60% showed no change at near. These findings agree with the work of Ngousse et al[5] who suggested the absence of significant effect in ocular functions on a work he conducted with sulphadoxine and pyrimethamine on Camerounians. Also Hoffman[3] indicated no significant effect of the sulphadoxine and pyrimethamine in his work done on male and female rabbits. The therapeutic use of sulphadoxine and pyrimethamine containing drugs in the treatment of malaria will not jeopardize the function of the visual status.

TABLE 1: SUMMARY OF THE MEAN BASELINE VALUES FOR HABITUAL PHORIA AT FAR AND MEAN INDUCED CHANGE DUE TO INTAKE OF FANSIDAR® (MEAN BASELINE =0.2)

Time interval in minutes	Mean induced phoria	Mean induced change	Percentage mean change
15	0.26	0.06	30%
30	0.35	0.15	75%
45	0.16	-0.04	20%
60	0.16	-0.04	20%

TABLE 2: SUMMARY OF THE MEAN BASELINE AND MEAN INDUCED CHANGE IN HABITUAL PHORIA AT NEAR DUE TO INTAKE OF FANSIDAR® (MEAN BASELINE =4.25)

Time interval in minutes	Mean induced phoria at near	Mean induced change	Percentage mean change
15	4.80	0.55	11.5%
30	5.12	0.87	16.9%
45	5.10	0.95	18.2%
60	4.7	0.45	9.6%

TABLE 3: SUMMARY OF THE MEAN BASELINE NPC AND MEAN INDUCED NPC DUE TO INTAKE OF FANSIDAR ® (MEAN BASELINE NPC =9.8cm)

Time interval in minutes	Mean Induced NPC (cm)	Mean Induced change NPC	Percentage mean change (%)
15	10.0	0.2	2.0%
30	9.9	0.1	1.0%
45	10.1	0.3	3.0%
60	9.9	0.1	1.3%

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