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RESEARCH ARTICLE

PROLONGED USE OF ORAL CONTRACEPTIVES AND AUDIOLOGICAL PROFILE IN WOMEN

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ABSTRACT

It is only in the last 2 decades that people have been able to be provided with safe and effective means of controlling their fertility with the safe guard. There is some physical alteration along with the most vital auditory and vestibular mechanism.

Aim: To profile the effect of oral contraceptive on audition and vestibular system.

Methodology: The study has been carried out with subjects of 10 healthy Female OCP users since minimum of 6 month period between the age of 25-35 yrs old, with out any significant medical history. A screening questionnaire admistered to rule out the detailed case history. All the subjects were followed an ENT evaluation along Audiological test battery, including PTA, SPEECH AUDIOMETRY and IMPEDANCE AUDIOMETRY.

Result: The following study shows that the OCP user represents various pathophysiological alteration in auditory and vestibular sensation, represntings signs of decrease sensitivity of hearing; however the alterations are depends on the prolongations of OCP. TERMINOLOGY- OCP- Oral contraceptive pills

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INTRODUCTION

Nearly 40% of married women in the country have adopted measures, 36% using modern methods and 4% relaying on traditional techniques, according to the national family health survey (NFHS). 1992-93 conducted by the international institute for population sciences, Bombay for the union ministry of health and family welfare the survey covers 24 states. Among the major states, the higher ever use of any contraceptive method was recorded in Kerala (75%) and lowest in Uttar Pradesh (26%). Women go through monthly reproductive cycle which starts during puberty and usually last during all their reproductive life stopping at menopause. These cycles prepare the female reproductive tract for pregnancy. Combined estrogen and progesterone pills (contraceptives) taken orally for a period of 3 weeks have involuntary action preventing fertilization from taking place. This occurs through gonadotrophin secretion inhibition by the pituitary acting on the hypothalamus. The progesterone agent present in the pill suppresses LH secretion and the estrogen agent is responsible for the FSH secretion surpression.the use of these contraceptive pills by women may cause different adverse reactions such as immune, metabolic, nutritional, psychiatric, vascular, ocular, gastro intestinal, hepatobiliary, skin, renal/urinary and auditory alterations. There are cases of sudden hearing loss, SN loss in the high frequencies, otosclerosis and progressive hearing loss. Previous studies (Dengerink, Dengerink, Swanson, Thompson, and Chermak, 1984; Petiot and Parrot, 1984), women using oral contraceptives were observed toexhibit significantly greater TTS than men and normal cycling (NC) women. The majority of Women using oralcontraceptives (OC) suggested that progesterone may play a role in mediating the effects of noise on hearing. Progesterone elevates basal body temperature (Tyler and Woodall, 1982; Ward, Stone, and Sandman, 1978), which reflects an increase in metabolic rate that may hasten fatigue of noise stimulated auditory structures (Henry, 1980; Law and Pettigrew, 1980; Shaddoek, Hammernik, and Axelsson, 1984). Further, progesterone and estrogen both appear to mediate blood pressure and cochlear blood flow changes in response to vasoactive compounds (Laugel, Dengerink, and Wright, 1987. Vestibular alterations like tinnitus vertigo and dizziness may appear because these are depends on the integrity of the vestibular system. The use of oral contraceptives can provoke functional alterations in the inner ear, specially tinnitus and Irritative Peripheral Vestibular Syndrome in the risk group; but auditory threshold alterations were not evident. Combined estrogen and progesterone pills (contraceptive pills), taken orally for a period of three weeks have anovulatory action, preventing fertilization from taking place. This occurs through gonadotrophin secretion inhibition by the pituitary acting on the hypothalamus.

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The progesterone agent present in the pill suppresses LH secretion and the estrogen agent is responsible for the FSH secretion suppression, showing a synergic effect. Besides, the estrogen component enhances the action of the progesterone agents, thus allowing a reduction on the doses of progesterone in the pill composition and, consequently, reducing its adverse effects (Cox, 1980). The use of these contraceptive pills by women may cause different adverse reactions, such as: immune, metabolic, nutritional, psychiatric, vascular, ocular, gastrointestinal, hepatobiliary, skin, renal/urinary and auditory alterations; Central Nervous System disorders, and reproductive system disorders. Moreover, the body may trigger vertigo in the pre-menstrual syndrome or during the use of these hormones, due to estrogen and progesterone concentrations (Davis, 1982; Dengerink *et al*., 2007; Frank, 2007; Henry, 1980; Lotvin, 1996; Miller., 1967; Robert, 1980).

Therefore, when vertigo and/or dizziness/hearing loss appear, it is necessary to investigate prior use of medication; it is necessary to know whether or not the symptoms started with the use of some substance or in changing a medication dosing (Rybak, 1995). Partial or total loss of auditory or vestibular function, during or after exposure to medications, solvents and other substances is called ototoxicity. Many are the potentially ototoxic substances, including cardiovascular drugs, central nervous system drugs, muscle relaxants, non-hormonal anti-inflammatory, antibiotics, hormones, respiratory tract drugs, antihistamines, contraceptive drugs, cytostatic drugs, anesthetics, appetite moderators, amongst others (Stover *et al*., 1996; Tyler, 1982).

Body balance depends on the integrity of the vestibular system, the somatosensorial system and vision. The labyrinth is responsible for the sense of balance and the bodys position in space. Dizziness and vertigo set it when something interferes in the normal functioning of these systems. The biochemical integrity of the inner ear liquids is important for its proper functioning. The hormonal alterations caused by oral hormonal contraceptives may impair the homeostasis of labyrinth fluids, because they have direct influence over the enzymatic processes and on the action of neurotransmitters. There are some studies that correlate inner ear alterations with the action of hormones, which will be reported below. The use of oral contraceptives may lower hearing thresholds, without altering stapedial reflex. There are cases of sudden hearing loss because of the use of estrogen and progesterone, alone or in association. The prolonged use of these hormones may cause sensorineural hearing loss in the high frequencies, besides total or partial vestibular involvement. This is explained when we observe labyrinth irrigation, because the vascular obstruction of the internal auditory artery brings disorders to the territory it irrigates, involving the cochlea, vestibule or both.

Need for the study

There is an increase demand in the field of audiology to meet with the need of cases with OCP irrespective of nature of the problem as hearing loss. Many clients don't show pathological hearing loss at initial period but presents hearing loss and vestibular alterations physiologically due impairments in enzymetic actions due to hormonal changes. The cases with OCP may represent normal hearing threshold for initial perod but with time span represents various types of hearing alterations along vestibular impairment.

The raising audiological issues in management is not only with audiology but with a team management as from Otorhinolaryngology. The associated sensory impairments of clients with OCP guide the researcher to conduct this study

The study aims at

Our goal was to correlate the use of oral hormonal contraceptive and possible outcomes as hearing and vestibular alteration

- To aware the OCP users about the outcomes as auditory and vestibular alterations.
- Profile the all effect of oral contraceptives on audition and vestibular status.

METHODOLOGY

The study has been carried out on 10 healthy female of OCP users, ranging from age 25-35yrs with no other complaints. The subject selection for this experimental study was based on the exclusion/inclusive criteria to control the variability on the study.

Inclusion criteria

- Healthy female with age range-25-35 yrs
- with minimum usage of OCP since 6 month
- No other health issues like diabetic and BP
- No family H/O hearing loss
- Exclusion criteria
- Female using combined oral contraceptive
- Females with age range more than 35yrs
- Family H/O hearing loss

The selected subjects were administered on a screening /questionnaire tool, subjects who met the criteria on the questionier has been followed with an ENT evaluation to rule out vestibular and any other problems. The questionnaire includes all the details about the OCP and Auditory and Vestibular complaints

S.No	Questioner	Response
1	year of marriage	
2	Date of period of MS	
3	Any contraceptive used	
4	Prolongation of pill (OCP)	
5	Amount of pills	
6	Duration of usage of OCP	
7	1st pregnancy date/NO. Of issue	
8	Any side effects reported	
9	presently continued/discontinued of OCP	
10	Any other health /medical issue family	
11	Any Family H/O hearing loss	
12	Any significant hearing loss	
13	Any significant vestibular issue	

After following ENT evaluation the subjects were undergone serial audiometric test. Audiometric test battery included PTA, Speech Audiomety, Impedance Audiometry. PTA for both the ear were plotted using ALPS (AD2100) audiometer from 250HZ to 8000HZ (AIR) and 250HZ to 4000HZ (Bone) testing with Ascendingdescendin method. Speech audiometry was carried out for recording SRT and SDS using PBwords and spondee words (in Telugu). Both the test for audiometry and speech audiometry was carried out under TDH39P headphones and B72 bone vibrator. Immitance audiometry was

carried out with an MAICO MA52 by instructing the patient by not to swallow and holding breath during testing for the Middle ear Status and auditory reflexes. The test protocols were carried out in a soundproof room with controlled noise back ground and calibrated instrument according to ANSI (1990).

RESULTS

Audiological test battery was administered on the 10 subject. audiometric results shows the impact of oral contraceptives on all the subjects, showing the sensitivity of OCP on ear, where the PTA Threshold degree ranges from moderate to moderately severe.30% subjects shows SN loss also reporting vertigo, tinnitus on ENT evaluation, 20% were with high freq hearing loss complaining of vertigo.20% mixed hearing loss with tinnitus.1 progressive SN loss with diseqilibrium.1 sudden conductive with dizziness and 1 otosclerosis without any complaint in ENT evaluation. Speech audiometry was done and result have shown correlation with SRT and SDS. SRT results ranges between 40-70 (RT and LT) and SDS ranges 60-95% (RT and LT). Tympanometry has shows A type in 60% of subjects (Snhl, high frequency hearing loss, progressive hearing loss) Ad type in 20% subjects (Mixed and Sudden Hearing Loss) C type in 10% subject (Mixed) As type in 1 subjec (?otosclerosis). Reflexometric test results are reported to be absent reflexes in 70% of subjects those who have sensory neural hearing loss, mixed hearing loss, conductive hearing loss, and high frequency hearing loss. Right ear reflexes are elevated and left ear reflexes are absent in 30% subjects with progressive sensory neural hearing loss, sudden conductive hearing loss and otosclerosis. Out of 10 controlled subjects there is complaint of hearing loss in all the cases and with significant ENT complaint in 9 members irrespective of doses as in this study the medication type was not controlled and usage of OCP is more than 6 month.

DISCUSSION

The present study was aimed to profile the effects of oral contraceptives on audition and vestibular system. The results concluded that the cases of OCP shows avaryng audiological configurations. How ever use of oral contraceptives for a period of minimum 6months may not cause auditory/vestibular alterations this present study shows a significant auditory vestibular alterations as the doses used was more than 6 month. Audiological evaluation showing a significant alteration on hearing threshold. That is Right mean value is 54dB. and Left mean is 59.3dB. with a auditory threshold ranging from mild-moderately severe form. The results of the vestibular tests showed 30% selected sample complained of verigo, 30%complained of tinnites, 10% reported disequilibrium, 10%complained of dizziness and 10% reported vestibulitis.

During the study when it was compared to a controlled group of women it was notices that the population has definite presence of tinnitus in all the vestibular complaints. It was concluded from this present study that women with oral contraception has an evidence of detoriation in hearing and provoke functional alterations in the inner ear leading to a management call from a team work and increases the demand of auditory management by audiologist. As a increased chances of incidence of impairment in hearing alterations, audiologist need to be have keen observation on OCP user with advising them a safe guard with a lower doses.

Limitations

The study with above audiological protocol has following limitations.

- Cases were of using different brands of oral contraceptive
- Exact month of usage of oral contraceptive could not be recorded.
- Study was carried out with limited number of sample.

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