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Prolonged oral contraceptive use and hearing loss; cross sectional analysis in Kashmiri population

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Abstract
Background: Present day women avoid unwanted pregnancy by a variety of methods, oral contraceptives being one of them. The prolonged use of these oral contraceptive pills (OCP) has substantial physical and sensory effects.
Aim: To find out the alteration of hearing sensitivity following prolonged usage of OCP.
Methodology: The study included 20 healthy women who used OCPS for a minimum of 6 months without any medical complications. Audiological evaluation included pure tone audiometry (PTA), Speech audiometry, and Impedance audiometry.
Results: The results show from this study showed that there was no significant change in the hearing threshold following prolonged contraceptive doses.
Conclusion: This cross sectional study represents a small study population and the result of no significant alteration should be taken with caution and further randomised studies are required.

Keywords: Oral contraceptive pills, hearing loss, Kashmir

Introduction

Hearing loss in a women on prolonged oral contraceptives (OCP) is most commonly attributed to the effects it has on bone metabolism of the ear ossicles mainly stapes; a condition termed Otosclerosis.. The bone around the stapes becomes thickened and eventually fuses the bone of the cochlea. This reduces normal sound transmission resulting in conductive deafness. In early stages of otosclerosis the cochlea and the nerve of the hearing are not affected though eventually these too may be involved [1-6].

Also it has been reported that females during pregnancy are more prone to get otosclerosis due to hormonal alterations. Due to hormonal alterations, there will be impairment in the homeostasis of labyrinth fluids. At this instance if the female user oral contraception to avoid the pregnancy there will be changes in progress of otosclerosis [5, 6]. Recent literature reveals that 0.5%-1% i.e. 5members of the women are affecting with otosclerosis during pregnancy out of 600 pregnancy women however present literature shows the impairment of hearing mechanism. Very few articles have been reporting the incidence of otosclerosis. The present study has been carried out to look the incidence of otosclerosis among the OCP users with reference to impairment of degree of loss.

The use of COC is contraindicated if a woman has experienced deterioration of hearing following otosclerosis during pregnancy or previous steroid use. a large cohort did not find any significant associating between COC use and otosclerosis. There have been suggestions that COC can worsen the condition but there is no evidence to support this. Faculty of family planning and reproductive health care otosclerosis is a disorder of hardening of the bones of the middle ear causing progressive hearing loss that is often reversible. Despite extensive searching, the clinical effectiveness unit could not find no information in the literature on the use of contraception in a women with family history of otosclerosis. Many cases of otosclerosis are genetic and the disorder affects women twice as men and often worsens rapidly during pregnancy [7].

Even though heredity plays an important role, a significant number of cases arise due to nongenetic causes, which are currently unknown. Clinical otosclerosis is a familial disease which is more frequent among women in their reproductive years. The condition usually aggravated by pregnancy.

Endocrinology variables may influence the time of onset and the course of the hearing loss. During the first part of menstrual cycle, body is preparing itself for pregnancy; more oestrogen is produced because it makes the lining of the womb thicker so that a fertilized egg can grow in it. During the second part of the cycle more progesterone is produced. This stops the growth of the lining the womb [5-7]. If the egg is not fertilized, the amounts of the two hormones decrease and this makes the lining of the womb breakdown. The lining will be discarded, together with the unfertilized egg as a menstrual breed. If the egg is fertilized, the two hormones will continue to be produced through pregnancy.

Objectives

So the present study were To find the auditory alteration hearing by pronged usage of OCP To find the degree and type of hearing loss following otosclerosis in prolonged usage of OCP.

Methodology

This study includes 20 healthy women, with prolonged usage of OCP for minimum of 6 months without any medical complications. The study population included women of age 26-35yrs attending outpatient \ at LD hospital from May 2019 to October 2019.

Inclusion criteria

1. Minimum usage of OCP for 6 months,
2. No significant complaint of hearing since childhood.
3. No family history of hearing loss
4. No other medical history

Exclusion criteria include

1. Age more than 35yrs
2. Usage of combined OCP
3. OCP used for less than 6 months
4. Family history of hearing loss

Instrumentation

Hearing thresholds were obtained using a pure tone audiometer (ALPS AD 2100) calibrated in accordance with American National Standard Institute specifications, speech reception and discrimination scores were obtained by speech audiometry using urdu stimulus, acoustic imittance measures were obtained using a calibrated tympanometry and reflexometry (MICO MA22) and cochlear functions can be measured using aotoacoustic emission (BIOLOGIC ADEAX). The PTA threshold, SRT, SDS were obtained by using calibrated earphones of TDH39 P and B 72 bone vibrator in a sound treated room.

Procedure

The subject selection was done from the referrals of gynaecologist and the test protocol was followed by an Otolaryngologists examination after confirming non-significant or unimpaired Vestibular and cochlear function. Serial audiometry was done on all the cases with prior Case history collection. Screened subjects were subjected to PTA (Pure tone audiogram) for both Right and Left ears by using TDH 39p headphones and for bone conduction by using B72 bone vibrator. This test is done in a sound treated room with a permissible ambient noise according to ANSI 1999. The subject is instructed according to ASHA guidelines and the threshold were obtain at octave frequencies from 250 to 8000 Hz for both right and left ears with pure tones as a stimulus. After obtaining AC thresholds, the better ear BC is measured by using bone vibrator at frequencies from 250 to 4000 Hz [10, 11]. After obtaining pure tone thresholds, speech thresholds were taken by using speech audiometry speech recognition and speech discrimination threshold by using PB words and spondee words in urdu. After that the subjects were undergone acoustic imittance values by using immitance audiometry and reflexometry to rule out middle ear pathology.

Results

The study included 20 healthy women who used OCPS for a minimum of 6 months without any medical complications. The degree of hearing loss of 4 subjects were ranging tending more towards minimal to mild level i.e16 to 40dB and none had moderately severe level i.e. 55 to 70dB The remaining 16 subjects had a normal pure tune audiogram. Speech audiometry test results were correlating to PTA for all the subjects. Tympanometry test results shows that there is a presence of various types of tympanogram based upon usage of medication. “As” type tympanogram is evident in 3 subjects, suggesting fixation of stapes foot plate to the oval window and “A” type tympanogram is evident in remaining 17 subjects.

For type As tympanogram the reflexes were absent in both ipsilateral and contralateral pathway. For all the type A tympanograms both ipsi and contralateral reflexes were present.

Discussion

By concluding the above result we find that usage of prolonged OCP, women are at no added risk of otosclerosis. The degree of hearing loss of 4 subjects were ranging tending more towards minimal to mild level i.e16 to 40dB and none had moderately severe level i.e. 55 to 70dB The remaining 16 subjects had a normal pure tune audiogram. Speech audiometry test results were correlating to PTA for all the subjects. Tympanometry test results shows that there is a presence of various types of tympanogram based upon usage of medication. “As” type tympanogram is evident in 3 subjects, suggesting fixation of stapes foot plate to the oval window and “A” type tympanogram is evident in remaining 17 subjects.

This present study with limited controlled sample has shown that the OCP usage has a no significant impact on inner ear along with hearing loss of various types; however more extensive randomised control trials are required to make any definitive statements.

Conflict of interest / funding; none

Limitations; Selected subjects for this study are limited and types of medicine not controlled. So this study can be carried out with a large number of samples to know the variability of hearing loss with OCP usage.

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