

Topical 1% Cyclopentolate Hydrochloride induced acute Cycloplegic Psychosis during Refraction

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Abstract: Acute cognitive dysfunctional manifestations observed in a 3 year old female child following topical 1% Cyclopentolate hydrochloride instillation during cycloplegic refraction. The child presented with exaggeration of suppressed emotions hidden under the unconscious mind by overwhelming responses with intermittent periods of selfishness, happiness and fear of insecurity. The animus component exhibited violently against her father by aggressive voice rising and unpleasant facial expressions calling her mother repeatedly. Happy moments were that of singing, dancing and vivid visual hallucinations. Teasers were viewed violently by biting and clenching, and fighting gestures. However the refraction procedure was completed with full cooperation of the child with love and affection. Systemic absorption of cyclopentolate caused release of inhibitory effect from the conscious mind. Systemic circulation of the drug could be prevented by temporal punctal occlusion in susceptible children. To evaluate factors causing altered behavioural pattern is the purpose of the present case study.

Keywords - Cyclopentolate hydrochloride, Cognitive dysfunction, Animus, Collective unconsciousness, Jungian psychoanalyses.

I. INTRODUCTION

Topical anticholinergic agents are being used for their cycloplegic actions essentially in children; to paralyze accommodation for determination of refractive errors. Altered psychotic behavioural pattern observed more frequently in children than adult patients. Psychopathological characteristics of atropine caused confusion, visual hallucinations, restlessness, involuntary movements with emotional breakdown and liability.^[1] A 17 year old female patient had psychotic attacks after topical 1% cyclopentolate instillation with similar clinical presentations.^[2-3] Consciousness alteration with visual hallucinations were observed and the risk of fatality reported specially with atropine intoxication in the previous study of using cycloplegic eye drops (combination of atropine 2%, scopolamine 0.5% and phenylephrine 4%) that contained three formulations.^[4] Present case study describes acute onset of behavioural changes after topical instillation of 1% cyclopentolate hydrochloride eye drops into conjunctival sac during assessment of refractive state and an attempt had been made to explore plausible factors causing these psychopharmacological effects.

II. CASE HISTORY

This is an observational case study witnessed in the Ophthalmology outpatient department during routine retinoscopy test under cycloplegia with topical 1% cyclopentolate hydrochloride in three year old girl (Figure 1). Baseline ocular and the adnexal examinations were normal with Snellens visual acuity of 6/6 in both eyes and unremarkable fundoscopic examination. Psychotic symptoms started appearing 2 hours later after two consecutive instillation of 1 drop of 1% cyclopentolate hydrochloride at an interval of fifteen minutes. Symptoms were observed by parents and reported immediately to optometrist that some behavioural changes occurred following topical instillation of drops.

On examination child was in full swinging mood with complete selfish involvement not caring for father, at times calling out mother's name. There was an intermittent period of nightmares experienced in terms of loss of security due to fear that was heralded by happy mood elevation. There were short alternate phases of happiness and sadness of laughing and crying respectively. The baby seems involved completely in her own environment by singing, dancing and making purposeless gestures. Involuntary movements of hands and fingers observed with dryness of the tongue and the oral mucous membrane. Child was trying to catch something in space that was not actually visible manifesting through visual hallucinations. Sometimes child was violent against her father with voice rise and suddenly hitting him with some irrelevant talk and always wanted her mother in spite of repeated convincement by her father.

Father was surprised and in fear, while mother was in tears in a hurry to reach home thinking of aborting the cycloplegic refraction. As the father was hospital ambulance driver who carry emergency patients to higher referral centres, identified that his child had developed altered psychotic behaviour after eye drops instillation. The pulse rate was 90 per minute with blood pressure of 100/60 mm of Hg. On teasing and repeatedly asking her name, child was furious with fight response shown with her feet and hands with clenched teeth, sometimes in an attempt to bite teased persons. Child had transient delusion and delirium and was unable to identify other known persons in the hospital premises except for her parents. However cycloplegic refraction was completed despite acute psychotic attack, further on showing love and affection; the baby cooperated completely with optometrist. She was fully cooperative for fundoscopic examination by direct ophthalmoscope. There were no other systemic or neurological complications observed. Symptoms continued till the evening however disappeared completely on the next day. There was tremendous anguish exhibited by child parents in view of their child being converted into a psychotic baby after topical instillation.

III. DISCUSSION

Three year old baby girl was instituted 1% cyclopentolate eye drops into conjunctival sac for determination of refraction to diagnose refractive errors. Symptoms manifested 2 hours after topical instillation of 1% cyclopentolate hydrochloride. Cyclopentolate hydrochloride belongs to anticholinergic group of drugs that that inhibits cholinesterase enzyme on topical administration, decreasing acetylcholine concentration available for miosis at receptor levels. On systemic circulation of drug produces dryness of oral cavity mucus membrane due to parasympatholytic action. It was very surprising to know that how cyclopentolate hydrochloride releases conscious mind from inhibitory effect and enter into unconscious mind through the parasympatholytic action which is more commonly observed in susceptible children. That means to exhibit repressed emotions by unconsciousness mind which is very potent and more active than conscious mind, probably depends onto the most extent on possible strong conditionings imposed by this modern society on Childs mind. Belief systems which are not exactly true systems were accumulated at basement layer of the unconscious mind only to erupt externally when conscious mind goes to sleep probably due to release from inhibitory effect-by cyclopentolate? Topical cyclopentolate stimulated central trigger zone in a 57 year hyperopic female patient followed by zones of hypnotic and sedative phases of restlessness and uproarious laughter, however refractive surgical correction for hypermetropia was completed successfully as reported previously, which was not noticed in the present case study.^[5]

Violence part of child that was manifested under the cycloplegic effect suggested animus nature that goes according to the Jungian analysis. Psychiatric symptoms exhibited may by similar to morphine over dosage or other addict drugs. It might be that repressed and suppressed desires manifested as explained by Freudian psychoanalysis, unlike Jungian analysis that describes unconscious state also includes the desires, phobias, fear etc which are mainly derived from our family and modern society. Cycloplegic psychosis produced non-rational functions of intuition and perverted sensation by taking away the rational functions of thinking and feeling. The ego (I) of self acquittance of possessing objects was evident in the form of hitting persons with hands and kicking on snatching the pen from child. There was disintegration between conscious and unconscious mind that lead to loss of individuation. Increased concentration of cyclopentolate of 1.31% induced acute poisoning reported in 8 year old boy compared to present case report, no neurological deficit was observed.⁽⁶⁾

Cognitive dysfunction was noted and inherited pattern of collective unconsciousness surfaced in the form of violence and happiness. Social behavioural pattern was exaggerated in terms of fear, insecurity and violence. We were unable to find out exactly what caused the behavioural pattern alteration. The present condition might be related to multifactorial development involving socioeconomic status, severe conditioning in family and prejudiced religious ritual attitudes. Drug action was similar to addicting drugs affecting the central nervous system by the mechanism of inhibition similar to acute alcohol intoxication. Randomized controlled studies are lacking and possibly might not be practical in view of unexpected adverse drug reactions and ethical issues implicated in pursuing the study further in research and development. It was unclear regarding development of behavioural changes that occur in a few susceptible children and rarely in adults whereas similar effects were not seen in others. Mechanisms involved might be postulated that the reaction could be due to hypersensitivity or idiosyncratic reaction. Cycloplegic psychosis probably developed secondary to family conditionings forced very strongly on susceptible innocent children. Those children under pressure of conditioning from their family or from schools possibly at risk of developing behavioural changes. Decision making on conflicts of confusions in child's mind may be difficult to cope with the situation. Anaphylactic reaction characterized by urticaria syndrome and allergic conjunctivitis with pharmacological reactions of topically instilled 1% cyclopentolate hydrochloride had been described in the previous report.⁽⁷⁾

IV. CONCLUSION

In conclusion, cyclopentolate hydrochloride induced acute psychosis caused cognition dysfunction and manifestations of repressed emotions and feelings imposed by society on delicate child's pure mind possibly caused resurfacing of the unconscious mind. Cyclopentolate hydrochloride absorbed through the conjunctiva, lacrimal drainage apparatus and nasopharynx mucosa entered directly into systemic circulation to exert pharmacological actions and influence of preoccupied mind perhaps led to psychopharmacological behaviour problems in the present case study. Precautionary measures may be adopted to practice punctal occlusion to prevent systemic absorption of drug which produces systemic side effects. A prior pre-cycloplegic psychiatric family history especially in susceptible children might contribute to further advancements on psychopharmacological behavioural effects of topically instilled cycloplegic agents.

Acknowledgements

We thank profoundly the parents and child for their cooperation extended during examination including departmental staff.

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Figure 1 cyclopentolae hydrochloride available in form-fill-sterile (FFS) package