INTRODUCTION

Methylphenidate hydrochloride (MPH; methyl-a-phenyl-2-piperidi-nacetate hydrochloride) is a mild central nervous system stimulant used in the management of attention deficit hyperactivity disorder (ADHD). MPH, commonly known as Ritalin, is the most prescribed medication to treat behavioral disorders in children and adults. MPH is one of the isomers of Amphetamine. It is a white, odorless, and fine crystalline powder which is soluble in water. Some researchers have shown that MPH could induce encephalopathic maintenance. So, it could prove to be an effective treatment option to reduce hyperactivity and hyperactivity. Moreover, its usage in children can be continued during adulthood, too. Due to the extensive use of this medication to treat ADHD symptoms, many investigations have been performed to evaluate its effects on the body organs. It has been shown that chronic use of Ritalin was shown to decrease the body weights of different body organs. Also, it was reported to reduce the number of Leydig cells, serum testosterone concentration. Moreover, the fertility rate the male mice declined significantly in comparison to the control group. Besides, the weight of the testes and seminal vesicles decreased significantly in these mice. In another report, disorders in the male mice were in comparison to the control group. Therefore, the treated groups compared with the control group.

ABSTRACT

OBJECTIVE: Ritalin is the most commonly used medication for attention deficit disorder. The growing Ritalin prescription frequencies in adults and the looking data on the effect of Ritalin on sperm, necessitates further investigations. In this study, we addressed the direct impact of Ritalin on sperm motion.

MATERIALS AND METHODS

Semen samples (n=10) were collected from healthy donors by masturbation after 2-5 days of abstinence. The initial semen analysis was performed according to the WHO 5th edition. Density gradient separation was performed to isolate male sperm. Samples were incubated at different time points (0, 60, 120, 240 and 360 minutes) and at different concentrations of Ritalin (1, 10, 100 and 1000 ng/mL Ritalinic acid) and compared to control. Samples were analyzed at different time points (0, 60, 120, 240 and 360 minutes). The main parameters were considered were sperm motility, sperm concentration and sperm morphology. Sperm parameters were expressed as the percentage of motile sperm and the motility kinetic parameters (curvilinear velocity, VCL, percentage of straight line displacement, VSL, linearity factor and LIN).

RESULTS

Ritalin concentration 1 ng/mL significantly increased sperm motility at a concentration of 1 ng/mL. Ritalin can be utilized to improve sperm quality in asthenozoospermic specimens from patients undergoing assisted reproductive procedures. Further investigation is required to evaluate the impact of Ritalin on other sperm parameters such as acrosome reaction, DNA fragmentation and membrane integrity.

CONCLUSIONS

1. Ritalin increases sperm motility at a concentration of 1 ng/mL. This compound has no toxic effect on sperm motility even at a concentration of 1000 ng/mL.
2. A time dependent increase in sperm motility was observed in Ritalin treated samples until 240 minutes at all concentrations. Therefore, a decrease was observed at 300 minutes in treated samples, even though motility remained significantly higher compared to control. No significant changes were seen in sperm motion kinetic parameters.

3. Normal semen analysis as per WHO 2010 guidelines.

4. Sperm samples were collected from 10 subjects (10 subjects) and were treated with different concentrations of Ritalin (1, 10, 100 and 1000 ng/mL Ritalinic acid) and compared to control. Samples were analyzed at different time points (0, 60, 120, 240 and 360 minutes). The main parameters were considered were sperm motility, sperm concentration and sperm morphology. Sperm parameters were expressed as the percentage of motile sperm and the motility kinetic parameters (curvilinear velocity, VCL, percentage of straight line displacement, VSL, linearity factor and LIN).

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