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Association of GRIN2A gene polymorphisms of Glutamate pathway with heroin dependence in Indian Population: A preliminary study

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Heroin dependence (HD) is a complex disorder leading to disruptions in particular circuits of the brain, influenced by both environmental and genetic factors. Heroin interacts with the different brain neurotransmitters affecting the normal functions including learning, memory, cognition etc. The presence of polymorphisms in the glutamate pathway has been reported to increase the risk of addiction. Aim: To identify an association of GRIN2A gene polymorphisms of glutamate pathway with HD and correlate with clinical parameters. Method: The study was in accordance with the declaration of Helsinki and approved by the Institute ethics committee. A total of 103 HD patients were recruited as per DSM-IVR criteria from the NDDTC, AIIMS. 100 healthy volunteers from the general population formed the control group. Genomic DNA from peripheral blood samples was processed for PCR followed by restriction digestion to screen for presence of polymorphisms i.e. rs11866328, rs1071502, rs1375067, rs1530669, rs12325652, rs16966381, rs1104068, rs16966448, rs9927871 and rs1366076 of GRIN2A gene of glutamate pathway. Genotype frequency and the difference between patient and control were assessed by chi-square test of significance and the results were correlated with duration, age at onset of heroin use, the quantity of heroin consumed and WHO ASSIST score. Statistical analysis was done by SPSS V21.0. Result: Mean age at first use, duration of heroin intake and ASSIST score were 25.49 ± 0.78 , 8.52 ± 0.84 and 29.82 ± 0.60 years respectively. None of the SNPs showed any significant difference in genotype and allele frequency between the patients and controls. GRIN2A polymorphisms rs1530669 and rs1071502 showed significant association with the heroin intake (g/day) ($p < 0.05$). A positive association with WHO ASSIST was observed with rs11866328 and rs12325652 ($p < 0.05$). Conclusion: This is the first study which reports on the association of GRIN2A receptor polymorphisms with heroin dependence among the Indian population.

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