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Phylogenetic analysis to study the evolution of Rotavirus G1P[6] strain isolated from Himachal Pradesh

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Background:

Rotavirus is the major cause of diarrhoea in children below the age group of five years. It kills around 0.5 million children every year globally. The worst affected are the under developed and developing nations of the world such as India. Before the introduction of rotavirus vaccine in the Indian National Immunization Programme, it is very crucial to study the epidemiology along with rotavirus strains circulating in different parts of the country. Therefore, this study focuses on the analysis of a rotavirus G1P[6] strain prevalent in Himachal Pradesh, a northern state of India.

Methods:

During active surveillance for the presence of enteric viruses in children from Himachal Pradesh in 2013, this rotavirus strain (JU-SOL-173) was isolated from the feces of a diarrhoeic child admitted to a regional hospital in Himachal Pradesh. The initial confirmation of the virus was carried out by VP6 gene specific PCR. The genotyping was performed by semi-nested PCR targeting the VP4 and VP7 genes. The amplicons of genotyping PCR were sequenced and subjected to multiple sequence alignments using CLUSTALW. The phylogenetic analysis was performed in MEGA 5.0 using neighbour-joining method.

Results:

The phylogenetic analysis of VP7 gene clustered this strain with the USA (2008747323) and German (GER109-08) strains with nucleotide sequence identity of 99%. Interestingly, previously reported Indian strains except one (6590) made a separate cluster. Also, VP4 gene revealed its closeness with South African strain (MRC-DPRU4090) with 99.4% similarity at nucleotide level.

Conclusion:

The close resemblance of VP7 and VP4 genes of this Indian strain (JU-SOL-173) with USA and South African isolates, respectively suggests the complexity of reassortment events and generation of different G/P type combinations. More intensive surveillance programme might be required to know the exact status of prevalent genotypes in India which will further help in formulating the preventive strategy.