

LETTERS



Nosocomial infection caused by a rare G8P[8] rotavirus subtype in a pediatric unit in Guangzhou, Southern China

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Rotavirus is considered as the most important viral agent of acute gastroenteritis in children less than 5 years old worldwide. Nosocomial rotavirus infection seems to be responsible for around 25% of all rotavirus-related hospitalizations.¹ Nosocomial rotavirus gastroenteritis is important because it significantly prolongs hospital stay and increases the social and economic burden of the hospitalization.^{2,3}

Recently, there were sporadic diarrhea cases in the department of pediatrics of a hospital in Guangzhou, southern China. In order to find out the causative agent, sources, and risk factors, we used the retrospective investigation method to collect the diarrhea situation of hospitalized cases in recent one month. As a result, a total of 6 children with diarrhea and positive for rotavirus in feces were found in pediatric inpatients in the past month, among which three cases had been discharged and three cases were in hospital. Five of 6 children were found vaccinated with only one dose Lanzhou lamb rotavirus vaccine (LLR) two years ago. The hospital quickly opened up isolation wards for three positive children. These children were not hospitalized for gastrointestinal diseases, and common infectious diseases were excluded before admission. According to the investigation, children in different wards often visit each other during hospitalization, which may lead to cross infection. We carried out monitoring and sampling of hospital environment, all children and medical staff in pediatric inpatient department. The samples were sent to Guangzhou Center for Disease Control and prevention for nucleic acid detection of common enteroviruses using RT-PCR, including Norovirus, Adenovirus, Astrovirus and Rotavirus. The test results showed that the smear samples of bed handrail and toilet in the ward of the three discharged child and three rectal swab samples from hospitalized children tested positive for Rotavirus. Then, we continued to expand the sampling range and the smear samples of three wards environment tested positive for Rotavirus, including the air outlet and return air outlet of air conditioner, door handles and bed rails, toilets and

mops in the isolation area. All the samples from medical staffs were tested negative for Rotavirus. Three samples from cases were genotyped for both VP7 and VP4. Phylogenetic analysis indicated that the Rotavirus strains detected in three samples were all Rotavirus G8P[8] (Figures 1 and 2).

This study reports a hospital acquired rotavirus acute gastroenteritis event in a pediatric unit. We speculate that it may be caused by close contact between children and failure of disinfection since we still detected positive for rotavirus in the environment after the implementation of routine disinfection in the hospital. Frequent visits between different wards may play a role in increasing the chance of rotavirus transmission.

Rotavirus, a double-stranded RNA virus belongs to the family Reoviridae, and children infected with rotavirus may experience severe watery diarrhea (often with vomiting), mild-to-moderate fever, and abdominal pain.⁴ Previous studies showed that the five genotypes G1P[8], G2P[4], G3P[8], G4P[8], and G9P[8] Group A rotavirus cause up to 75% of human Group Rotavirus infections worldwide,³ which is similar to the study in China.⁵ Rotavirus genotype G8 infection is common in bovines but rarely occurs in humans; however, the G8 strains have been reported frequently among children in African countries.⁶ The result indicated that the G8 strains might be recently introduced into China. The effectiveness of current rotavirus vaccines not against the unusual G8P[8] subtype, for which was virtually not targeted in the vaccines.⁷ The emerging strain and incomplete vaccination may explain the failure of vaccination protection. However, epidemiological surveillance data on G8P[8] in crowd settings such as schools and health-care facilities is scarce in China. Continuing etiological surveillance is required to monitor the circulating strains and the virulence in humans. Be alert to the epidemic caused by the new rotavirus subtype in COVID-19's prevention and control. The improvement of the whole course immunization coverage rate of rotavirus vaccine should be enhanced meanwhile.

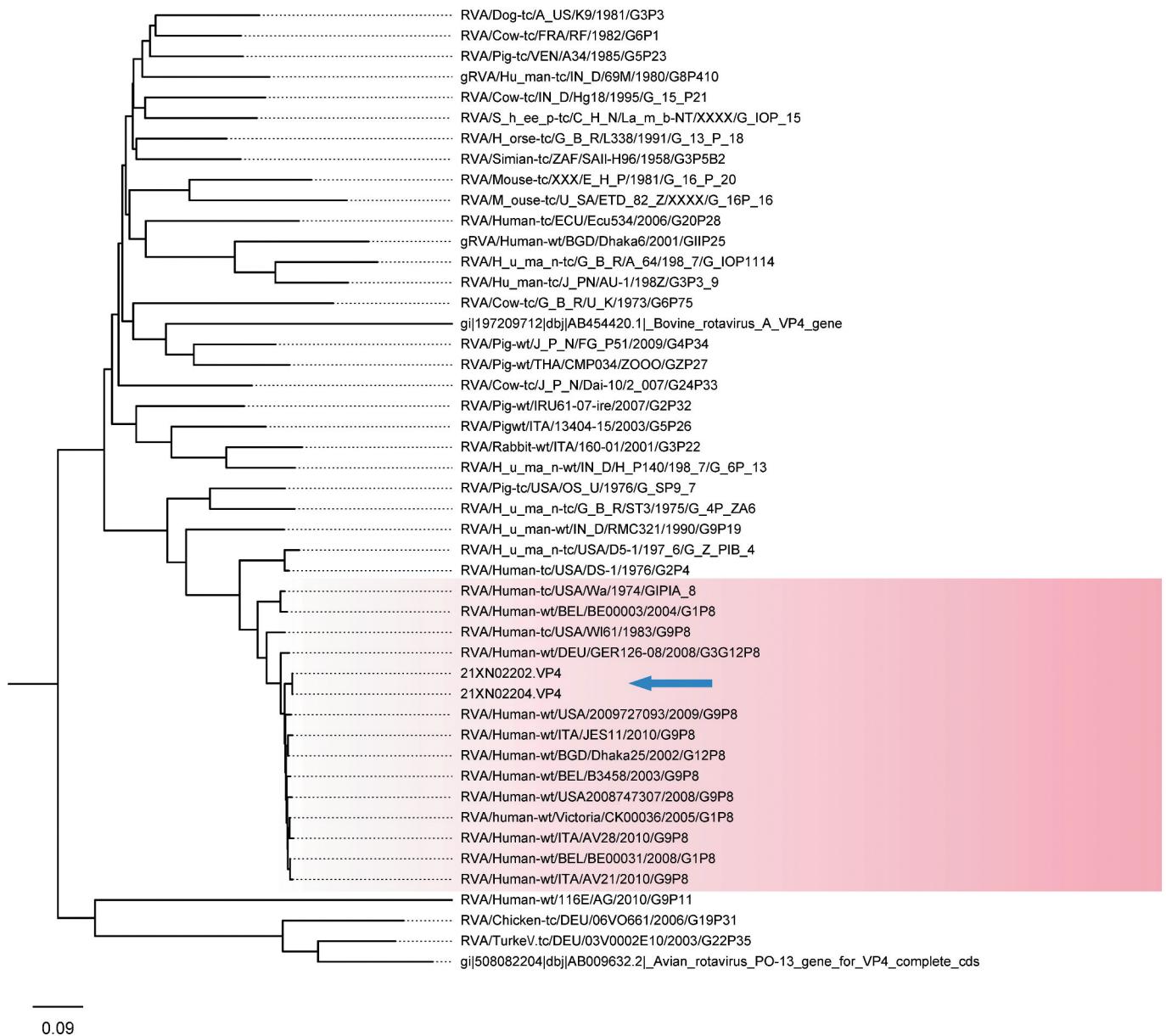


Figure 1. Phylogenetic analysis of the viral protein 4 gene of G8 rotavirus strains used in a study of nosocomial G8P[8] rotavirus infection in a pediatric unit in Guangzhou, Southern China.

Among the viral factors, most of the outbreaks of nosocomial infections were due to the rotavirus.⁸ An outbreak of rotavirus infection in a neonate intermediate care unit and rotavirus was identified in samples taken from the computer keyboard and mouse from the ward.⁴ Similar to this study, we also found direct evidence in the environment. Rotavirus is highly infectious and can survive for weeks or months on hands and surfaces. Good hand hygiene should also be advocated in controlling nosocomial infection. Transmission is presumed to occur via hands of caregivers, fomites, contaminated

surfaces, or aerosols.⁹ This study confirms the possibility of aerosol transmission for the detection of rotavirus from the air outlet and return air outlet of air conditioner. Thus, when faced with highly infectious pathogens such as rotavirus, cleaning the environment with appropriate disinfectants is the most important step to control infection, and the evaluation of disinfection effect is also of great significance. In addition, training and health education should be conducted for cleaning personnel, and mops in different areas should be strictly disinfected and placed separately.

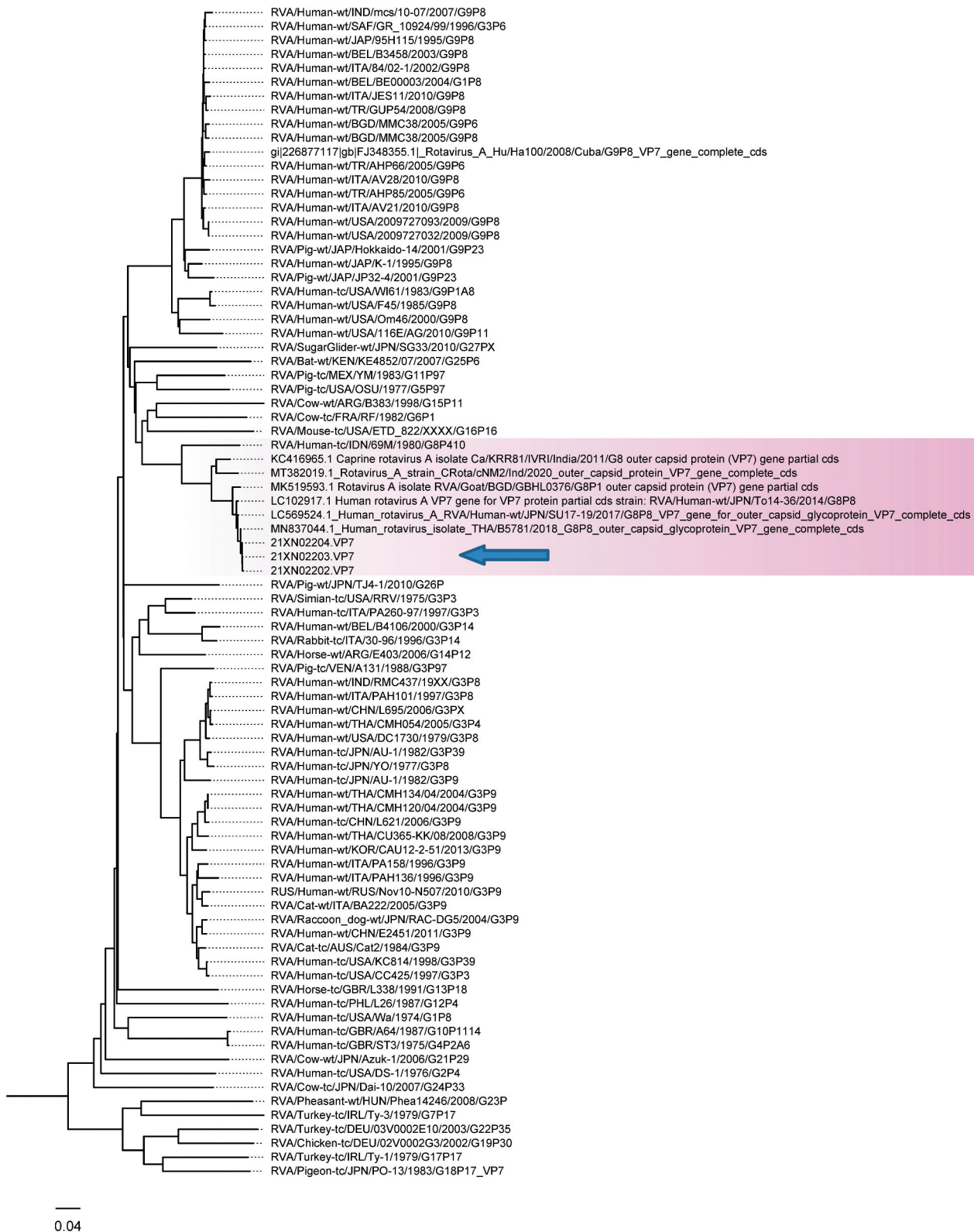


Figure 2. Phylogenetic analysis of the viral protein 7 gene of G8 rotavirus strains used in a study of nosocomial G8P[8] rotavirus infection in a pediatric unit in Guangzhou, Southern China.

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Author contributions

Concept and design: Ying Lu, Jianyun Lu. Acquisition, analysis, or interpretation of data: Ying Lu, Huaping Xie, Dahu Wang. Drafting of the manuscript: Ying Lu, Dahu Wang. Experiment: Huaping Xie. Statistical analysis: Ying Lu, Huaping Xie. Supervision: Jianyun Lu.

Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

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