

Abstract

The disease acute gastroenteritis causes a big economic loss every year. The etiologic agents related to this disease are rotavirus, enteric adenovirus, calicivirus, astrovirus, and probably coronavirus. It is still not clear what is the role of these gastroenteritis viruses in Taiwan.

Fecal samples were collected from clinical laboratories distributed in different parts of Taiwan. Rotaviruses were detected by ELISA. The samples detected as rotavirus positive were further analyzed the G and P genotypes by RT-PCR, and the electropherotypes by RNA polyacrylamide gel electrophoresis.

In the fecal samples from the patients with acute gastroenteritis in the period from January to October 2004, the rotavirus-positive detection rates in Taipei and Kaoshiung for rotavirus were 17.8% and 29.8%, respectively. Most of the positive samples were collected from January to March. In the period from November 2004 to October 2005, rotavirus-positive detection rates in Taipei and Kaoshiung for rotavirus were 7.4% and 22.7%, respectively. Approximately half of the cases were from children under age two, 15-20% from children over 5-year-old.

In the period from January to October 2004, G9 rotavirus was the most prevalent virus, it contributed about 40 % of the rotavirus infections in Taipei area, over 50% in Kaoshiung area. G1, G2, and G3 rotaviruses were detected in these regions. G1 and G2 rotaviruses each contributed more than 20% of the rotavirus infection in Taipei area. Taken together, mixed rotavirus infections were detected in about 3% of the samples. In the period from November 2004 to October 2005, G3 and G2 were the most prevalent types in Taipei and Kaoshiung, respectively. G9 contributed less than 20% of the infections.

Analysis of the G and P genotypes, and RNA electropherotypes of rotavirus samples showed that some rotaviruses had unusual combinations of G and P types or incompatible RNA electropherotypes. These rotaviruses could have been formed from genetic reassortment. We must pay attention to their contribution in rotavirus epidemics in the future.

Caliciviruses were detected by RT-PCR. From the 2445 samples collected in one year period from 2002 to 2003, 4.6% and 8.9% of the samples from Taipei and Kaoshiung area were detected as calicivirus positive, respectively. The norovirus positive rate for Kaoshiung area was significantly higher than that for Taipei area. About 60% of these calicivirus positive samples were collected from children under age 3. The calicivirus positive samples were present in higher numbers from September to December in this study period. By sequence and phylogenetic analyses of RNA polymerase gene, these caliciviruses could be classified as Norwalk-like virus (NLV, Norovirus) and Saporo-like virus (SLV, Sapovirus). The number of NLV-positive samples was about four times that of SLV-positive samples. Of the NLV samples, majority belonged to genogroup II, only two belonged to genogroup I, and some were distantly related.

SARS coronavirus could not be detected in the samples collected before the SARS epidemic last year. However, coronavirus 229E-like viruses were detected in 1.4% of the samples, and most of the positive samples were collected from January to April, 2002.

Astrovirus was also detected by RT-PCR. From the 2160 samples collected in one year period from 2002 to 2003, 8.1% and 5.5% of the samples from Taipei and Kaoshiung area were detected as astrovirus positive, respectively.

Astrovirus-positive detection rates between rotavirus-positive and rotavirus-negative samples were similar in Taipei area. However, no mixed infection detected in Kaoshiung area. Genotyping of astroviruses revealed that type 1 was most prevalent type, some strains with type 2, 3, 4, 5, and 8. Of the type 1 strains, more than 70% belonged to type 1a. We had successfully isolated type 1a and 1b, and type 5 astroviruses in CaCO₂ cell.

We need to keep the molecular epidemiology study of the viruses related to acute gastroenteritis for understanding the role of each viral agent and the changes from year to year. The information will be important for future selection and development of vaccines for our needs.

Keyword: Acute gastroenteritis, rotavirus, calicivirus, norovirus, sapovirus, coronavirus, astrovirus, molecular epidemiology