

INTERNATIONAL SYMPOSIUM ON INFECTIOUS DISEASES AND VACCINES



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Viral shedding of and during acute phase of hantavirus infection

Abstract:

Background: Andes virus (ANDV) is a zoonotic orthohantavirus that causes hantavirus cardiopulmonary syndrome (HCPS). Transmission typically occurs through environmental exposure, inhaling rodent feces and urine, but rare person-to-person transmission has been documented, mainly in family clusters and super-spreader events. Previous studies indicated that close contact (e.g., deep kissing, sexual contact, sharing food/drink, breastfeeding) during the prodromic phase posed a high risk for person-to-person transmission. Other studies utilized next-generation sequencing (NGS) for genomic comparisons between related cases in outbreaks. This study investigates ANDV presence and infectivity in body fluids from confirmed cases.



Methods: Clinical samples (buffy coat, plasma, gingival crevicular fluid (GCF), saliva, nasopharyngeal swabs (NPS), and urine) were collected weekly for three weeks from 133 confirmed ANDV HCPS cases (via specific ANDV-RT-qPCR) enrolled between 2008 and 2022. Samples were categorized as acute or convalescent (up to and after 16 days of symptom onset). Infectivity of positive fluids was assessed by culturing samples on Vero E6 cells and using flow cytometry assays to determine ANDV-N protein production.

Findings: ANDV-RNA was detected in 100% of buffy coats during the acute phase, declining to 95% by day 17, and 93% between days 23-29. ANDV-RNA in GCF and saliva decreased from 30% and 12% respectively during the acute phase to 12% and 11% during convalescence. Successful infectivity assays of positive fluids (including GCF, saliva, NPS, and urine) were observed in 42% (18/43) obtained during the acute phase. After re-culture, the capacity to infect Vero E6 cells was maintained in 88.9% (16/18). In brief, this study identifies the timing of ANDV shedding in a large cohort, suggesting a period during the acute phase (up to 16 days post-symptom onset) with higher viral shedding, depending on the compartment. The presence of infectious viral particles in GCF, saliva, and nasopharyngeal secretions indicates that exposure to these fluids may facilitate person-to-person transmission. This study enhances understanding of viral shedding during acute and convalescent phases, identifying body fluids with evidence of ANDV infection. This information can improve infection control strategies for healthcare personnel and close household contacts, and provides valuable data for molecular diagnosis from various sample sources.

Biography: Constanza Martínez-Valdebenito is a Biochemist with a Bachelor's degree from Universidad de Santiago de Chile, a Master of Science in Epidemiology, and a PhD candidate in Epidemiology at Pontificia Universidad Católica de Chile. Her research focuses on emerging infectious diseases, particularly zoonotic diseases, including hantavirus, influenza virus, and scrub typhus.

With over 16 years of experience in hantavirus research and a decade of work on scrub typhus, she has developed expertise in molecular diagnosis, epidemiology, genetic epidemiology, and vector-borne infections. Her work extends to understanding immunological responses in infectious diseases, contributing significantly to the fields of public health and disease prevention.