Jpn. J. Infect. Dis., 59, 2006

Laboratory and Epidemiology Communications

An Influenza AH3 Outbreak in a Hospital, Nara Prefecture, Japan, in Summer 2005

Yasushi Yonezawa*, Yumiko Inoue, Yoshiteru Kitahori and Mamoru Nakano

Virology and Bacteriology Division, Nara Prefectural Institute for Hygiene and Environment, Nara 630-8131, Japan

Communicated by Ichiro Kurane

(Accepted December 5, 2005)

An influenza outbreak occurred in summer, a non-epidemic season, in a hospital in the northern area of Nara Prefecture, Japan. The outbreak occurred in a ward for mentally and physically disabled patients. On July 15, the first patient, a 43-year-old male inpatient, developed fever (38.7°C) and fatigue of unknown origin. The second patient showed similar symptoms on July 31, and the disease then spread rapidly among inpatients and staff members from August 3 to August 10. A total of 28 inpatients and 10 staff members developed a similar illness (Fig. 1). All the patients showed typical influenza-like symptoms; fever (37.3 to 40.0°C), dyspnea, cough and rhinorrhea. In the hospital, the patients were examined with a rapid influenza detection kit using nasal drips and diagnosed with influenza A virus infection.

To obtain detailed information, we analyzed the virus by the RT-PCR method, DNA sequencing and hemagglutination inhibition (HI) assay. Influenza AH3 virus was detected by the RT-PCR method reported by Shimizu et al. (1), using specific primers (D01 and D02) for hemagglutinin genes of influenza AH3 virus. Next we determined the sequence of 222 nucleotides after TA cloning (pSTBlue-1 AccepTor™ Vector Kit; Novagen, Madison, Wis., USA) and compared the sequence with those of influenza AH3 strains in GenBank using a BLAST search. The results revealed that the detected A/Nara/29/2005 strain shared a high nucleotide homology with influenza A/Wyoming/03/2003 (GenBank accession no. AY531033). Nucleotide and amino acid sequences of the hemagglutinin region are shown in Figures 2A and 2B. Nucleotide and amino acid homologies between these two strains were 98.7% (227/231 bases) and 97.4% (75/77 amino acids), respectively. The A/Nara/29/2005 strain had four point mutations. Three provided amino-acid replacement: 429 (G→A, Ala to Thr), 483 (A→C, Lys to Asn) and 524 (A→T, Tyr to Phe), and one was a mutation with no amino acid change (position No. 444). Virus isolation was attempted from six specimens by inoculating the samples onto MDCK cells. A cytopathic effect was observed in all of the inoculated cells by day 3 or 4 after the inoculation. HI assay was performed using antisera against A/Wyoming/03/2003, A/Kumamoto/102/02 and A/Panama/2007/99, provided by the National Institute of Infectious Diseases, Tokyo. HI titers against respective antisera were 640 (homotypic titer, 1280), 640 (homotypic titer, 1280) and 20 (homotypic titer, 320). The results suggest that the isolated A/Nara/29/2005 strain was nearly identical to A/Wyoming/03/2003, the vaccine strain in the 2004/05 season (2).

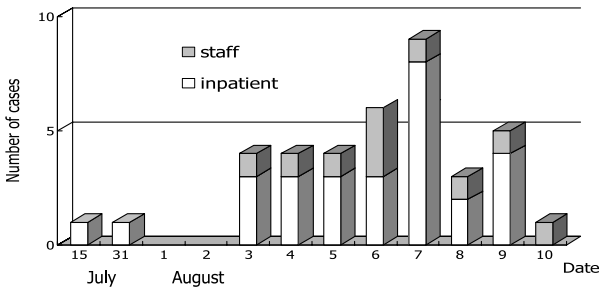

Fig. 1. Case distribution of the nosocomial infection.

In conclusion, the outbreak was caused by influenza AH3 virus, which was identified as an A/Wyoming/03/2003-like virus. This was the main epidemic strain in Nara Prefecture in the 2004/2005 season.

The authors would like to thank Dr. Rika Ishizuka and the staff members of Koriyama Public Health Center for their collaboration in this study.

This article appeared in the Infectious Agents Surveillance Report (IASR), vol. 26 p. 244-245, 2005 in Japanese.

*Corresponding author: Mailing address: Virology and Bacteriology Division, Nara Prefectural Institute for Hygiene and Environment, Ohmori-cho, Nara 630-8131, Japan. Tel: +81-742-20-2887, Fax: +81-742-27-0634, E-mail: y.yonezawa@ihe.pref.nara.jp

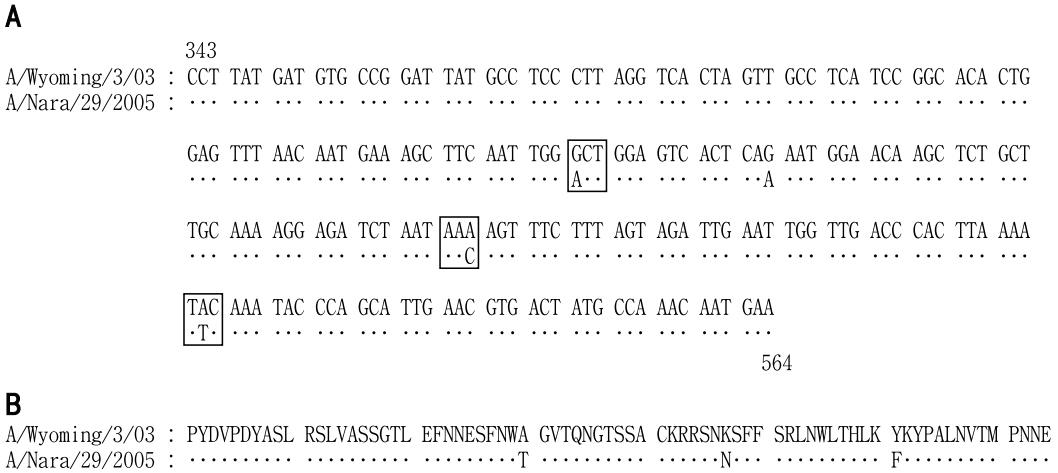

Fig. 2. Nucleotide (A) and predicted amino acid (B) sequences of the A/Nara/29/2005 gene (343-564).

REFERENCES

1. Shimizu, H., Watanabe, S. and Imai, M. (1997): Rapid detection of influenza virus A (AH1, AH3) and B by nested-polymerase chain reaction. J. Jpn. Assoc. Infect. Dis., 71, 522-526 (in Japanese).
2. National Institute of Infectious Diseases and Tuberculosis and Infectious Diseases Control Division, Ministry of Health, Labour and Welfare (2004): 2003/04 influenza season, Japan. Infect. Agents Surveillance Rep., 25, 278'-279'.