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LETTER TO THE EDITOR

Acute exacerbation of chronic obstructive pulmonary disease among hospitalized patients caused by influenza virus infection

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Influenza is an acute infectious viral disease that has been a threat to individual and global health (*1*). Influenza is highly contagious, acute, and widespread. This disease causes the death of 250,000 to 500,000 people annually. Deaths occur primarily among individuals with known risk factors, such as chronic respiratory disease (*2*). Influenza is highly infective, has high antigen variability, spreads rapidly, and has higher incidence and mortality rates among children, the elderly and immunocompromised individuals compared with healthy individuals (*3*). Accurate detection of influenza viruses can be slow and difficult. GICA is a simple, fast, accurate, and non-polluting method for rapidly detecting influenza virus antigens (*4, 5*). Chronic obstructive pulmonary disease (COPD) is the fourth leading cause of death worldwide. Acute exacerbation of COPD (AECOPD) is a common cause of mortality, morbidity, and high health care costs. Respiratory viruses, especially influenza viruses, are associated with approximately 50% of AECOPD cases. Thus, rapid influenza diagnosis is important among AECOPD patients (*6, 7*).

A total of 229 AECOPD hospitalized patients in the Department of Respiratory Medicine of the 306th Hospital (Beijing, China) from February 2007 to February 2010 were enrolled in this study. This study was conducted with approval from the Ethics Committee of the 306th Hospital. Written informed consent was obtained from all participants. We pressed the tongue of the patient with a spatula after rinsing the mouth. A throat swab and a nasal swab were inserted into the pharyngeal area and the nostrils to obtain secretions. Two root swabs were pooled fully into the diluents. The GICA kit was placed on a horizontal plane; three to four drops of the sample were placed into the sample hole. The results were observed after 10 min to 15 min. Two red ribbons in the detection and control areas indicated a positive result, whereas a single red ribbon in the control area indicated a negative result. Statistical analysis was conducted using SPSS 19.0 for Windows. A database was established by chi-square test. No statistically significant difference in the positive detection rates for influenza A and B was observed between the two gender groups ($P > 0.05$; Table 1). A total of 229 patients were divided into two groups: a younger than 65 years old group and a 65 years and older group. The difference in influenza A antigen positive detection rate was statistically significant between the two age groups ($P < 0.05$). The influenza B antigen positive detection rate was higher among the older patients than that in the younger ones, but the difference was not statistically significant ($P > 0.05$; Table 1). Higher influenza A antigen positive detection rate was observed among the 229 AE-

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Abbreviations: AECOPD = acute exacerbation of chronic obstructive pulmonary disease; COPD = chronic obstructive pulmonary disease; GICA = gold immunochromatography assays

Table 1. Comparing influenza virus antigen-positive detection rate in different groups and in different quarter

	Total of cases		Influenza A		Influenza B	
			No. of positive cases (%)	χ^2 (P)	No. of positive cases (%)	χ^2 (P)
Gender	Male	163	29 (17.8%)	1.857 (0.173)	15 (9.0%)	0.443 (0.506)
	Female	66	17 (13.3%)		8 (12.1%)	
Age	≥65 years	185	43 (23.2%)	4.995 (0.025)	22 (11.9%)	2.653 (0.103)
	<65 years	44	3 (6.8%)		1 (2.3%)	
Quarter	1st	59	17 (28.8%)	1st/2nd: 4.802 (0.028)	8 (13.6%)	3.372(0.324)
	2nd	39	4 (10.3%)	1st/3rd: 7.538 (0.006)	2 (5.1%)	
	3rd	50	4 (8.0%)	2nd/4th/:3.919 (0.048)	3 (6.0%)	
	4th	81	21 (25.9%)	3rd/4th/: 6.433 (0.011)	10 (12.3%)	

COPD patients in the first and fourth quarter than that in the second and third quarters of the year (P <0.05). The influenza B positive detection rate of the 229 AECOPD patients did not significantly differ among the quarters (χ^2 = 3.472; P = 0.324; Table 1).

The symptoms of the patients that were positive in the influenza virus test were typical of influenza, such as fever, coughing, runny nose, sore throat, muscle pain, headache, and general fatigue. However, five patients were febrile, and four of whom were over 65 years old. The blood sedimentation and C-reactive protein of most patients were moderately increased, with a number of patients exhibiting normal to high values. The white blood cell and neutrophil counts of the patients were normal to decreased; only 10 patients exhibited higher than normal total white blood cell counts.

Influenza is an acute respiratory viral infection that continues to pose endemic and pandemic threats to human health. This disease has the highest incidence among all infectious diseases. Influenza is also the first infectious disease that has been monitored at a global scale (*8, 9*). The diagnosis of influenza should be based on clinical symptoms and laboratory results. The GICA method is a rapid diagnostic technique with good specificity and simple operation. This method is especially suitable for grassroots clinical research (*10, 11*). In our research, different AECOPD age groups showed variations in the detection of influenza viruses. The influenza virus A detection rate was significantly higher among patients above 65 years old than among patients less than 65 years old. This finding was consistent with the results in another paper, which showed that the flu viruses are the primary cause of acute respiratory infections among the elderly (*12*). This finding may be related to the reduced immunity of the respiratory tract because of the reduced number of epithelial cells, gland atrophy, thinner mucosa, and sIgA secretion by epithelial and plasma cells, which increase with age (*13*).

Influenza outbreaks are seasonal. Influenza often occurs from November to March in the Northern Hemisphere [14], which is consistent with the incidence of influenza A among AECOPD patients in this study. COPD is a chronic inflammatory airway condition associated with episodes of acute deterioration (called acute exacerbations). AECOPD is characterized by the worsening of respiratory symptoms from the usual sTable state, dyspnoea, increased sputum volume, and purulence. AECOPD is a common cause of mortality and morbidity; hence, prevention of AECOPD is as important as the effective treatment of the exacerbations (*15–18*). Exacerbations are closely related to bacterial infections; however, several studies have shown that viruses have an important function in the exacerbation of COPD. Moreover, viral infections may cause one third of all the exacerbation of COPD, and influenza viruses may be a significant cause of AECOPD (*19, 6, 20*). Some patients in the present study, especially those in the older age group, were febrile. This unresponsiveness can be attributed to poor temperature reaction because of the decreased immunity of the elderly, which should be considered to avoid misdiagnosis. Although GICA is highly specific for the rapid detection of influenza viruses and provides helpful diagnostic information, this method only has moderate sensitivity when detecting influenza viruses. The sensitivity of GICA varies from 54% to 96% among different studies [21, 22], which may affect the accuracy of the results. In future studies, clinically ill patients suspected of influenza who were tested negative using GICA should be tested using more sensitive methods for virus detection (such as PCR or culture methods) to confirm the diagnosis.

In conclusion, this study indicates that sporadic cases of influenza occur throughout the year among AECOPD patients. Elderly AECOPD patients are at high risk of influenza virus infections. Preventing viral influenza infections among COPD patients may substantially decrease morbidity, mortality, and the use of medical resources. Annual vaccination is recommended for COPD patients to help reduce the frequency of exacerbations (*23, 24*).

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