

## Hospitalized Adult Patients with 2009 Pandemic Influenza A (H1N1) in Kaunas, Lithuania

Auksė Mickienė<sup>1</sup>, Lina Daniusevičiūtė<sup>1</sup>, Neringa Vanagaitė<sup>2</sup>, Daiva Vėlyvytė<sup>1</sup>, Ona Blauzdžiūnienė<sup>3</sup>, Rūta Nadišauskienė<sup>3</sup>, Andrius Macas<sup>4</sup>, Raimundas Sakalauskas<sup>5</sup>, Vidas Pilvinis<sup>6</sup>, Irena Nedzelskienė<sup>7</sup>, Liucija Jodžiūnienė<sup>8</sup>

<sup>1</sup>Department of Infectious Diseases, Medical Academy, Lithuanian University of Health Sciences,

<sup>2</sup>Department of Radiology, Medical Academy, Lithuanian University of Health Sciences,

<sup>3</sup>Department of Obstetrics and Gynecology, Medical Academy, Lithuanian University of Health Sciences,

<sup>4</sup>Department of Anesthesiology, Medical Academy, Lithuanian University of Health Sciences,

<sup>5</sup>Department of Pulmonology and Immunology, Medical Academy, Lithuanian University of Health Sciences,

<sup>6</sup>Department of Intensive Care, Medical Academy, Lithuanian University of Health Sciences,

<sup>7</sup>Department of Dental and Oral Pathology, Medical Academy, Lithuanian University of Health Sciences,

<sup>8</sup>Intensive Care Unit, Kaunas Hospital, Lithuania

**Key words:** influenza A (H1N1); risk factors; pregnancy; complications; pneumonia.

**Summary.** The objective of this study was to identify case characteristics and clinical course of the disease in patients hospitalized with 2009 pandemic influenza A (H1N1) infection during the first wave of the pandemic and to identify risk factors associated with the complicated course of illness.

**Material and methods.** A retrospective study of adult cases of the laboratory-confirmed 2009 pandemic influenza A (H1N1) virus admitted to three hospitals in Kaunas between November 1, 2009, and March 15, 2010, was carried out. The main outcome measures were clinical characteristics, risk factors for complicated disease, treatment, and clinical course of the disease.

**Results.** The study enrolled 121 of the 125 patients hospitalized due to 2009 pandemic influenza A (H1N1) virus infection. The median age was 31 years (range, 18–83); 5% of the patients were aged more than 65 years. Pregnant and postpartum women comprised 26% of all hospitalized cases. Nearly half (49.5%) of those who underwent chest radiography had findings consistent with pneumonia, which was bilateral in one-third of cases. The risk to have pandemic influenza complicated by pneumonia increased significantly with one-day delay from symptom onset to antiviral treatment (OR, 2.241; 95% CI, 1.354–3.710). More than half (57%) of the patients received antiviral treatment. In 45% of the treated patients, antiviral drugs were administered within 48 hours from symptom onset. Intensive care was required in 7.4% of the cases. The overall mortality was 5% (6/121). The median age of the patients who died was 43.5 years (range, 23–62); 4 patients had been previously healthy, 1 patient suffered from chronic lympholeukemia, and 1 patient was a pregnant woman.

**Conclusion.** The 2009 pandemic influenza A (H1N1) caused considerable morbidity in a significant proportion of hospitalized adults. The main risk factor associated with the complicated course of illness was delayed antiviral treatment.

### Introduction

The novel influenza A (H1N1) virus was first identified in Mexico in April 2009. Different from the strains in the past and containing a unique combination of gene segments from swine, avian, and human lineages, this new virus appeared to be able to spread among human beings leading to influenza-like symptoms and progressing in a few cases to viral pneumonia, respiratory failure, and death. On June 11, 2009, the World Health Organization (WHO) raised the level of pandemic alert to phase 6, indi-

cating that a global pandemic had begun (1).

In Lithuania, the first case of pandemic influenza was diagnosed on June 26, 2009, in a traveler who had returned from India. Since the beginning of November, a sustained local spread of the pandemic influenza virus within the country was documented. A total of 69 000 influenza cases were registered during the first wave of the pandemic. The laboratory-confirmed pandemic influenza was reported in 810 cases resulting in 23 deaths (2).

Pandemic influenza seems to be more severe than

Correspondence to A. Mickienė, Department of Infectious Diseases, Medical Academy, Lithuanian University of Health Sciences, Baltijos 120, 47116 Kaunas, Lithuania  
E-mail: amickiene@yahoo.com

Adresas susirašinėti: A. Mickienė, LSMU MA Infekcinių ligų klinika, Baltijos 120, 47116 Kaunas  
El. paštas: amickiene@yahoo.com

the previous seasonal influenza A (H3N2), which has dominated since 1968 (3, 4). The 2009 influenza A (H1N1) virus has a higher affinity for  $\alpha 2,3$  sialic acid receptors in the lungs compared with A (H3N2), which explains why the risk of developing virus pneumonia is higher with the new pandemic virus (5).

Hereby, we report the main clinical findings and risk factors for complicated disease in adult patients hospitalized due to 2009 pandemic influenza A (H1N1) in Kaunas, Lithuania.

### Material and Methods

The study retrospectively reviewed adult ( $\geq 18$  years of age) cases of the pandemic 2009 influenza A (H1N1) virus admitted to three hospitals located in Kaunas (Hospital of the Lithuanian University of Health Sciences [former Kaunas University of Medicine], Kaunas Hospital, and Kaunas 2nd Clinical Hospital) between November 1, 2009, and March 15, 2010. Patients admitted to the hospitals mentioned above were considered eligible for inclusion into the study if they had 2009 influenza A (H1N1) virus infection confirmed by the detection of the virus from the nasopharyngeal swab sample by a real-time reverse transcriptase polymerase chain reaction (RT-PCR) assay using test kits supported by the WHO from the Centers for Disease Control and Prevention (CDC) (CDC RT-PCR protocol for detection and characterization of swine influenza, version 2009, CDC REF.#I-007-05) (6). Testing was performed at the Virology Laboratory of the Center for Communicable Diseases and AIDS of Lithuania, a statewide service.

Data on demographics, clinical signs and symptoms, comorbid conditions, selected laboratory tests, radiographic findings, treatment course, and outcomes were extracted from the medical records using the same standardized case report form by two investigators. Comorbidities were considered absent in cases for which records stated that a patient had been previously healthy or had no underlying medical conditions or when there was no direct reference to the condition. Body mass index (BMI) was calculated for the patients whose height and weight were available. Obesity was defined as BMI of  $\geq 30$  kg/m<sup>2</sup>. BMI was not calculated for pregnant women. Fever was defined as documented or self-reported temperature of  $\geq 37.7^\circ\text{C}$ .

Complicated pandemic influenza was defined in the presence of radiologically confirmed pneumonia, septic shock, multiorgan failure, central nervous system (CNS) involvement, etc. or secondary bacterial infections of the upper respiratory tract defined and diagnosed by standard methods. A severe case was defined as requiring admission to an intensive care unit (ICU) or death.

Data on Kaunas city and district demographics were obtained from the Department of Statistics under the Government of the Republic of Lithuania (7).

*Statistical Analysis.* Missing or unknown information was excluded from all calculations. Patients who had a noncomplicated course of influenza were compared with those who experienced complications. Nonsevere cases were compared with the severe ones. A comparison of pregnant women with nonpregnant women of childbearing age was also made.

Statistical analysis included descriptive statistics with frequency analysis (percentages) for categorical variables and median values with ranges and/or means with standard deviations (SDs) for continuous variables. To test for differences between the compared groups, the two-sample *t* or Mann-Whitney tests were used for continuous variables as appropriate, and the  $\chi^2$  test was used for categorical variables.

Multivariate logistic regression models were employed to investigate associations of risk factors with the complicated illness. Results of the logistic regression analysis are summarized by odds ratios (OR) and 95% confidence intervals (CI) with OR greater than 1.0 signifying greater risk of complications.

Receiver operating characteristic (ROC) analysis was used to calculate cut-off points and their sensitivity as well as specificity for age, BMI, time from symptom onset to hospitalization, and C-reactive protein (CRP) level.

*P* values were two-sided and considered to be statistically significant if  $< 0.05$  (SPSS Statistics for Windows software, version 13.0).

### Results

*Demographic Data and Clinical Characteristics.* The study involved three settings: the tertiary hospital, the university-associated city hospital with the ward specially designed for the treatment of infectious diseases patients, and the regional hospital. These hospitals admitted 124 of the 125 laboratory confirmed pandemic influenza cases hospitalized in Kaunas. Hospital records of 3 eligible cases were not available for the review; therefore, these cases were not included into the study. Overall, 121 patients were examined: 77 cases (64%) were treated in Kaunas 2nd Clinical Hospital (university-associated), 37 cases (30%) in the Hospital of the Lithuanian University of Health Sciences (tertiary institution), and 7 cases (6%) in Kaunas Hospital (regional).

The first pandemic influenza case was admitted during week 47, 2009, and the last during week 8, 2010. A quarter of study participants (31/121, 26%) were hospitalized during week 48, 2009 (Fig. 1).

The median age of the study participants was 31 years (range, 18–83). Patients aged 18 to 40 years comprised 66.1% (80/121). Age-adjusted incidence

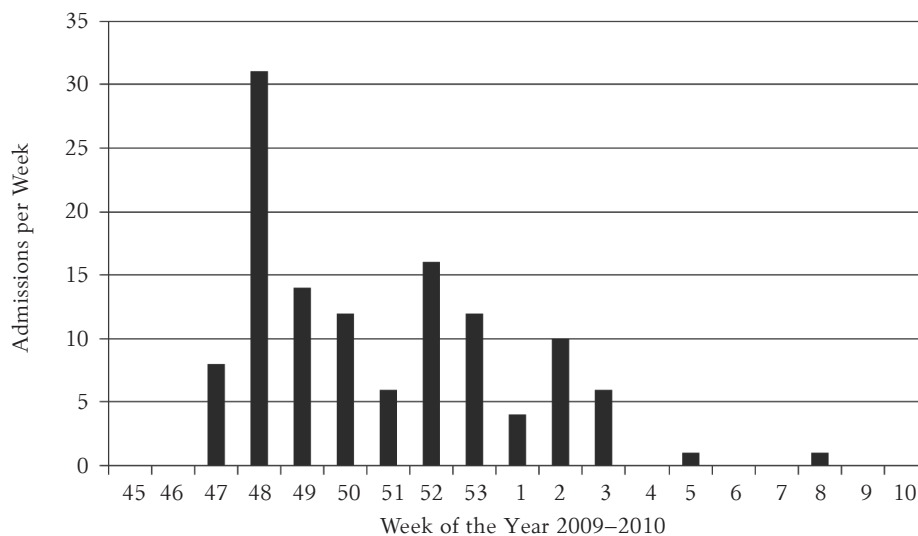


Fig. 1. Number of weekly admissions of patients with confirmed pandemic influenza to three participating hospitals

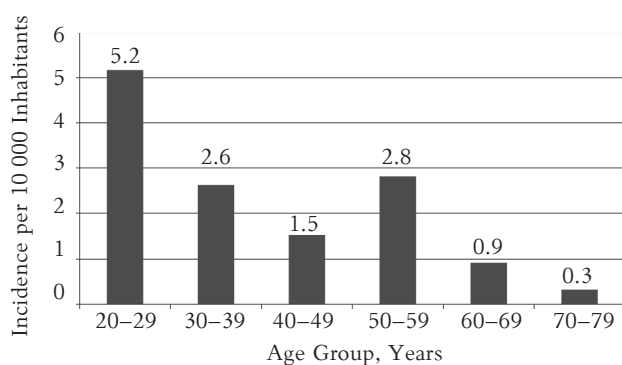


Fig. 2. Age-adjusted incidence of 2009 A (H1N1) virus infection requiring hospital admission in Kaunas

of influenza A (H1N1) virus infection requiring hospital admission in Kaunas is presented in Fig. 2.

Demographic data, risk conditions, and clinical symptoms are shown in Table 1.

The median time from illness onset to hospital admission was 2 days (range, 0–7).

Nosocomial influenza was diagnosed in 3 cases (2%).

On admission, 64 patients (53%) reported symptoms, which met the WHO clinical case definition of uncomplicated pandemic influenza (fever with cough, sore throat, rhinorrhea, headache, muscle pain, or malaise, but no shortness of breath and dyspnea), and 46 patients (38%) had symptoms compatible with the definition of complicated influenza (fever and dyspnea and/or hypoxia) or presenting secondary complications such as septic shock, multiorgan failure, CNS involvement, etc. Eleven patients (9%) could not be classified into any of the two groups due to the lack of the information regarding symptoms and signs described in the definition.

Of the 64 patients with the symptoms of uncomplicated influenza on admission, 38 (59.4%) had risk factors for severe disease from pandemic A (H1N1) virus infection according to the WHO: comorbidity was observed in 15, pregnancy in 23, obesity in 6, and 1 patient was aged more than 65 years.

**Diagnostic Findings.** Of the 97 patients who underwent chest radiography on admission, 48 (49.5%) had findings consistent with pneumonia. Radiographic findings included bilateral infiltrates in 35.4% (17/48) of the patients; the remaining had unilateral infiltration. Chest x-ray abnormalities on admission were detected in 14 (31.8%) of the 44 patients and 30 (69.8%) of the 43 patients with the clinical symptoms compatible with uncomplicated and complicated influenza, respectively, corresponding to the WHO definition. Both sensitivity and specificity of the definition of uncomplicated and complicated influenza were 0.7.

Of the 34 patients whose blood cultures or lower respiratory tract specimens were taken, 10 (29%) had microbiologic evidence of the secondary bacterial infection. The most common isolates were *Klebsiella* (n=3) and *Pseudomonas aeruginosa* (n=3).

The rest of the baseline laboratory findings are presented in Table 1.

**Treatment.** The data regarding the use of antiviral drugs were available from all patients. Antiviral treatment was given to 69 patients (57%). All patients were treated with oseltamivir. Oseltamivir at a standard dosage of 75 mg twice a day was given to 66 patients. An increased dosage (150 mg twice a day) was used in 3 patients. The median time from illness onset to initiation of antiviral therapy was 3 days (range, 0–10). The mean time from symptom onset to oseltamivir therapy in patients with risk conditions was 4.0 days (SD, 2.74 days) and

Table 1. The Baseline Characteristics of the Total Study Sample and Comparison of Patients With Complicated and Noncomplicated Influenza A (H1N1)

Study Characteristic	Total n=121	Clinical Course		P
		Noncomplicated n=69	Complicated n=52	
<b>Demographics</b>				
Sex, male, n (%)	52 (43)	20 (29.0)	32 (61.5)	<0.001
Age, mean (SD), years	36.3 (15.7)	29.7 (11.7)	45.1 (16.1)	<0.001
Age >65 years, n (%)	6 (5)	2 (2.9)	4 (7.7)	0.229
Age >35 years, n (%)	54 (44.6)	15 (21.7)	39 (75.0)	<0.001
Time from symptom onset to hospitalization, mean (SD), days	2.74 (1.99)	2.13 (1.38)	3.44 (2.22)	0.001
Hospitalized within 48 h, n (%)	61 (52.1)	42 (61.8)	19 (38.8)	0.014
Hospitalized after 96 h, n (%)	20 (17.2)	3 (4.4)	17 (35.4)	<0.001
<b>Risk conditions</b>				
Obesity BMI >30 kg/m <sup>2</sup> , n (%)	15 (23.1)	5 (14.7)	10 (32.3)	0.093
BMI >27 kg/m <sup>2</sup> , n (%)	26 (40)	8 (23.5)	18 (69.2)	0.005
Pregnancy, n (%)	31 (26)	28 (63.6)	3 (27.3)	0.030
Lung disease, n (%)	14 (11.6)	9 (13.0)	5 (9.6)	0.559
Kidney disease, n (%)	8 (6.6)	2 (2.9)	6 (11.5)	0.058
Diabetes mellitus, n (%)	8 (6.6)	3 (4.3)	5 (9.6)	0.248
Gastrointestinal tract disease, n (%)	8 (6.6)	3 (4.3)	5 (9.6)	0.248
Cardiovascular pathology, n (%)	26 (21.5)	5 (7.2)	21 (40.4)	<0.001
Immunosuppression, n (%)	2 (1.7)	0 (0)	2 (3.8)	0.183
At least one comorbidity, n (%)	50 (41.3)	20 (29.0)	30 (57.7)	0.002
<b>Symptoms</b>				
Fever, n (%)	105 (87)	58 (84.1)	47 (90.4)	0.808
Cough, n (%)	108 (89)	63 (91.3)	45 (86.5)	0.402
Shortness of breath, n (%)	39 (32)	13 (18.8)	26 (50)	<0.001
Myalgia, n (%)	60 (49.6)	36 (52.2)	24 (46.2)	0.512
Gastrointestinal symptoms, n (%)	19 (16)	15 (21.7)	4 (8.2)	0.048
Headache, n (%)	46 (38)	30 (43.5)	16 (30.8)	0.154
<b>Laboratory values</b>				
CRP, mean (SD), mg/L	66.5 (84.8)	31.46 (30.68)	112.9 (108.62)	<0.001
CRP >100 mg/L, n (%)	24 (19.8)	2 (2.9)	22 (42.3)	<0.001
Leukocyte count, n (%):				
<4×10 <sup>9</sup> /L	82 (69.5)	48 (70.6)	34 (68.0)	
4–10×10 <sup>9</sup> /L	21 (17.8)	11 (16.2)	10 (20.0)	0.846
>10×10 <sup>9</sup> /L	15 (12.7)	9 (13.2)	6 (12.0)	
Lymphopenia <1×10 <sup>9</sup> /L, n (%)	72 (66)	48 (70.6)	24 (57.1)	0.150
Thrombocytopenia <140×10 <sup>9</sup> /L, n (%)	27 (23)	15 (21.7)	12 (24.0)	0.771
SpO <sub>2</sub> , <95%, n (%)	25 (58)	7 (46.7)	18 (64.3)	0.264
<b>Treatment</b>				
Antiviral treatment, n (%)	69 (57)	34 (49.3)	35 (67.3)	0.047
Time from symptom onset to initiation of antiviral treatment, mean (SD), days	3.85 (3.57)	2.12 (1.67)	4.81 (2.76)	0.001
Treatment started within 48 h, n (%)	30 (45.5)	23 (69.7)	7 (21.2)	<0.001

BMI, body mass index.

in those without risk conditions was 3.14 days (SD, 2.55 days) ( $P=0.221$ ). In these groups of patients, antiviral therapy was started within 48 hours in 22 (50%) and 8 (36.4%) cases, respectively ( $P=0.294$ ).

Of the 121 patients, 86 (71%) received antibiotics. Commonly used antibiotics were amino-penicillins administered as monotherapy in 29 cases (33.7%) and in combination with aminoglycosides in 5 cases (5.8%). Penicillin was used in 10 cases

(11.6%), second-generation cephalosporins in 15 (17.4%), second-generation or third-generation cephalosporins in combination with various other antimicrobial agents in 18 (20.9%), and other antibiotics in 9 cases (10.5%).

Antiviral drugs were administered to 34 (71%) of the 48 patients with radiographic findings consistent with pneumonia. At the same time, all patients (100%) were treated with antibiotics.

**Clinical Course. Complicated vs. Noncomplicated Cases.** In total, complicated influenza was diagnosed in 52 (43%) of the 121 cases. Radiologically confirmed pneumonia was the main complication observed in 48 (92.3%) of the 52 complicated cases. Otitis (n=1), sinusitis (n=2), and tonsillitis (n=1) were diagnosed in 7.7% of cases.

Comparison of the baseline characteristics of patients with complicated vs. noncomplicated influenza A (H1N1) is presented in Table 1.

Factors predicting complications were found to have the following cut-off points: age of 35 years (sensitivity, 0.75; specificity, 0.78), hospitalization 96 h after symptom onset (sensitivity, 0.37; specificity, 0.96), BMI of >27 kg/m<sup>2</sup> (sensitivity, 0.58; specificity, 0.77), and CRP level of 50 mg/L (sensitivity, 0.6; specificity, 0.9).

Independent predictors of the complicated course of illness were assessed using the multivariate logistic regression model. Only factors that were statistically significant were included in the multivariate analysis, i.e., age, sex, CRP level, and time from symptom onset to antiviral treatment. Since age and presence of comorbidities, time from symptom onset to hospitalization, and initiation of antiviral treatment as well as shortness of breath and CRP levels were interrelated, only one of the two interrelated variables was included in the logistic regression model.

The risk to have a complicated course of pandemic influenza increased significantly with one-day delay from symptom onset to antiviral treatment (OR, 2.241; 95% CI, 1.354–3.710), an increase in CRP level above 50 mg/L (OR, 15.082; 95% CI, 2.392–95.095), an increase in age with each decade (OR, 2.784; 95% CI, 1.362–5.692), and being male (OR, 11.831; 95% CI, 1.627–86.005).

**Severe cases.** Of the 121 patients examined, 9 (7.4%) were admitted to an ICU. The median age of those who were admitted to the ICU was 43 years (range, 23–62 years). Of the 9 ICU patients, 3 had underlying medical conditions, including 1 patient with chronic lympholeukemia, 1 pregnant woman (25-week pregnancy), and 1 obese patient with cardiovascular pathology. Acute respiratory distress syndrome was diagnosed in 7 ICU patients; 5 had

a clinical diagnosis of septic shock. Mechanical ventilation was urgent in 8 cases; meanwhile, extracorporeal membrane oxygenation was necessary in 2 cases. Secondary bacterial pneumonia was diagnosed in 3 ICU patients, in all of which it was ventilation-associated pneumonia caused by *Pseudomonas* (n=2) and *Acinetobacter* (n=1). All patients received antiviral drugs and antibiotics.

Of the 121 study patients, 6 (5%) died; all were ICU patients. The median age of the patients who died was 43.5 years (range, 23–62). A pregnant woman and a patient with lympholeukemia were among those who died. The remaining 4 patients who died had been previously healthy.

The median time from illness onset to initiation of antiviral therapy in both the groups of ICU patients who survived and those who died was 5 days (range, 0–10 days). Antiviral drugs had been given to 22% (2/9) of the ICU patients and 17% (1/6) of the patients who died within 48 h after illness onset.

The mean hospital stay of noncomplicated, complicated, and severe cases was 4.8±2.3, 12.2±13, and 33±32.5 days, respectively. The median time from illness onset to death was 21.5 days (range, 7–49 days).

Table 2 represents comparison of severe with nonsevere cases.

**Pregnant vs. Nonpregnant Women of the Reproductive Age.** Of the 55 women in the study cohort who were of childbearing age (18–44 years old), 30 (54.5%) were pregnant and 1 immediately postpartum (1.8%). Of the 30 pregnant women, 2 (7%) were in the first, 15 (50%) in the second, and 13 (43%) in the third pregnancy trimester. No obstetric complications in the group of pregnant women were reported during hospitalization. Comparison of pregnant and nonpregnant women of childbearing age is presented in Table 3.

## Discussion

In this study, we have shown that pandemic influenza caused considerable morbidity in a significant proportion of hospitalized adults and that the use of antiviral drugs was beneficial in hospitalized patients, especially when such therapy was initiated early.

The majority of information on clinical presen-

Table 2. The Baseline Characteristics of Patients With Severe and Nonsevere Pandemic Influenza A (H1N1)

Baseline Characteristic	Nonsevere n=112	Severe n=9	P
Sex, male, n (%)	49 (43.8)	3 (33.3)	0.731
Age, mean (SD), years	35.9 (15.9)	40.1 (13.8)	0.450
Time from symptom onset to hospitalization, mean (SD), days	2.60 (1.82)	3.63 (2.50)	0.139
Hospitalized within 48 h, n (%)	58 (53.2)	3 (37.5)	0.477
BMI, mean (SD), kg/m <sup>2</sup>	26.02 (5.74)	32.73 (8.69)	0.112
At least one risk condition, n (%)	73 (65.2)	3 (33.3)	0.076
Time from symptom onset to initiation of antiviral treatment, mean (SD), days	3.20 (2.49)	5.00 (3.16)	0.685
Treatment started within 48 h, n (%)	28 (49.1)	2 (22.2)	0.166

Table 3. The Baseline Characteristics of Pregnant vs. Nonpregnant Women of the Reproductive Age With Pandemic Influenza A (H1N1)

Baseline Characteristic	Pregnant Women n=31	Nonpregnant Women of the Reproductive Age n=24	<i>P</i>
Age, mean (SD), years	25.6 (5.5)	28.3 (5.5)	0.129
Time from symptom onset to hospitalization, mean (SD), days	1.79 (1.37)	3.33 (1.81)	0.001
Hospitalized within 48 h, n (%)	20 (69.0)	8 (33.3)	0.010
At least one comorbidity, n (%)	5 (16.1)	5 (20.8)	0.654
Fever, n (%)	30 (96.8)	23 (95.8)	0.853
Cough, n (%)	28 (90.3)	21 (87.5)	0.902
Shortness of breath, n (%)	4 (12.9)	8 (33.3)	0.069
Myalgia, n (%)	14 (45.2)	11 (45.8)	0.960
Gastrointestinal symptoms, n (%)	2 (6.5)	6 (25)	0.060
Headache, n (%)	15 (48.4)	11 (45.8)	0.851
Complicated influenza, n (%)	3 (9.7)	8 (33.3)	0.04
Antiviral treatment, n (%)	19 (61.3)	14 (58.3)	0.824
Time from symptom onset to initiation of antiviral treatment, mean (SD), days	2.18 (1.88)	4.43 (2.10)	0.004
Treatment started within 48 h, n (%)	9 (52.9)	4 (28.6)	0.171

tation, outcome, and risk factors for severe disease associated with pandemic influenza comes from various countries of the Southern Hemisphere and North America, whereas there is limited information available from European countries and, to our best knowledge, no information from the Baltic States. The cases presented in this report comprise 25% (121/490) of all the laboratory-confirmed adult pandemic influenza cases in Lithuania and include all the hospitalized adult patients with confirmed pandemic influenza from a catchment area of 438 820 inhabitants (6, 7). We believe that it strengthens the validity of our findings despite the retrospective nature of this study.

The distribution of influenza A (H1N1) cases by age, characterized by the concentration of cases in 18–40-year-old individuals, was similar to the distribution of cases observed worldwide (8–11). Only 5% of our patients were aged more than 65 years. Such findings suggest the possibility of varying levels of immunity in this age group or a reduced penetration of the virus into the elderly community in the first wave of the pandemic.

The majority of hospitalized patients in our study had the recognized risk factors for severe influenza. Obesity and cardiovascular pathology were the most common risk conditions. Arterial hypertension was the main illness observed in 69% of cases with cardiovascular pathology (data not shown). This reflects a higher prevalence of arterial hypertension in relation to age rather than influence on the course of disease (3, 4, 9, 10). In contrast, recent reports have reported high proportions of severe or fatal pandemic influenza cases among obese patients (8–11). We did not, however, observe significant differences in the prevalence of any obesity among hospitalized patients who died and those who survived due to the limited number of patients includ-

ed in our study. However, taking into consideration its prevalence in our cohort and the fact that obesity is usually associated with other conditions such as diabetes, obesity should be viewed as an important risk factor when treatment and prevention measures of influenza are considered.

Pneumonia was the main complication observed in 39.7% of hospitalized patients. Complicated disease was associated with a longer interval from symptom onset to antiviral treatment and increased age. Shortness of breath was significantly more often observed in the group of complicated cases and can be considered as a highly predictive symptom of possible involvement of the lower respiratory tract. However, 1 of the 3 patients with clinical symptoms compatible with the WHO definition of uncomplicated pandemic influenza had radiologically confirmed pneumonia on admission. Moreover, more than one-third of complicated cases (38.8%) were hospitalized within 48 hours from symptom onset. These findings suggest that involvement of the lower respiratory tract can be rapid in a significant proportion of patients with pandemic influenza and that sensitivity of subjective complaints is rather low to rely on it.

A significantly greater proportion of patients who received antiviral treatment within 48 h from symptom onset of noncomplicated compared with complicated cases (69.7% vs. 21.2%,  $P > 0.001$ ) suggest that early antiviral treatment protects against the development of pneumonia. However, the role of neuraminidase inhibitors in recovery from pandemic influenza complicated by pneumonia remains unclear, since 30% of patients with radiologically confirmed pneumonia recovered without antiviral treatment. Similar findings were reported in other studies (12–15). It is difficult to determine precisely the cause of pneumonia based on radiographs only,

and further studies are necessary to correlate radiographic findings with the cause of pneumonia during an influenza outbreak. In the absence of accurate diagnostic methods, treatment with both antibiotics and antiviral drugs should be indicated for the patients who are hospitalized with suspected influenza and lung infiltrates on chest radiography.

In our series, severe cases requiring management in the ICU occurred in all age groups, mostly in previously healthy individuals without any known risk factors predisposing to complicated influenza. Death occurred in 5% of patients in our study, which corresponds to the findings reported elsewhere (10, 15, 16). The risk of death from seasonal influenza is highest among people aged 65 years and more. In the case of pandemic influenza, severe outcomes occurred in a much younger population than typically it is in the case of seasonal influenza (10, 17–19). The results of our study confirm this observation.

A significant proportion – a quarter of all hospitalized patients – in this cohort was comprised of pregnant or postpartum women. The majority of pregnant women (90.3%) had uncomplicated influenza and were admitted due to pregnancy as a major risk factor for possible aggravated course of illness. Pregnant women did not differ from nonpregnant with regard to age, comorbidity, and use of antivirals. Only 1 of the 31 pregnant and postpartum patients had a severe course and died, which differs from the reports of increased mortality rates for this group of patients in other countries (20–26). Since time from symptom onset to hospitalization and initiation of antiviral treatment was significantly shorter in pregnant women compared to nonpregnant, it is tempting to conclude that pregnant women ben-

efit from early antiviral therapy. Taken together, we attribute our findings of a less complicated course of illness in pregnant women to early presentation, diagnosis, and prompt specific treatment.

Our study has several limitations, which make our findings suggestive rather than definitive. We evaluated only the patients with confirmed pandemic 2009 influenza A (H1N1) virus infection; therefore, our sample may not be representative of the hospitalized patients who may not have been tested. In addition, the criteria for hospitalization and the algorithms for the use of diagnostic tests were not uniform in all three participating centers. Finally, despite the use of a standardized data collection form, not all information was collected for all patients.

### Conclusions

We report the first case series on clinical spectrum of pandemic influenza in adults in Lithuania and conclude that delayed initiation of antiviral therapy may have contributed to increased severity of illness. The results of our study might help in guiding prevention measures and choosing disease management during the upcoming influenza seasons in Lithuania.

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## Nuo pandemio 2009 m. A (H1N1) gripo Kaune, Lietuvoje, stacionare gydyti suaugusieji

Auksė Mickienė<sup>1</sup>, Lina Daniusevičiūtė<sup>1</sup>, Neringa Vanagaitė<sup>2</sup>, Daiva Vėlyvytė<sup>1</sup>,  
Ona Blauzdžiūnienė<sup>3</sup>, Rūta Nadišauskienė<sup>3</sup>, Andrius Macas<sup>4</sup>, Raimundas Sakalauskas<sup>5</sup>,  
Vidas Pilvinis<sup>6</sup>, Irena Nedzelskienė<sup>7</sup>, Liucija Jodžiūnienė<sup>8</sup>

<sup>1</sup>Lietuvos sveikatos mokslų universiteto Medicinos akademijos Infekcinių ligų klinika,

<sup>2</sup>Lietuvos sveikatos mokslų universiteto Medicinos akademijos Radiologijos klinika, <sup>3</sup>Lietuvos sveikatos mokslų universiteto Medicinos akademijos Akušerijos ir ginekologijos klinika, <sup>4</sup>Lietuvos sveikatos mokslų universiteto Medicinos akademijos Anesteziologijos klinika, <sup>5</sup>Lietuvos sveikatos mokslų universiteto Medicinos akademijos Pulmonologijos ir imunologijos klinika,

<sup>6</sup>Lietuvos sveikatos mokslų universiteto Medicinos akademijos Intensyviosios terapijos klinika,

<sup>7</sup>Lietuvos sveikatos mokslų universiteto Medicinos akademijos Dantų ir burnos ligų klinika,

<sup>8</sup>Kauno ligoninės Reanimacijos ir intensyviosios terapijos skyrius

**Raktažodžiai:** 2009 m. A (H1N1) gripas, rizikos veiksniai, nėštumas, komplikacijos, pneumonija.

**Santrauka.** *Tyrimo tikslas.* Nustatyti pacientų, gydytų 2009 m. stacionare nuo pandemio A (H1N1) gripo per pirmuosius penkis pandemijos mėnesius, ligos ypatumus ir komplikuotos ligos formos rizikos veiksnius.

*Tiriamųjų kontingentas ir tyrimo metodika.* Retrospektyvioji suaugusių pacientų, patvirtintus laboratoriškai A (H1N1) gripą, gydytų trijose Kauno ligoninėse nuo 2009 m. lapkričio 1 d. iki 2010 m. kovo 15 d., analizė. Pagrindiniai vertinimo kriterijai: klinika, komplikuoto gripo rizikos veiksniai, gydymas ir ligos eiga.

**Rezultatai.** Į tyrimą įtrauktas 121 pacientas iš 125, hospitalizuotų dėl pandemio 2009 m. A (H1N1) gripo. Vidutinis tiriamųjų amžius – 31 metai (nuo 18 iki 83 metų). 5 proc. pacientų buvo vyresni nei 65 metų. Nėščios ir pogimdyminio laikotarpio moterys sudarė 26 proc. visų hospitalizuotų ligonių. Infiltracija plaučiuose nustatyta 49,5 proc. pacientų, kuriems buvo atlikta krūtinės ląstos rentgenograma, trečdaliu atvejų – abipusė. Plaučių uždegimu komplikuoto pandemio gripo rizika reikšmingai didėjo su kiekviena uždelsto gydymo vaistais nuo gripo diena (ŠS 2,241, 95 proc. PI 1,354–3,710). 57 proc. tiriamųjų skirtas gydymas vaistais nuo gripo, 45 proc. gydytų ligonių vaistai nuo gripo buvo pradėti vartoti per 48 val. nuo simptomų pradžios. 7,4 proc. pacientų gydyti intensyviosios terapijos skyriuose. Mirė 5 proc. pacientų (6 iš 121). Vidutinis mirusių pacientų amžius – 43,5 metų (nuo 23 iki 63 metų). Keturi mirę ligoniai nesirgo jokiomis gretutinėmis ligomis, vienas sirgo lėtine limfocitopenija, viena mirusioji buvo nėščia.

**Išvada.** Kompliktuotas pandemio 2009 m. A (H1N1) gripas nustatytas didelei daliai hospitalizuotų suaugusių pacientų. Svarbiausias komplikuoto pandemio gripo rizikos veiksnys – uždelstas gydymas vaistais nuo gripo.

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