

Original article:

Clinical profile of patients with H1N1 and non-H1N1 infection in a tertiary care centre

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Abstract:

Prognosis of patients with H1N1 pneumonia is relatively poor compared to that of non H1N1 pneumonia mainly due to exhibition rapidly progressive refractory hypoxemia in those patients which requires advanced ventilation strategies for adequate management of those patients. Studies have shown that in patients with H1N1 ARDS invasive ventilation is required in around 80% of patients. It is important to note that H1N1 affects relatively younger previously healthy individuals.^[2]Hence it is very important to understand and differentiate between the clinical presentation of patients with H1N1 and non-H1N1 infection for proper triage and treatment of these patients.

From this study we may conclude , patients with H1N1 infection often presents with shorter duration of symptoms with higher incidence of acute dyspnea, sorethroat compared to non-H1N1 infection which can be helpful to suspect H1N1 influenza patients in the peripheral health centre which helps the physician for early referral and treatment. H1N1 influenza infection is associated with higher mortality compared to non-H1N1 infection.

Introduction

H1N1 influenza infections have caused significant mortality and morbidity throughout the world since 2009 pandemic. Clinical presentation of H1N1 influenza ranges from mild flu to acute respiratory distress syndrome (ARDS). Prognosis of patients with H1N1 pneumonia is relatively poor compared to that of non H1N1 pneumonia mainly due to exhibition rapidly progressive refractory hypoxemia in those patients which requires advanced ventilation strategies for adequate management of those patients. Studies have shown that in patients with H1N1 ARDS invasive ventilation is required in around 80% of patients.^[1] It is important to note that H1N1 affects relatively younger previously healthy individuals.^[2]Hence it is very important to understand and differentiate between the clinical presentation of patients with H1N1 and non-H1N1 infection for proper triage and treatment of these patients.

Methodology

Study design: We conducted a retrospective study of all patients admitted to hospital with acute onset respiratory symptoms like cough and dyspnea and fever in a tertiary care teaching hospital during January- March 2017. Data was collected from the case records. We collected clinical characteristics, course of illness, radiological and laboratory parameters, outcome and H1N1 throat swab results. We compared among patients with H1N1 positive and H1N1 negative. Cases with inadequate history were excluded from the study. We collected information on patient's

age, sex, clinical presentation and duration of symptoms, comorbidities like diabetes mellitus, hypertension, COPD, risk factors such as smoking status and alcoholism were recorded. Clinical indicators like pulse rate, respiratory rate, blood pressure and oxygen saturation and laboratory parameters such as complete hemogram, liver function test, renal function tests and findings in the chest x-ray were noted. Throat swab for H1N1 was taken on the day of admission and put in a sterile container containing 3ml of viral transport media and sent to a government approved lab for detecting H1N1.

We also collected data on duration of hospital stay, ICU stay, number of patients put on non invasive ventilation and invasive ventilation. Results of sputum and blood cultures were also recorded.

Complete hemogram was analyzed in SYSMEX (6 part differential cell counter). Hemoglobin was quantified by Cyanmeth hemoglobin method and platelet count and total count was quantified using Flow-cytometer.

We defined acute respiratory symptoms as symptoms like cough, dyspnea, chest tightness within 1 week of presentation to hospital after exclusion of cardiac cause.

We defined smoking as “ An adult who has smoked 100 cigarettes in life time and who currently smokes cigarettes”^[3]

We defined Alcoholism as chronic alcohol use to the degree that interferes with physical and mental health, or with normal social or work behavior.^[4]

We defined Diabetes mellitus as per American Diabetes Association (ADA) as, A hemoglobin A1c (HbA1c) level of 6.5% or higher or A fasting plasma glucose level of 126 mg/dL or higher;^[5]

We defined Hypertension as per blood pressure >130 mm Hg systolic and >80mm Hg diastolic pressure.

Statistical methods: Descriptive data are presented as frequencies (percentages) for discrete variables and as means (SDs) for continuous variables. For comparisons between two groups, Mann-Whitney *U* test was used or, when appropriate, the two-sample *t*-test. Chi-square test was used to evaluate categorical factors. All statistical tests were 2-tailed, and factors were considered statistically significant at $p < 0.05$. IBM SPSS version 22 and CDC Epi Info version 7 was used for analysis.

Results

In our retrospective study, we found 80 patients admitted to hospital with acute respiratory symptoms. Twenty two patients were excluded from the study (20-inadequate data in case sheet and 2-cardiac patients). Fifty eight patients were finally included into study. Thirty two patients tested positive for H1N1 and 26 patients tested negative for H1N1. Mean age of the cohort was 45.5 ± 15 years. Thirty two (55.17%) were men. All patients with H1N1 infection had dyspnea (100%) whereas in patients with non H1N1 infection dyspnea was noted in 50% of patients. Incidence of sorethroat was higher in H1N1 patients compared to non H1N1 patients (48% vs 12%) .Cough was seen in nearly 90% of patients in both H1N1 and non H1N1 infected patients. Duration of symptoms was found to be shorter in patients with H1N1 influenza infection. Comorbidities were seen in 32(55%) of patients and diabetes (40 %) was the most common comorbidity. All patients were started on oseltamivir 75mg BD empirically based on clinical symptoms as per guidelines given by WHO^[6].

We found around 41 % of patients required ICU admission. 31% (10/32) of patients with H1N1 infection needed invasive ventilation and only 19%(5/26) of patients with non H1N1 infection needed mechanical ventilation. Non

invasive ventilation was used in 37% and 30% of patients with H1N1 and non H1N1 infection respectively. Ventilator associated pneumonia was seen in 10 patients (17.2%). Mortality rate among patients with H1N1 associated and non H1N1 infection was 37.5% and 15.38% respectively. We found higher mortality rates among patients with H1N1 infection compared to non H1N1 infection which was statistically significant. Duration of hospitalization was more in patients with H1N1 infection (12.5 vs 8.5 days).

We found microbiological confirmation in 38.4% (10/26) of patients among non H1N1 infection. Streptococcus pneumonia was the most common organism isolated (5/10) followed by klebsiella pneumonia (3/10).

Variables	H1N1 Pneumonia (32)	Non H1N1 Pneumonia (26)	P value
Age in years, mean (SD)	42.5(6.2)	47.2(5.2)	0.264
Gender, Male, n (%)	15(46.8)	17(65.3)	0.094
Comorbidities, n (%)	18(56.2)	14(53.8)	0.561
Diabetes	6(18.75)	5(19.2)	0.325
COPD	6(18.75)	4(15.3)	0.685
Asthma	2(6.2)	2(7.6)	0.785
Hypertension	4(12.5)	3(11.5)	0.632
Smoking, n(%)	12(37.5)	6(23)	0.578
Alcoholism, n(%)	15(46.8)	12(46.15)	0.235
Duration of symptoms in days, mean (SD)	3.5(3)	6.2(1.2)	0.044
ICU admission, n (%)	15(46.8)	9(34.6)	0.358
Non Invasive Ventilation, n (%)	12(37.5)	8(30.76)	0.963
Invasive ventilation, n (%)	10(31.2)	5(19.2)	0.069
Vasopressor usage, n (%)			
Length of hospital stay, mean (SD)	12.5(5.50)	8.5(4.5)	0.052
Mortality, n(%)	12(37.5)	4(15.3)	0.004

Table 1: Baseline characteristics of patients with H1N1 pneumonia and Non H1N1 pneumonia

Discussion:

In the present retrospective study we observed that patients with H1N1 infection higher incidence of dyspnea and sorethroat at admission compared to non H1N1 infection. We also observed more need for invasive ventilation in H1N1 patients compared to non H1N1 patients. We found statistically significant higher mortality in patients with H1N1 infected patient compared to non H1N1 patients.

Various studies all over the globe have attempted to study the factors that are more commonly observed in H1N1 patients than in non H1N1 pneumonia patients, some of them include younger age, female predisposition, obesity, lesser comorbidities, higher lactate dehydrogenase, lower PaO2/FiO2 ratio, bilateral radiological opacities^[7-13]A 5 point regression model was developed by Bewick et al to identify clinical variables most predictive of H1N1 pneumonia which included age <65, WBC <12000/mm³, bilateral radiological opacities, oriented mental status, temperature >38°C. ^[12]

There were some important observations in our study. First, patients with H1N1 infection had shorter duration of symptoms, higher incidence of dyspnea and sorethroat compared to non -H1N1 ARDS which helps physician in early referral of H1N1 cases in the periphery. A study done by Bewick et al also found higher incidence of dyspnea in H1N1 patients that was statistically significant ($p < 0.001$).^[12] Second, patients with H1N1 have more severe disease with higher mortality rates in H1N1 compared to non H1N1 pneumonia patients. Similar results were found in a retrospective Brazilian study done by Nardocci et al who found higher mortality in H1N1 patients compared non H1N1 pneumonia patients (40% vs 20%).^[7] In contrast studies done by Riscili^[14] and Samra^[15] found no difference in mortality among the two groups.

There are several limitation in our study. First, our results cannot be generalized as it is a single centre study with a relatively small sample size. Second, we have not used severity of illness scores like APACHE2 score and SOFA score that are more validated for predicting mortality. Third, our centre was not equipped with advanced rescue ventilation strategies like Extra Corporeal Membrane Oxygenation, High Frequency Oscillation Ventilation.

Conclusion:

Patients with H1N1 infection often presents with shorter duration of symptoms with higher incidence of acute dyspnea, sorethroat compared to non-H1N1 infection which can be helpful to suspect H1N1 influenza patients in the peripheral health centre which helps the physician for early referral and treatment. H1N1 influenza infection is associated with higher mortality compared to non-H1N1 infection.

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