

Original Research Article

A cross sectional analysis on the clinical presentation and outcome of H1N1 influenza patients in a tertiary care hospital in Central Kerala

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ABSTRACT

Background: The World Health Organization raised pandemic H1N1 influenza alert level to phase 6 in June 2009 due to a widespread community transmission on two continents. The recent surge in positive H1N1 cases necessitates a revisit to the clinical profile of the 2009 pandemic. This study was aimed to analyse the clinical profile and outcome of swab positive H1N1 patients.

Methods: A cross sectional analysis on the clinical presentation and primary out come in the confirmed H1N1 influenza cases was done. H1N1 confirmation was done using real time reverse transcriptase-Polymerase Chain Reaction in throat swab samples. The data were analysed statistically and presented in percentage.

Results: Total 31 cases of severe H1N1 were included in the study. Majority of the cases (16/31) were between 15 to 30 yrs of age. Among the total cases, 27 cases were females (87.1%) of which 11 cases were pregnant (35.5%). The predominant presenting symptoms were fever (100%), breathlessness (80.6%), body ache (45.2%), headache (29%) and sore throat (29%). Twenty three of the 31 patients (74.2%) survived while 8 succumbed to the illness (25.8%). All the patients required ICU admission and 8 underwent invasive ventilation. The mortality was high among the ventilated patients ($p=0.0064$).

Conclusions: Pregnancy was associated with higher rate of complications. Early respiratory support did not help in preventing progression to respiratory failure in most of the patients. Vaccination, early recognition of the disease and prompt initiation of treatment appear to be the only way to reduce H1N1 disease progression and mortality.

Keywords: H1N1 virus, Influenza A virus, Pneumonia, Respiratory failure, Ventilation

INTRODUCTION

The pandemic of 2009 was caused by H1N1 influenza A virus that represented a re-assortment of two swine strains, one human strain and one avian strain of influenza.^{1,2} The largest proportion of genes came from swine influenza viruses. Illness with influenza in pigs was first recognized during the influenza pandemic of 1918 to 1919. The swine influenza virus was first isolated from human in 1974. Between 1958 and 2005, 37 cases of swine influenza were reported among civilians. Forty-

four percent of the infected individuals had history of exposure to pigs. Cases were reported in the USA, former Czechoslovakia, Netherlands, Russia, Switzerland and Hong Kong. Since 2015, there has been a re-emergence of H1N1 influenza and the incidence of new cases continues to rise.

First H1N1 pandemic in India was reported in 2009-10. However, the first epidemic was under control within a year. Since then, H1N1 positive cases in India have been increased significantly with reduced mortality. In 2017, a

resurgence of H1N1 cases with 12,460 swab positive cases and 600 deaths were detected till 9th July. The management of H1N1 cases in India requires classification of patients as per the revised guidelines of Ministry of Health and Family Welfare, Government of India.³ Furthermore, the overall mortality was found varying according to the underlying co-morbidity.^{4,5} Previous report indicated that pregnancy is associated with higher rate of complications and thus high mortality rate was found.^{6,7} The risk factor with high disease mortality was found varying among different populations. Therefore, population based study is warranted in order to rule out risk factors with high disease mortality. This has prompted us to analyse the earlier data and publish the results.

METHODS

Study design and sampling

A retrospective cross sectional study was designed among the confirmed H1N1 influenza cases admitted at Amala Institute of Medical Sciences, Amala Nagar, Thrissur, Kerala during the period of January 2010 to January 2011. All patients with severe H1N1 (category 3) were hospitalised, throat swabs collected and sent to laboratory. H1N1 confirmation was done by real time reverse transcriptase-Polymerase Chain Reaction in throat swab samples in an approved Virology Institute, South India (Manipal Virology Institute, Manipal, Karnataka). Only confirmed cases based on the laboratory analysis were included in this study. The study design was approved by the Institutional Ethics Committee.

Study procedure

Data such as age, gender, pregnancy trimester and complications, duration of illness, travel history, family contacts, fever, breathlessness, cough, diarrhoea, vomiting, jaundice, haemoptysis, sore throat, body ache, head ache, pulse rate, hypotension, temperature, total leukocyte count, pneumonia pattern, renal failure, secondary infection, ICU admission, ventilation and weaning were collected. Factors found relevant were further analysed.

Statistical analysis

Data were expressed as percentage of incidence and the significant difference between the groups was analyzed by Fisher's exact test using SPSS software package, (v 16, IBM, IL, USA). $P < 0.05$ was considered as significant.

RESULTS

Total 31 confirmed cases of severe H1N1 were included in the present study. Out of 31 cases, 16 cases (51.6%) of 15-30 yrs was the major age group followed by 9 cases of 31-45 yrs (29%), while only 3 cases (9.7%) were >60 yrs.

Females constituted majority of the cases (27 cases, 87.1%) wherein pregnant cases accounted for 11 cases (35.5%). Among the total cases, 29% of cases were reported within 2 days, 35.5% of cases were reported between 2-4 days, 25.8% reported between 5-7 days and rest 9.7% cases reported after 7 days of onset of symptoms to the hospital (Figure 1).

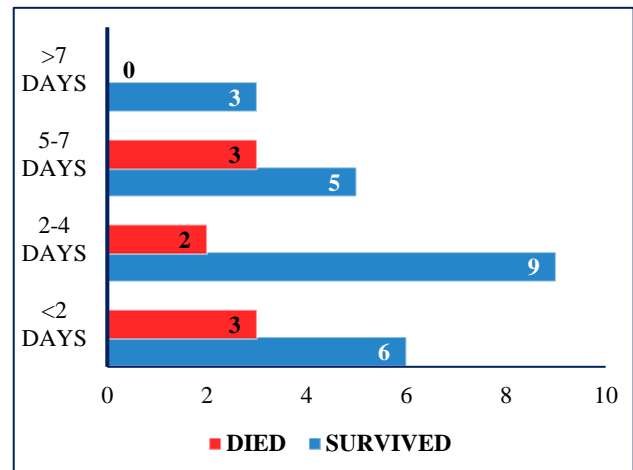


Figure 1: Distribution of duration of presentation of illness.

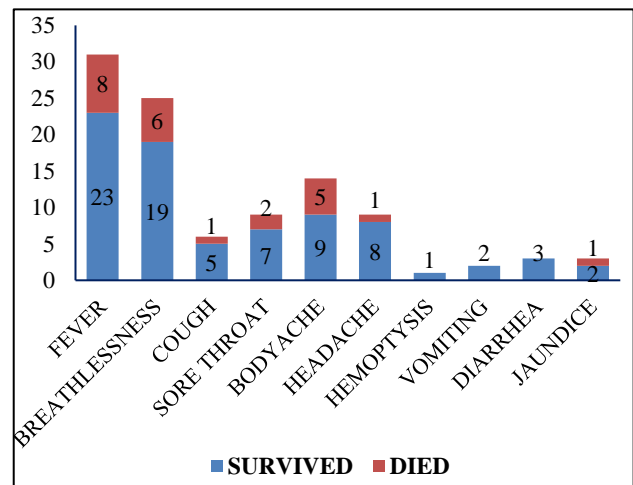


Figure 2: Distribution of main symptoms at presentation.

Only 12.9% patients had travel history in the recent past. Contact history in family was reported in 16.1% of the cases. Main symptoms at presentation were fever (100%), breathlessness (80.6%) and myalgia (45.2%) (Figure 2). Among the various symptoms, jaundice (33.3%), tachycardia (42.9%) and leucopenia (50%) showed increased correlation with mortality (Figure 2).

All these symptoms were almost sure causes for mortality in case of altered liver function (77.8%), low glomerular filtration rate of < 60 ml/min/m² body surface area (50%) and secondary infection by gram negative bacteria (83.3%). Most common co-morbidity associated with

H1N1 infection was pregnancy (11 cases, 35.5%) followed by respiratory ailments (5 cases, 16.1%), while cardiovascular ailments and diabetes accounted for another 9.7% each (Figure 3). Preponderance of pregnant cases can be associated with preponderance of female cases in the study. Out of the 11 pregnant patients, 8 were in their third trimester, and all 11 patients survived.

Total mortality was 8/31. Out of the 8 patients, only one ventilated patient survived ($p=0.0064$). Though the reported cases were more in 15-30 age group, mortality was found high in the 31-45 age group (50% of all death). Mortality within the 15-30 age group was only 18.8%. Similarly, males were represented meagerly in the total sample, mortality was 50% (2/4 cases) while it was only 22.2% for females. Though pregnancy was the most common co-morbidity (35.5%), it was not responsible for any mortality. Cardiovascular ailments precipitated 100% mortality while diabetes caused 33.5% mortality and respiratory complications 20% (Figure 3). Among the total mortality, 9.6% was not associated with any co-morbidity ($p=0.6595$). Chest X-ray of 28/31 cases had bronchopneumonia, while 2/3 cases with lobar pneumonia succumbed to illness.

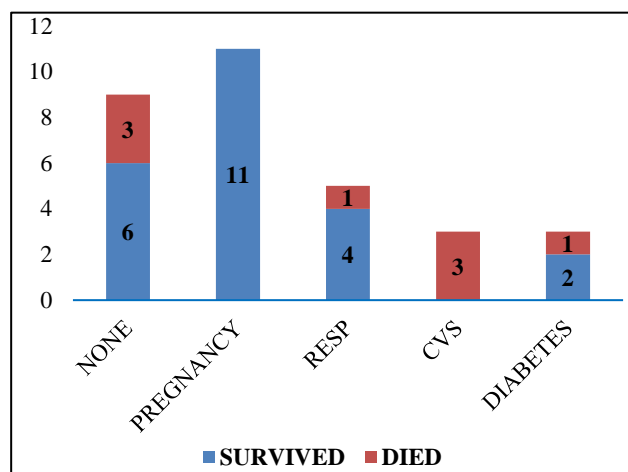


Figure 3: Distribution of co-morbidities in H1N1 patients. RESP: respiratory disease; CVS: cardiovascular system.

DISCUSSION

Results of this study revealed that the most common presenting symptom was fever, breathlessness, body ache, sore throat and headache. The most common coexisting conditions were pregnancy and respiratory diseases. However, previous studies reported diabetes as the major co-morbidity. Chudasama et al, also reported diabetes and hypertension as the common risk factors in India.⁸ While bronchial asthma and chronic obstructive pulmonary disease were the risk factors reported in US.^{8,9} Kashinkunti et al. reported that around 45%-50% of their cases had diabetes mellitus or hypertension as co-morbidity.¹⁰ Authors also noticed that early presentation

of the illness, did not affect the mortality outcome in our patients ($p=1.0000$).

Pregnancy has been reported as the most constant risk factor with high disease mortality.¹¹⁻¹³ In present study, patients with cardiovascular disease had the highest mortality (100%) and the lowest (0%) among the pregnant women. According to our study, the most common cause of death was pneumonia and the dominant pattern was bronchopneumonia (6 patients). Puvanalingam et al, also reported pneumonia as the most common cause of death.¹² Since laboratory analysis of all cases was impossible, only serious cases were lab tested as per the recommendation of direction of Ministry of Health and Family Welfare, Government of India. Also, pregnant cases were given priority in laboratory testing although present guidelines do not require that. In this study, all the cases were presented serious and hence selected for the lab test.

The management of influenza A/H1N1 cases in India requires classification of these patients as per the revised guidelines of Ministry of Health and Family Welfare, Government of India, into three categories - Category A includes mild cases where no laboratory testing or antiviral treatment is needed. Category B includes high risk patients such as children, pregnant women, persons aged ≥ 65 year, and people with chronic disease. These patients need not be confirmed by laboratory investigation but should be isolated at their homes and given oseltamivir treatment. Category C patients are severe cases who need hospitalization, laboratory testing and oseltamivir treatment.³ Treatment protocols followed in this study were antiviral medication using oseltamivir (75 mg bd) and other supportive management.

Murhekar et al, on influenza A (H1N1) outbreak in India suggested that there was no significant genetic change in the virus affecting its virulence.¹⁴ Health education and vaccination are the promising tools to prevent further epidemics. An article by Mossad et al, also supported that the only way to combat the continuing pandemics was by vaccination.¹⁵ Although patients in high risk group are definite candidates for vaccination, it should not be restricted to this group. Health-care personnel and persons coming in close contact with infected persons should also be advised to get vaccinated. The live attenuated vaccine has been found to be more effective and also helpful in providing herd immunity and hence should be preferred over inactivated vaccine. Furthermore, creating awareness about the symptoms of the disease can help in early contact with medical facility and hence treatment.

CONCLUSION

Pregnancy was associated with higher rate of complications. Early respiratory support did not help in preventing progression to respiratory failure in most of the patients. Vaccination, early recognition of the disease

and prompt initiation of treatment seem to be the only way to reduce the disease progression and associated mortality. Patients with risk factors require additional attention as clinical course can be unpredictable.

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