Clinical Profile of Patients Admitted with Swine-Origin Influenza A (H1N1) Virus Infection: An Experience from a Tertiary Care Hospital

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Abstract

India saw its most crippling outbreak of the H1N1 influenza, also called swine flu five times more than previous year and more number deaths. Influenza spreads through droplets from infected individuals while speaking, coughing or sneezing. In present study we observed clinical profile of patients admitted with confirmed H1N1 swine flu infection and risk factors associated with need of mechanical ventilation and/or death in Dr.Hedgewar Hospital, Aurangabad. Total 487 patients reported with Influenza-like illness (ILI) and out of them 79 were tested for H1N1 out of them 21 (26.58%) were positive and were admitted and treated. This accounted for 4.3% positivity. Out of those 14 (66.66%) patients recovered well and they did not have any complications. However, 7 (33.33%) had death. 14 out of 21 patients who required mechanical ventilation out of these seven patients who required invasive ventilation all died. We concluded the commonest cause of death was hypoxemic respiratory failure with or without acute respiratory distress syndrome and in some cases, it was multi organ dysfunction syndrome. Deranged LFT, Thrombocytopenia, relative lymphopenia, shock and RDS were having poor outcome. Comorbidities like diabetes, hypertension and multi organ involvement were associated with very high mortality.

Keywords: H1N1, Swine flu, Thrombocytopenia, RDS, Diabetes

Introduction

India saw its most crippling outbreak of the H1N1 influenza, also called swine flu five times more than previous year and more deaths. Influenza spreads through droplets from infected individuals while speaking, coughing or sneezing. Non-human influenza spreads from respiratory or gastrointestinal tracts of infected hosts. Flu can occur throughout the year, but peak occurrence is in the winter months.¹² Flu epidemics occur every 6 to 10 years, usually due to antigenic shifts, which expose the population to strains to which it has not been exposed previously.³⁴ Swine influenza (H1N1) is a novel influenza A virus, which comprises of a re-assortment of four distinct genetic elements, namely, swine, human, avian, and Eurasian, which combine into a single influenza virus, swine influenza (H1N1). Present study was conducted in Dr. Hedgewar Hospital, Aurangabad. We studied clinical profile of patients admitted with confirmed H1N1 swine flu infection and risk factors associated with need of mechanical ventilation and/or death.

Materials and Methods

This was an observational prospective study conducted in a tertiary care teaching institute during June 2017 to Nov 2017.

Various Definitions

Influenza-like illness (ILI)

Fever (temperature of 100°F [37.8°C] or greater) with cough or sore throat, loose motions in the absence of a known cause other than influenza.¹³

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A Confirmed Case of H1N1 Influenza A (Swine Flu)

An individual with an influenza-like illness with a laboratory-confirmed H1N1 influenza A virus detected by RT-PCR or culture.\textsuperscript{1,3}

Thrombocytopenia

Thrombocytopenia was defined when platelets were <150,000 platelets

Clinical Specimens, Microbiological Investigation for Diagnosis of H1N1 Swine Flu Virus

Patients who presented with influenza-like illness (ILI) were subjected to throat swab testing for reverse transcriptase polymerase chain reaction to Ranbaxy Diagnostics. Tests were done as per Indian guidelines for swine flu H1N1 infection.\textsuperscript{2}

Inclusion Criteria

All confirmed cases of H1N1 swine flu infection warranting admission were studied.

Exclusion Criteria

Patients with negative RT-PCR.

Data Collection and Assessment

A standardized questionnaire was prepared to collect following details: age, gender, time distribution, co-existing medical conditions like diabetes, chronic liver or kidney disease, hypertension, hypothyroidism malignancy, rest detailed history regarding presenting symptoms, duration of symptoms, location of admission (isolation ward/intensive care unit (ICU)) and laboratory investigations like complete blood counts, liver function test and renal function test.

All confirmed cases of H1N1 infection were treated with Oseltamavir 75 mg twice daily for 5–10 days as per CDC guidelines\textsuperscript{5} and antibiotics symptomatic therapy according to the need of the situation. The outcomes of interest were need of mechanical ventilation and/or death during hospitalization. Institute’s research committee approved the study, as it was in the interest of public health to collect data on an emerging pathogen like influenza H1N1 A, as issued in guidelines by the ministry of health of India.\textsuperscript{2}

Results

Baseline Characteristics

Total 487 patients were presented to our hospital with ILI during the study period and out of those only affordable 79 were tested for H1N1 throat swab with RT-PCR. Among them, 21 (26.58%) patients were confirmed to have H1N1 infection. All 21 patients were admitted in hospital in isolation and were treated with Oseltamavir, antibiotics and ventilation or dialysis according to need of the patient. All these patients were included in the study.

Mean age of the study cohorts was 45.8 with 7.78 SD years, with a range of 32–62 years. Baseline demographics of the patients are shown in Fig. 1. 52.38% patients belonged to age group of 41–50. There were 13 male and 8 females in our study (Fig. 1).

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Figure 1. Graph Showing Age-Wise and Gender-Wise Distribution of H1n1 Cases

Base Line Demographic

Monthly Distribution of H1N1 Swine Flu Cases

Highest occurrence of H1N1 swine flu was observed in the month of September 2017 (Fig. 2).
Clinical Symptoms and Pre-existing Illness at Time of Presentation

Most common clinical symptom at time of presentation was fever and cough (100%), 17 patients, i.e., 80.95% had dyspnea, 9 patients, i.e., 42.85% had loose motions, 11 patients, i.e., 52.38% had body ache and nausea vomiting (Fig. 3).

Diabetes mellitus was the most common co-existing medical condition in 6 patients, i.e., 28.57%, 4 patients, i.e., 19% were hypertensive, 1 patient, i.e., 4.76% was having hypothyroidism and IHD. Total 8 patients, i.e., 38% were having comorbidities; out of these, 5, i.e., 62.5% patients died. There was strong correlation between comorbidities and mortality.

Complications Developed during the Course of Illness

14 patients, i.e., 66.66% developed pneumonitis and subsequently RDS. Out of these, 7, i.e., 50% patients died. 8 patients, i.e., 38% had shock and severe thrombocytopenia, 5 patients, i.e., 23.8% patients had deranged LFT (Fig. 4).

Isolation of Other Organisms from Sputum in Cases of H1N1 Infection

All the patients admitted with H1N1 swine flu infection, who had cough with sputum production, were also checked with sputum Gram smear and culture to find out co-existing/super-added bacterial infection. Out of 21 patients, 14 were subjected for sputum Gram stain and culture. Out
of 14 sputum culture, 6 turned out to be positive for bacteria. Extended spectrum beta lactamase producing Klebsiella pneumoniae 1 case and ssp pneumonia 1 case, E. coli 2 cases, non-fermenting Gram-negative bacilli Acinetobacter baumannii were seen in 2 cases, followed by Streptococcus mitis in 1 case and Enterococcus faecium 1 case and Candida tropicalis in 1 case.

**Risk Factors Associated with Need for Mechanical Ventilation and/or Mortality in H1N1 Infection**

Diabetes mellitus was the most common co-existing medical condition in 6 patients, i.e., 28.57%, 4 patients, i.e., 19% were hypertensive while 1 patient, i.e., 4.76% was having hypothyroidism and IHD. Total 8 patients, i.e., 38% were having comorbidities; out of these, 5, i.e., 62.5% patients died.

Fourteen patients, i.e., 66.66% developed pneumonitis and subsequently RDS. Out of these, 7, i.e., 50% patients died. 8 patients, i.e., 38% had shock and severe thrombocytopenia, 5 patients, i.e., 23.8% had deranged LFT.

Out of 21 admitted patients, 14 required mechanical ventilation either noninvasive or invasive, which is almost 66.6% and out of them 7 died, i.e., 33.33% of all the patients put on invasive ventilation died. There were 5 men and 2 women among the patients who died (Fig. 5).

**Discussion**

Total 487 patients reported with ILI and out of them 79 were tested for H1N1. Out of them, 21 were positive and were admitted and treated. This accounted for 4.3% positivity. Out of 79 tested, 21 patients, i.e., 26.58% were positive for H1N1. Study conducted by Samara et al. showed 17.35% positivity, which was similar to that in the present study. Diabetes mellitus was the most common co-existing medical condition, followed by hypertension and hypothyroidism and IHD among risk factors for H1N1 infection. However, these risk factors were associated with significantly increased mortality and/or need for mechanical ventilation in the present study. The most common presenting symptoms in the present study were fever, cough, cold, dyspnea, body ache and loose motions followed by sore throat and cough that was similar to those which were seen in other Indian studies. In our study, 14 (66.66%) patients recovered well and they did not have any complications. However, 7 (33.33%) died. 14 out of 21 patients required mechanical ventilation; out of these 7 patients who required invasive ventilation all died. The commonest cause of death was hypoxemic respiratory failure with or without acute respiratory distress syndrome and in some cases it was multi-organ dysfunction syndrome. Overall, mortality in the present study was 33.33% (7 deaths out of 21), that was much higher than worldwide mortality of 0.3–0.4%. Another Indian study also reported mortality of 5–7%. The patients included in our study were mostly referred cases and they were more critically ill than the general population level, which would have contributed to increased mortality in the present study. Relative lymphopenia, deranged LFT, thrombocytopenia, shock and RDS having poor outcome is one of the risk factors for poor outcome as shown in guidelines by Winthrop University Hospital Infectious Disease Division for management of swine flu H1N1 infection. Bilateral patchy infiltrate at time of admission was another risk factor associated with need for mechanical ventilation or mortality. We understand that bilateral pneumonia may represent secondary bacterial infection. However, bilateral pneumonia on chest X-ray might be due to bacterial pneumonia, acute respiratory distress syndrome or progressive viral pneumonia.

**Limitations**

The high cost of H1N1 test was biggest hurdle in this study. This study included only hospitalized patients of a tertiary care institute; so analysis may not reflect the actual distribution of cases at the population level. The data is very small; we need more data for authentic conclusions.

**Conclusions**

- We have high percentage of H1N1cases this year.
- The disease seemed more aggressive as more number of admission and deaths as compared to previous year.
• Comorbidities and multi-organ involvement was associated with very high mortality.
• All patients ventilated invasively died.

Conflict of Interest: None

References