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Original Research Article

Retrospective Analysis of 26 Deaths Due to Influenza A (H1N1) Seasonal Flu

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Abstract

A Pandemic of Influenza A (H1N1), caused by a new strain of the Virus started in Mexico in 2009. The first case in India was seen at Hyderabad in June 2009. Influenza A H1N1 2009 is transmitted by airborne droplet infection. The disease was initially known as Swine Flu, but now called as Seasonal Flu. The study has been carried out at M. P. Shah Government Medical College and Guru Gobind Singh Hospital, Jamnagar Gujarat. As per Ministry of Health and Family Welfare (MOHFW), Government of India guidelines, Category C Seasonal Flu patients were admitted in the Hospital. Out of 178 samples sent, 99 samples tested positive. 26 patients succumbed to the illness. Retrospective analysis of the Fatal cases were done with respect to various parameters. Maximum number of patients were in the age group above 60years. More number of fatal cases were in the age group of 40 to 49 years. Mortality was more in males although incidence was almost same in both sex. Presence of Co-Morbid illness was high amongst fatal cases. All fatal cases had low Oxygen saturation on presentation and were late in starting Oseltamivir after onset of symptoms. Even after 10 years Seasonal Influenza caused by H1N1 Virus carries significant mortality.

Keywords: Swine Flu, H1N1, Seasonal Flu, Influenza A.

INTRODUCTION

Influenza Virus are RNA Virus. They are of 3 types, A, B and C. These Viruses are 80 to 120nm in diameter. They have Hemagglutinin H and Neuraminidase N Antigens on their surface [1]. Epidemics and pandemics are caused by Influenza A Virus. They can undergo frequent changes in their antigenic structure. Minor Antigenic changes are called Antigenic drift and major ones are called Antigenic Shift [1]. Antigenic Shifts produce a Virus which is new for the entire population, hence the chances of Pandemics are high [1].

A pandemic of Influenza had originated in Mexico in the year 2009. The Virus was Influenza A and had genetic material from Human, avian and swine Influenza Virus, hence known as Swine Flu [2]. In June 2009 World health Organization (WHO) had declared a pandemic. Thus this pandemic occurred after 1977 [2]. Index case of H1N1 Influenza in India was detected in Hyderabad in June 2009 [3]. Large number of cases and deaths were seen. Till august 2010, 44987 confirmed cases and 2728 deaths occurred in India [4]. WHO, in August 2010 declared end of the Pandemic phase and beginning of the post Pandemic Phase [5]. However large number of cases continue to occur till today and the disease still has significant mortality. In the year 2019 till mid-February, India has more than 10000 cases and 312 deaths [6]. Treatment of H1N1 Seasonal Flu is done as per Ministry of health and family welfare (MOHFW) guidelines with Oseltamivir in the doses mentioned below [7].

Table-1: Oseltamivir dosage for treatment of H1N1 influenza

Dosage of Oseltamivir for Treatment of H1N1 Influenza as per MOHFW	
Body Weight	Oseltamivir Dose
For weight <15 Kg	30 mg BID for 5 days
15 to 23 Kg	45mg BID for 5 days
24 to < 40 Kgs	60 mg BID for 5 days
More than 40 Kgs	75mg BID for 5 days.

MATERIALS AND METHODS

Study of H1N1 Seasonal Influenza patients admitted in Guru Gobind Singh Government hospital, Jamnagar in the year 2019 was done. Patients having symptoms of Acute Respiratory Infection (ARI) were categorized as per MOHFW Guidelines (Table-2) [7]. Only patients in Category C were admitted as per guidelines [8]. All patients were kept in Seasonal Flu Isolation ward and ICU of the Hospital.

Testing for H1N1 was done by RT-PCR of throat and nasal swab of the patients. Total 178 samples were rested out of which 99 samples were positive for H1N1. Investigations like Complete Blood count, Liver Function tests, Renal Function tests, Arterial Blood Gas Analysis (ABG), X-Rays, and Echocardiography were done in all cases. In diabetic patients Glycosylated Haemoglobin was done. Patients having Oxygen saturation of <90% or having PaO2 of less than 60% on ABG analysis were given Oxygen via Reservoir Bag/ Bi Level Positive airway pressure (Bi-PAP) via mask, or Invasive Mechanical ventilation after Intubation, depending on requirement to maintain oxygen saturation of >90%. These measures were initiated depending on ABG findings, clinical patient distress and response to therapy or progress of disease. All patients not maintaining saturation of >90% of PaO2 of >60% on Reservoir bag or Bi-PAP were intubated and invasive ventilation started. Patients were treated with Oseltamivir in doses mentioned in Table-1 Broad Spectrum antibiotics, Intravenous Fluids, Antipyretics were given. Specific treatment for Diabetes, hypertension, Ischemic Heart Disease was given to individual patients suffering from such conditions.

Retrospective Analysis of fatal cases were done with respect to Epidemiological parameters, delay in presentation to hospital, presence/absence pf Co-Morbid conditions, initiation of Oseltamivir after symptom onset, duration of stay, complications etc.

Table-2: Categorization of Seasonal Influenza Cases as per MOHFW Guidelines

Guidelines on categorization of Seasonal Influenza cases during screening for home isolation, testing, treatment and hospitalization [8]	
Category A	Patients with mild fever plus cough / sore throat with or without body ache, headache, diarrhoea and vomiting will be categorized as Category-A. They do not require Oseltamivir and should be treated for the symptoms mentioned above. The patients should be monitored for their progress and reassessed at 24 to 48 hours by the doctor. No testing of the patient for Influenza is required.
Category B	1. In addition to all the signs and symptoms mentioned under Category-A, if the patient has high grade fever and severe sore throat, may require home isolation and Oseltamivir 2. In addition to all the signs and symptoms mentioned under Category-A, individuals having one or more of the following high risk conditions shall be treated with Oseltamivir: • Children with mild illness but with predisposing risk factors. • Pregnant women; • Persons aged 65 years or older; • Patients with lung diseases, heart disease, liver disease kidney disease, blood disorders, diabetes, neurological disorders, cancer and HIV/AIDS; • Patients on long term cortisone therapy. NO testing for H1N1 is required
Category C	In addition to the above signs and symptoms of Category-A and B, if the patient has one or more of the following: 1. Breathlessness, chest pain, drowsiness, fall in blood pressure, sputum mixed with blood, bluish discolouration of nails; 2. Children with influenza like illness who had a severe disease as manifested by the red flag signs (Somnolence, high and persistent fever, inability to feed well, convulsions, shortness of breath, difficulty in breathing, etc). 3. Worsening of underlying chronic conditions. All these patients mentioned above in Category-C require testing, immediate hospitalization and treatment

OBSERVATIONS AND DISCUSSION

Total 178 throat and nasal swab samples of Category C patients were tested for H1N1 Influenza by RT-PCR in Department of Microbiology at the college out of which 99 samples tested positive. Maximum number of positive cases were seen in age group above 60 years (Table-3). However most of fatal cases were in the age group of 40-49 years (Table-4). There were no deaths in Paediatric age group.

Table-3: Age wise distribution of H1N1 Positive cases

Age Group	Number of positive cases	Percentage
<10 yrs	9	9.09%
10 to 19 yrs	9	9.09%
20 to 29 yrs	12	12.12%
30 to 39 yrs	15	15.15%
40 to 49 yrs	17	17.17%
50 to 59 yrs	17	17.17%
>60 yrs	20	20.20%
Total	99	100%

Table-4: Age wise distribution of H1N1 deaths

Age Group	Number of Deaths	Percentage
<10 yrs	0	0%
10 to 19 yrs	1	3.85%
20 to 29 yrs	4	15.38%
30 to 39 yrs	1	3.85%
40 to 49 yrs	9	34.61%
50 to 59 yrs	4	15.38%
>60 yrs	7	26.92%
Total n	26	100%

Sex distribution amongst positive cases had slight female preponderance (Table-5). Mortality in males was much more compared to females (Table-6).

Table-5: Sex distribution of H1N1 positive cases

Sex	Cases	Percentage
Male	48	48.48%
Female	51	51.52%
Total	99	100%

Table-6: Sex distribution of H1N1 positive deaths

Sex	Deaths	Percentage
Male	15	57.69%
Female	11	42.31%
Total	26	100%

Mean duration between onset of symptoms and 1st Medical consultation at local place and 1st presentation to our hospital and initiation of Oseltamivir was analysed. 50 percent of patients had consulted local practitioners for illness 5 to 8 days after symptom onset (Table-7).

Table-7: Day of illness when 1st Medical consultation sought at local level

Day of illness when 1st medical consultation sought	Number of patients and percentage
< 1day	2(7.7%)
2 to 4 days	7(26.9%)
5 to 8 days	13(50%)
9 to 12 days	3(11.53%)
>12 days.	1(3.84%)
Total	26(100%)

57.69 % of patients reached our ICU 5 to 8 days after onset of symptoms and oseltamivir was started. 19.23% of patients reached tertiary care centre more than 8 days after symptom onset (Table-8).

Table-8: Day of illness when patient presented at tertiary care hospital and Oseltamivir was started

Day of illness admitted to ICU and Oseltamivir started.	Number of patients and percentage
< 1day	0(0%)
2 to 4 days	4(15.38%)
5 to 8 days	15(57.69%)
9 to 12 days	5(19.23%)
>12 days.	2(7.7%)
Total	26(100%)

Amongst the fatal cases 69.24% of patients had Co-morbid illness. Commonest illness were Diabetes and hypertension(38.46%) each. 23.07% patients had more than one Co-Morbid illness. 30.76% patients however had no Co-morbid illness (Table-9).

Table-9: Presence of Co-Morbid conditions in fatal cases of H1N1 influenza

Co-Morbid conditions	Number of Patients
Pregnancy	1(3.84%)
Diabetes	10(38.46%)
Hypertension	10(38.46%)
Ischemic Heart Disease	2(7.7%)
Chronic respiratory Disease	3(11.53%)
More than 1 Co-morbid conditions	6(23.07%)
No Co-Morbid conditions	8(30.76%)

Majority of patients had Low oxygen saturation on admission and required Oxygen by rebreathing mask/Bi-PAP/Invasive ventilation after intubation. 42.30% of patients had Oxygen Saturation between 81 to 90 % on room air (Table-10). Patients were initially kept on Bi-PAP. Those patients, who did not tolerate Bi-PAP, did not maintain saturation despite adequate Oxygenation on Bi-PAP were intubated and kept on invasive Ventilation.

Table-10: Oxygen Saturation (SpO2) on admission in fatal cases

Oxygen Saturation (SpO2)	Number of patients
<30%	1(3.84%)
31 to 60%	6(23.07%)
61 to 80%	5(19.23%)
81 to 90%	11(42.30%)
>90%	3(11.53%)
Total	26(100%)

50% of patients were kept on Bi-PAP for 1 to 5 days before intubation (Table-11). 56.7% of patients survived for 1 to 5 days before death on invasive ventilation (Table-12).

Table-11: Duration of Ventilation by Bi-PAP before intubation

Duration on Bi-PAP	Number of patients.
< 1 day	3(11.53%)
1 to 5 days	13(50%)
6 to 10 days	7(26.92%)
>11 days	3(11.53%)

Table-12: Duration of Invasive ventilation before death

Duration on Invasive ventilation	Number of patients.
< 1 day	2
1 to 5 days	15
6 to 10 days	9
>11 days	0

CONCLUSION

Total 99 RT-PCR confirmed Category C cases of H1N1 Seasonal Flu were admitted in ICU of Guru Gobind Singh Hospital, Jamnagar from 1st January 2019. Out of them 26 patients expired (Case fatality in Category C patients 26.26%), which is quite high for Influenza. Most of the cases were in the age group of more than 60 years (20.21%). However maximum mortality was in the 40-49 year age group (34.61%). Mortality was higher in males (57.69%) compared to females (42.31%). There were no deaths in Paediatric age group. 50% of patients presented after 5 days of onset of symptoms to local practitioners. 57.69% of patients got admitted to ICU, 5 to 8 days after symptom onset. 89% of patients had Oxygen saturation below 90% on presentation. 69.24% of patients had Co-Morbid illness, commonest being Hypertension and Diabetes. 50% of patients were on Bi-PAP for 1 to 5 days after admission, before being intubated. 56.7% of patients survived 1 to 5 days on Invasive ventilation before death. Thus even after 10 years seasonal Influenza caused by H1N1 carries significant mortality and morbidity.

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