STUDY OF FACTORS INFLUENCING EARLY SYMPTOMATIC IMPROVEMENT, RETURN TO NORMOXIA AND RADIOLOGICAL RESOLUTION IN SWINE FLU PATIENTS WITH RESPIRATORY FAILURE IN RICU

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ABSTRACT

BACKGROUND

Since 2009, swine influenza outbreaks have been recorded virtually every year, although their extent and severity have varied widely. Localised outbreaks are taking place at variable intervals, usually every 1-3 years. The most recent outbreak has been from December 2016 through April 2017. We still are in the midst of one. This study of factors influencing early clinical and radiological improvement and reversion to normoxia in swine flu patients with respiratory failure helps in saving precious lives.

MATERIALS AND METHODS

This is a cross-sectional study conducted at RICU, Department of Pulmonary Medicine, S.V.R.R. Government General Hospital/S.V. Medical College, Tirupathi, Andhra Pradesh, between January 2017 and April 2017. Study sample was the total number of swine flu patients admitted to the RICU of the Department of Pulmonary Medicine with respiratory failure.

RESULTS

Out of 42 patients who tested positive for swine flu, 37 had respiratory failure and were immediately admitted in RICU. Oxygen support, oseltamivir and higher antibiotics were immediately started, injectable steroids given where necessary. Comorbidities were meticulously managed. 19 were males and 18 were females. 21 patients (>50%) were above 50 years. Cough and breathlessness were present in all patients (100%). At admission, all 37 showed SpO2 <85% and at discharge all of them were normoxic. 18 patients had either multilobar pneumonia or ARDS on CXR, which had resolved by the time of discharge. The shortest duration of stay was 7 days and the longest duration of stay was 11 days. 35 patients were discharged and 2 patients died.

CONCLUSION

Good oxygenation, starting of oseltamivir on day 1 of admission prevents further complications and hastens recovery. Swine flu patients with normal chest x-ray and no comorbidities can still end up with respiratory failure. Steroids decrease cough and breathlessness, but have no role in hastening recovery. No residual symptoms were present in the patients after a post discharge follow up after 10 days.

KEYWORDS

Symptomatic Improvement, Swine Flu, Normoxia, Radiological Resolution.

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BACKGROUND

Influenza virus are members of Orthomyxoviridae family of which three separate genera A, B, C are seen based on antigenic characteristics of Nucleoprotein (NP) and Matrix (M) protein antigens.[1] Swine flu is caused by influenza virus subtypes H1N1, H1N2, H1N3, H3N1 and H3N2. These viruses are endemic in pigs.[2]

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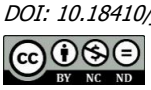

The virus is transmitted through aerosols generated by coughing and sneezing, although hand to hand contact, other personal contact and even fomite transmission may take place. Adults and children who have chronic pulmonary (including asthma), cardiovascular, renal, hepatic, neurological, haematological or metabolic disorders (including diabetes mellitus) and people who have immune suppression (HIV or on immunosuppressive drugs) are more susceptible to swine flu.

Early on, in the disease, there are body aches, sore throat, fever, prostration and later some patients developed diarrhoea.[3] The principal clinical syndrome leading to hospitalisation and intensive care admission is diffuse viral pneumonia associated with severe hypoxaemia, ARDS and sometimes shock and renal failure.[4]

Suspects of swine flu are categorised as-

Category A- Previously healthy, no comorbidities, mild fever - no need of swab, no need of oseltamivir.

Category B1- A+ high fever + sore throat - no need of swab, no need of oseltamivir.

Category B2- Children <5 yrs. pregnant women, age >65 yrs. + comorbidities - oseltamivir.

Category C- Breathlessness, cyanosis, haemoptysis, respiratory failure, chest pain, respiratory failure (SpO2 <89%) or PaO2 <60 mmHg - ICU admission + swab + oseltamivir.[5]

AIMS AND OBJECTIVES

1. To determine the factors influencing early symptomatic improvement in swine flu patients admitted with respiratory failure in RICU.
2. To study the factors that influence early return to normoxia (at least SpO2 of 90-92%) in patients with respiratory failure.
3. To observe the factors that influence early radiological resolution in swine flu patients.

Study Design- Cross-sectional study.
Study Setting- Respiratory Intensive Care Unit (RICU) of Department of Pulmonary Medicine, SVRRGGH/SVMC, Tirupathi.

Period of Study- January 2017 to April 2017.
Sample Size- Total number of swine flu patients with respiratory failure admitted to RICU of Department of Pulmonary Medicine, SVRRGGH, Tirupathi, in the study period.

37 patients with positive test result for swine flu (done by sending nasopharyngeal and throat swabs to virology lab at Sri Venkateswara Institute of Medical Sciences, Tirupathi) and respiratory failure (SpO2 <89%) were admitted in RICU, oxygen started and oseltamivir 75 mg b.d. given. Patients were mechanically ventilated where necessary and higher antibiotics given. Injectable steroids were given to individuals whose oxygen levels did not improve with supplemental oxygen. Comorbidities were meticulously managed. Patients were discharged after complete symptomatic improvement, normoxia and radiological resolution and followed up after 10 days.

Criteria for Patient Selection

Inclusion Criteria

All category C swine flu patients admitted in RICU, Department of Pulmonary Medicine, SVRRGGH and willing to participate in the study.

Exclusion Criteria

Those swine flu patients with respiratory failure not willing to participate in the study.

Investigations

Complete blood picture.
Fasting and postprandial sugars.
Chest x-ray PA view.
Throat and nasopharyngeal swabs for viral assay.
Sputum for acid-fast bacilli, Gram stain, pyogenic culture and sensitivity.
CT scan chest.
Renal and liver function tests.
Pulse oximetry, arterial blood gas analysis.

RESULTS

Out of 37 patients with swine flu and respiratory failure admitted in RICU, 19 were males and 18 were females, n=37.

Total Number of Patients	37
Males	19 (51.3%)
Females	18 (48.6%)

Table 1. Sex Distribution

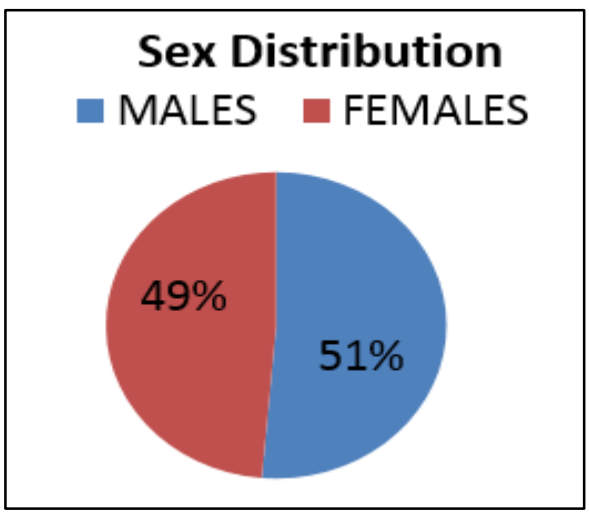

Figure 1. Sex Distribution

The number of patients with age more than 50 years (21, i.e. 57%) were greater than those less than 50 years (16, i.e. 43%).

Age	Number of Patients
>50 yrs.	21 (57%)
<50 yrs.	16 (43%)

Table 2. Age Distribution

Cold, cough and breathlessness were present in all patients (100%). Sore throat was reported in 5 patients only, n=37.

Symptoms	Number of Patients
Cold	37 (100%)
Cough	37 (100%)
Breathlessness	37 (100%)
Sore throat	5 (13.5%)

Table 3. Symptomatology in Patients

Only 4 patients had comorbidities in our study. Out of 37 patients, 1 each had diabetes, HIV, pregnancy and TB pleural effusion, n=37.

Type of Comorbidity	Number
Diabetes	1
HIV	1
TB pleural effusion	1
Pregnancy	1
No comorbidities	33

Table 4. Comorbidities

Chest x-ray was normal in 19 patients, 13 patients had lobar/multilobar pneumonia, 5 had ARDS, n=37.

Chest X-Ray/CT Appearance	No. of Patients
Lobar/multilobar pneumonia	13
ARDS	5
Normal	19

Table 5. Radiological Presentation (Chest X-Ray and CT Findings)

Injectable steroids were given in 21 patients out of total 37 patients. 16 patients were not given.

The longest duration of hospital stay was 11 days and the shortest duration was 7 days, n=37.

Number of Days Admitted	Number of Patients
7	12
8	12
9	4
10	-
11	7

Table 6. Duration of Hospital Stay

Out of the total 37 patients, 35 were discharged with good general condition. Two patients, one male and one female died, n=37.

Outcome	Number of Patients
X-ray resolution, symptomatic improvement and discharge	35
Death	2

Table 7. Outcome of Patients

DISCUSSION

The pandemic of 2009 and the regular outbreaks from the recent past justify such a study.[6] Our study showed equal number of men and women (19:18). However, individuals more than 50 years formed a large chunk of our study population (57%), which seems contrary to routine belief that older people are immune to swine flu. Cold, cough and breathlessness were present in all patients, though sore throat was seen in only 5 (13.5%) patients. Surprisingly only 4 patients had comorbidities, one each with diabetes, HIV, TB pleural effusion and pregnancy. Normal chest x-ray with respiratory failure[7] was the commonest radiological presentation (19/51.3%) followed by pneumonia in 13 patients and ARDS (5, 13.5%). Normoxia (SpO2 >90%), symptomatic and radiological improvement was most commonly seen by the 7th or 8th day. Addition of injectable steroid did not seem to hasten the recovery as most of those discharged on the 7th or 8th day had not been given any steroid.

The two patients who died, one male and one female had no comorbidities, but had ARDS and multiorgan failure.

CONCLUSION

1. Good oxygenation starting of oseltamivir on day 1 of admission prevents further complications and hastens recovery.
2. Swine flu patients with normal chest x-ray and no comorbidities can still end up with respiratory failure.
3. Steroids decrease cough and breathlessness, but have no role in hastening recovery.
4. No residual symptoms were present in the patients after a post discharge follow up after 10 days.

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