Research Article

Study of clinico-epidemiological profile, drug utilization pattern, and outcome of swine flu cases: A recent epidemic in Latur

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ABSTRACT

Background: Swine flu, an acute respiratory tract disease, is caused by swine flu virus. The World Health Organization (WHO) declared the H1N1 pandemic in June 2009 after more than 70 countries reported cases of H1N1 infection. Since 2009-2014, 59,677 cases and 4141 deaths have been reported in India. **Objective:** To study the clinico-epidemiological profile, drug utilization pattern, and outcome of H1N1 positive cases admitted to swine flu ward from January 2015 to September 2015 at a tertiary care hospital in Latur. **Materials and Methods:** The study was conducted from January 2015 to September 2015 at Government Medical College (GMC), Latur. Clinico-epidemiological profile, treatment details, and outcome of the patients were recorded. Prescription pattern was analyzed using the WHO International Network for Rational Use of Drug use indicators. **Results:** A total of 52 swine flu positive cases were admitted to GMC, Latur, out of which 38 (73.07%) were female patients and 14 (26.92%) were male patients. Total numbers of drugs prescribed were 267. The most common antimicrobial prescribed was oseltamivir. Total drugs prescribed from the National List of Essential Medicine 2015 were 98 (36.70%). **Conclusion:** This study is an attempt to know the clinico-epidemiological profile, drug utilization pattern, and outcome in swine flu positive patients. A good adherence to the WHO guideline for clinical management of swine flu cases, the Joint Indian Chest Society and the National College of Chest Physician guidelines, and the WHO Essential Drug List was seen in our study. However, prescription with the brand name, polypharmacy, and excessive use of fixed dose combinations are a matter of concern.

KEY WORDS: Clinico-epidemiological Profile; Drug Utilization; Swine Flu Patients

INTRODUCTION

Swine flu is an acute respiratory disease caused by swine flu virus belonging to the genus orthomyxovirus of family Orthomyxoviridae, which consists of influenza Type A, B, and C. Swine flu causing influenza has 3 subtypes; H1N1, H2N2, and H3N3. Currently, the influenza pandemic is caused by H1N1 strain of influenza Type A virus, officially referred to as novel A/H1N1. The virus is a mixture of four known strains of influenza A virus: one endemic in humans, one endemic in birds, and two endemics in pigs (swine).[1]

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Influenza was first proposed to be a disease related to human flu during the 1918 pandemic, which killed 3-5% of the world's population. In April 2009, human infection with a new strain of this virus was confirmed in Mexico. In June 2009, the World Health Organization (WHO) declared this new strain of swine flu as pandemic after more than 70 countries reported cases of H1N1 infection.

From 2009 to 2014, 59,677 cases and 4141 deaths have been reported in India.[2]

Swine flu has a wide clinical spectrum of manifestations ranging from non-febrile, mild upper respiratory tract illness, febrile influenza-like illness to severe or even fatal complications, including rapidly progressive pneumonia and death.

The mainstay of management of swine flu is antiviral drugs. The 2009 pandemic influenza is susceptible to neuraminidase inhibitors oseltamivir and zanamivir. Antibiotics are usually not recommended for the management of swine flu virus infection; however, the current WHO guidelines for clinical management of H1N1 states that if at all required, they should be guided by microbiological studies and recommendations from evidence-based guidelines for community-acquired pneumonia. However, seasonal influenza and past influenza have been associated with an increased risk of secondary bacterial infections, which are likely to be important causes of morbidity and mortality in swine flu patients, which justifies the use of antibiotics during the swine flu epidemic.[3]

Due to epidemic panic, deviations from the standard guidelines are often seen as a result of which the rationality of drug prescription is greatly hampered.[4] Furthermore, very few studies have been conducted to overcome the problems faced during epidemic period. Hence, this study is an attempt to increase knowledge regarding swine flu epidemic by studying the clinico-epidemiological profile, drug utilization pattern, and outcome of swine flu patients which may aid in the management of swine flu epidemic in the near future.

MATERIALS AND METHODS

It is a retro-prospective study conducted at GMC, Latur, Maharashtra, between January 2015 and September 2015. The retrospective data of January and February 2015 were collected from medical record section department of GMC, Latur. For prospective data, case sheets available at the swine flu ward were reviewed. The permission from Head of the Swine Flu Department and Institutional Ethics Committee was taken before the start of study. The data were recorded in a specially designed pro forma which included the following parameters:

1. Clinico-epidemiological profile
    a. Patient demographics such as age, sex, address, and duration of stay
    b. Clinical presentation and investigations
    c. Risk factors.
2. Drug utilization pattern
    a. Drug name, dose used, route of administration, frequency of administration, duration of treatment
    b. Days on ventilation.
3. Outcome details

    Patient cured or died or discharged against medical advice.

Prescription pattern was analyzed using the WHO International Network for Rational Use of Drug (INRUD) indicators. The adherence to drug prescription guidelines was checked using the National List of Essential Medicines (NLEM) 2015 guidelines and the WHO Essential Drug List (WHO EDL) guidelines.

Inclusion Criteria

Patient admitted to swine flu ward and positive throat swab for H1N1.

Exclusion Criteria

Patient admitted to swine flu ward and negative throat swab for H1N1.

Analysis of Data

The data were analyzed according to

1. The demographic profile of the patient (age, gender, address, etc.,), clinical features, laboratory parameters, risk factors including pregnancy and clinical outcome
2. The prescription pattern was analyzed using the WHO INRUD drug use indicators which included the total number of drugs prescribed, average number of drugs per prescription, average number of injectables per prescriptions, and number of drugs by generic name. Total number of prescriptions containing fixed dose combinations (FDCs)
3. Outcome of the disease.

Statistical Analysis

Descriptive statistics was applied to the collected data using Microsoft Excel 2010 software and GraphPad Prism. Results were expressed in percentages and mean ± standard deviation.

RESULTS

Clinico-epidemiological Profile

In our study, a total of 140 cases were admitted to the swine flu ward of our tertiary care hospital during the epidemic period, i.e., from January 2015 to September 2015, out of which 52 (37.1%) were swine flu positive. Out of these 52 swine flu positive cases, 38 (73.07%) were female patients and 14 (26.92%) were male patients.

The most common age group affected was 41-50 years 15 (28.84%). The most common presentation was cough, cold, rhinorrhea, followed by fever, breathlessness, myalgia, chest pain, vomiting, and headache (Table 1).

Table 1: Demographic details of swine flu positive cases

Age in years	Total cases	Male (%)	Female (%)
<1	1 (1.92)	0 (0)	1 (1.92)
1-10	5 (9.61)	3 (5.76)	2 (3.84)
11-20	3 (5.76)	0 (0)	3 (5.76)
21-30	6 (11.53)	2 (3.84)	4 (7.69)
31-40	14 (26.92)	3 (5.76)	11 (21.15)
41-50	15 (28.84)	5 (9.61)	10 (19.23)
51-60	8 (15.38)	1 (1.92)	7 (13.46)
Total	52	14 (26.92)	38 (73.07)

22 (42.30%) patients had associated risk factors, out of which 4 (18.18%) were antenatal cases (Table 2).

Among the 52 positive cases, majority of them, i.e., 15 (28.84%), showed anemia, and 10 (19.23%) cases showed abnormality in X-ray findings, maximum of which showed patchy consolidation of lungs.

Treatment Details

In all, 52 prescriptions contained 267 drugs. Out of these, 176 (65.91%) were antimicrobials. Other drugs commonly coprescribed were hydrocortisone, insulin, antacids, cough syrups, multivitamin tablets, and intravenous fluids. Drugs such as dopamine, adrenaline, and furosemide were used for resuscitative measures in critically ill patients. FDC was seen in 43 (82.69%) prescriptions. The most common FDC prescribed was piperacillin + tazobactam, which was prescribed to 38 (73.07%) of patients, and the combination of salbutamol and ipratropium bromide prescribed to 25 (48.07%) patients (Tables 3 and 4). WHO INRUD drug use indicators were described in table 5.

Ventilatory Support

Bilevel positive airway pressure (BIPAP) and mechanical ventilation were given to 9 (17.30%) patients. Free flow oxygen with nasal prongs was given to 35 (67.30%) patients. The average duration of ventilation used was 2.7 ± 2.1 days (mean ± standard deviation [SD]).

Outcome

Out of 52 positive cases, 19 (36.53%) people died, 30 (57.69%) were cured, and 3 (5.76%) were discharged against medical advice. A total of 22 patients had associated risk factors. Out of 19 deaths, 10 (45.45%) deaths were in patients who had associated risk factors.

DISCUSSION

Influenza A H1N1 is a highly contagious pathogen which made headlines in 2009, as the so-called swine flu, by causing a worldwide influenza pandemic.

Table 2: Risk factors and swine flu positive cases

Risk factors	Swine flu positive (%)
Diabetes	5 (9.61)
Hypertension	4 (7.69)
COPD	3 (5.76)
Pregnancy	4 (7.69)
Others	6 (11.53)

COPD: Chronic obstructive pulmonary disease

Table 3: Commonly used drug groups in swine flu positive patients

Drug	Total number of patients (%)
Antiviral (oseltamivir)	52 (100)
Antibiotics	52 (100)
Antipyretics	51 (98.07)
Bronchodilators	25 (48.07)
Antihistaminic	7 (13.46)
Miscellaneous	8 (15.38)

Table 4: Commonly used antibiotics in swine flu positive patients

Antibiotic	Total number of patients (%)
Piperacillin+tazobactam combinations	38 (73.07)
Levofloxacin	37 (71.15)
Linezolid	10 (19.23)
Amikacin	10 (19.23)
Cephalosporin	10 (19.23)
Others	19 (36.53)

Table 5: WHO INRUD drug use indicators

Indicator	Value (%)
Average number of drug per prescription	3
Percentage of drug prescribed by generic name	28.08
Percentage of encounters with antibiotic prescribed	65.19
Percentage of encounters with injections prescribed	44.56
Percentage of prescriptions with FDC	82.69
Percentage of drugs prescribed from National List of Essential Medicine 2015	36.70

WHO: World Health Organization, INRUD: International Network for Rational Use of Drug, FDC: Fixed dose combination

The most recent outbreak of influenza A H1N1 started at the end of January 2015 and lasted till end of April 2015, with the second outbreak during August which lasted till the end of September 2015 at Latur, Maharashtra. Taking into account the severity of recent epidemic, this study was conducted to know the clinico-epidemiological profile, drug utilization pattern, and outcome of swine flu cases during the outbreak of swine flu at a tertiary care hospital, Latur.

Out of the 178 patients who were admitted to the swine flu ward, 52 patients were found to be positive for swine flu virus after reverse transcription polymerase chain reaction assay.

In our study, the age group most commonly affected was 41-50 years, 15 (28.84%). The infection rate was higher in females, 38 (73.07%) as compared to males, 14 (26.92%). The maximum cases were seen in February, 25 (48.07%), with subsequent fall in cases till April and the second peak in August. This fact signified direct relationship between occurrence of swine flu in winter and rainy season. The average duration of hospitalization in positive case was 6.53 ± 4.01 (mean ± SD) days. These findings were similar to the findings reported by the studies conducted by Gaikwad and Haralka, and Malkar et al., Singh and Sharma, and Puvanalingam et al.[5-7]

The clinical features include cough, cold, and running nose, which was seen in all cases, followed by fever (86.53%), breathlessness (67.30%), and other symptoms such as vomiting, diarrhea, headache, and myalgia.

Oseltamivir was prescribed to all the patients on admission even before laboratory confirmation of swine flu infection. Piperacillin and tazobactam combination, 38 (73.07%), was prescribed to maximum patients; levofloxacin was also prescribed along with piperacillin + tazobactam in majority of the patients This treatment approach was according to the WHO guidelines and the Joint Indian Chest Society and the National College of Chest Physician (ICS/NCCP) guideline for clinical management of swine flu virus. These guidelines state that the antiviral treatment should be initiated immediately and the combination of a β-lactam plus macrolide antibiotics should be used for the treatment of suspected swine flu-associated pneumonia. If the patient is allergic to beta-lactam antibiotics, the guideline recommends the use of fluoroquinolones.[3] Hence, a good adherence was seen to both the guidelines in our study. Total drugs prescribed from NLEM 2015 were 98 (36.70%) and from WHO essential list of medicine 2015 were 150 (56.17%).[8,9] This discrepancy among the two lists is because of the inclusion of tablet oseltamivir in WHO EML. A good adherence to WHO EML is seen in our study.

However, antibiotics were started on admission before culture sensitivity reports were obtained and continued till the endpoints (discharge and death of the patients). Prolong use of antibiotics in our study may be due to the increase number of referral cases which were of greater severity, previous treatment experience of the treating physician, and epidemic panic. This resulted in deviation from the WHO standard guideline which states that antibiotic should be started after culture sensitivity report, and in case empirical therapy is needed, culture sensitivity test should be done immediately after the start of empirical treatment and the use of antibiotics should then be guided by the culture sensitivity report.

Polypharmacy was seen in all the prescriptions. The minimum numbers of drug prescribed were 3. The high rate of polypharmacy could be due to the use of concomitant drugs for symptomatic treatment and for prophylactic management of infections. Only 74 (28.9%) drugs were prescribed by generic names. High frequency of prescription by brand names may be due to inclusion of prescriptions with FDCs. However, prescriptions of drugs with generic name should be encouraged. The number of injections and FDCs used was 119 (44.56%) and 43 (82.69%), which was more in comparison to the studies conducted by Mukherjee et al. and El Mahalli, where the rate of FDC prescription was 18% and use of injectables was 2%.[10,11] The increase frequency of prescription with injections and FDCs use could be due to increase in number of referral cases, which were of greater severity and beliefs and attitudes of health professionals about the efficacy of injection versus oral medication.

BIPAP and mechanical ventilation were given to 9 (17.30) patients. The average duration of ventilation used was 2.7 ± 2.1 days (mean ± SD).

Out of 52 patients, 19 (36.53%) patients died. Out of these 19 deaths, 10 patients (42.30%) with risk factors (1 antenatal patient in her second trimester and 9 patients suffering from hypertension, diabetes, chronic obstructive pulmonary disease [COPD], congestive cardiac failure [CCF], etc.) succumbed to death. According to the clinical management of human infection with pandemic (H1N1) 2009: Revised guidance, the severity of disease and mortality is seen in patient having associated risk factors such as diabetes, hypertension, COPD, CCF, and pregnancy. Hence, this study also concluded that the mortality rate and severity of disease are more common in the patient with these risk factors.[3]

CONCLUSION

This study is an attempt to know the clinico-epidemiological profile, drug utilization pattern, and outcome in swine flu positive patients. Our study has found the highest rate of infection among the female population and the productive age group and highest mortality among the patient having associated risk factors. A good adherence to the WHO guideline for clinical management of swine flu cases, the Joint ICS/NCCP guidelines, and the WHO EDL list was seen in our study. However, higher prescription with brand name, polypharmacy, and greater use of FDCs and injections are the areas which needs to be addressed. Prescription of drugs with generic name and culture sensitivity testing before and during antimicrobial treatment should be encouraged.

Moreover, this is a preliminary study and further studies are required to broaden the understanding of spectrum of swine flu epidemic and its management so that therapeutic guidelines could be made and revised accordingly to give proper care to the community during epidemics.

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