

Clinical Profile and Treatment Outcomes among Swine Flu (H1N1) Infected Patients

Dr. Ashish Gade¹, Dr. Anil Sontakke², Dr. Balkrishna Tayade³

¹Junior Resident, Department of Respiratory Medicine, NKP Salve Institute of Medical Science & Research Center and Lata Mangeshkar Hospital, Nagpur, Maharashtra, India

²Professor and Head of Department, Department of Respiratory Medicine, NKP Salve Institute of Medical Science & Research Center and Lata Mangeshkar Hospital, Nagpur, Maharashtra, India

³Professor, Department of Respiratory Medicine, NKP Salve Institute of Medical Science & Research Center and Lata Mangeshkar Hospital, Nagpur, Maharashtra, India

Abstract: ***Background:** Influenza causes seasonal epidemics in world annually. H1N1 one of the strains of influenza virus also known to cause swine flu globally and is very well - known pandemic infection in recent times. Affects mainly middle - aged population with hence there is importance of gathering evidence for effective treatment & intensive care management. Hence observational retrospective study of swine flu patients admitted to Intensive Care Unit and ward in tertiary care centre is done. **Aims:** To know profile and pattern of swine flu patients admitted to Intensive Care Unit and isolation wards also study treatment outcomes and factors associated. **Materials and Methods:** Demographic, clinical and lab data of 16 swine flu cases were collected and analyzed between survivors and non survivors. Data like gender, co - morbidities, laboratory values and radiological finding were analyzed and outcome presented as frequency and percentages. **Results:** This retrospective study based on collection of data from 15 swine flu patients from 21/07/2022 to 30/09/2022. Out of 15 patients 10 (66%) were male and 5 (34%) were female. 13 (86%) got discharged and 2 (34%) could not be survived. Case fatality between male and female is 50%. Case fatality between male and female is 50%. Most patients present with fever (100%) and cough (75%) and dyspnoea present in 80% of patients. Procalcitonin positive in positive in 2 patients both could not be survived. **Conclusion:** Patients mainly present with fever and dyspnoea, tachypnoea and tachycardia mainly associated with intensive care. Arterial blood gas analysis and PaO₂/FiO₂ is important in deciding severity of lung injury and need for ventilatory support. Respiratory failure is main cause for mortality. Serum procalcitonin level is useful in determining outcomes.*

Keywords: Influenza virus, Acute lung injury, Procalcitonin level, Intensive Care Unit (ICU), PaO₂/FiO₂

1. Introduction

1.1 Background

1st case of swine flu reported in 2009 and declared pandemic within next three months. Patients get admitted to Intensive Care Unit with acute lung injury. In India 1st case reported from Maharashtra (Pune) and 2nd wave of H1N1 in 2012. Most common complication of swine flu is pneumonia with highest transmissibility rate and rapid rise of cases over limited time period exert heavy workload on health care system. For effective management of swine flu along with newer strain need to study evidence regarding patients ICU parameters hence retrospective observation study had done.

1.2 Objective

The study was designed to know the profile and pattern of swine flu admitted to isolation ward and factors associated with treatment outcomes in survival and non - survival.

2. Methods

Study design - Retrospective observational cohort study.

Settings - Study was conducted on H1N1 RT - PCR confirmed cases admitted to isolation and Intensive Care Unit from time period 21/07/2022 to 30/09/2022 under Department of Respiratory Medicine at NKP Salve Institute of Medical Science and Research Center and Lata

Mangeshkar Hospital, Nagpur. Participants: 16 RT - PCR confirmed cases at Lata Mangeshkar hospital above age of 18 yrs are observed in this study. Variables: Arterial blood gas analysis was done at regular intervals and classifies patients accordingly looking need of ICU admission or isolation ward.

Statistical Analysis

During given time period that is from 21 July 2022 to 30 Sept.2022 patient came to be H1N1 positive is considered as study population. Qualitative data like gender, co - morbidities, normal and abnormal lab values (TLC, PROCAL LEVEL, CRP) and radio - logical finding were analyzed and outcome presented as percentages.

3. Results

Retrospective study was based on collection of data from 15 H1N1 positive patients admitted to ICU / isolation ward in LMH Nagpur within above mentioned time period.

Table 1: Shows Demography, co - morbidities and serum procal level.

Gender	Survivors	Non - Survivors	Total	Percentage
Male	9	1	10	66%
Female	4	1	5	34%
total	13	2	15	100%
Co - Morbidities				53%
Respiratory illness	1	1	2	
DM	1	1	1	
Cardiovascular illness	4		5	
Serum Procalcitonin				
Positive	0	2	2	
Negetive	13	0	13	

Out of 15 patients 10 (66%) were Male and 5 (34%) were Female. Age ranged from 19 - 75. Most common affected age group is 30 - 60 yrs. Symptoms most patients have fever (100%), cough (75%), breathlessness (80%), myalgia (10%) and sore throat (10%). Most of the patients have tachycardia and tachyonea. Respiratory system auscultation shows coarse crepitation and rhonchi with tubulobronchial breathing also noted in some patients. Other blood parameters like TLC, DLC, LFT, KFT are within normal limit. Serum procalcitonin estimation done in all 15 patients which came to be positive (more than 0.5) in 2 patients. Out of 15 patients 8 have co - morbidities like Respiratory illness (post covid status, Asthma, COPD), Diabetes Melities and Hypertension. Delayed recovery is observed in patients with co - morbidities. Most common associated illness were respiratory disease followed by cardiovascular diseases.

Table 2: Age Group and Days of Presentation After Onset of Symptoms

Sex	Male	Female
Outcome	Death Discharge	Death Discharge
Age groups (Yrs) less than 30	0 0	0 0
30 - 60yrs	1 9	1 1
More than 60	0 3	1 1
Days of presentation less than 7	0 9	0 4
After onset of Symptoms More than 7	1 0	1 0

Days of presentation are important criteria for outcome of patients. If patients present as soon as symptoms appears better prognosis is there as patient initiated on tablet oseltamavir, oxygen support according to need, intravenous fluids and antibiotics and symptomatic support.

Table 3: Ventilatory and lab findings

Sex	Male	Female
	Death Discharge	Death Discharge
Spo2/Fio2 more than 300	0 9	0 4
Less than 300	1 0	1 0
TLC less than 11000	1 7	0 4
More than 11000	0 1	1 1

11 out of 15 was admitted to intensive care for management. Among 11 cases 9 were Acute Lung Injury managed by non invasive ventilatory support and all cases recovered and 2 patient have severe ARDS treated with invasive ventilation. Both patient with severe ARDS had extensive lung damage they cannot be survived.

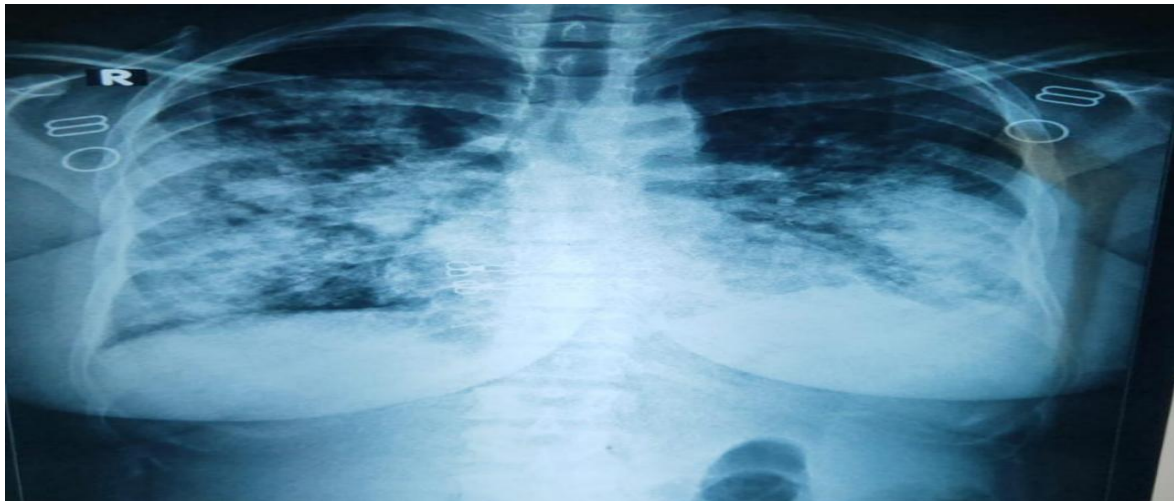


Image 1: All the 15 patients show varying degree of lung infiltration suggestive of Bronchopneumonia, ARDS and ALI. Above chest xray shows varying degree of mid zone lower zone heterogeneous opacification.

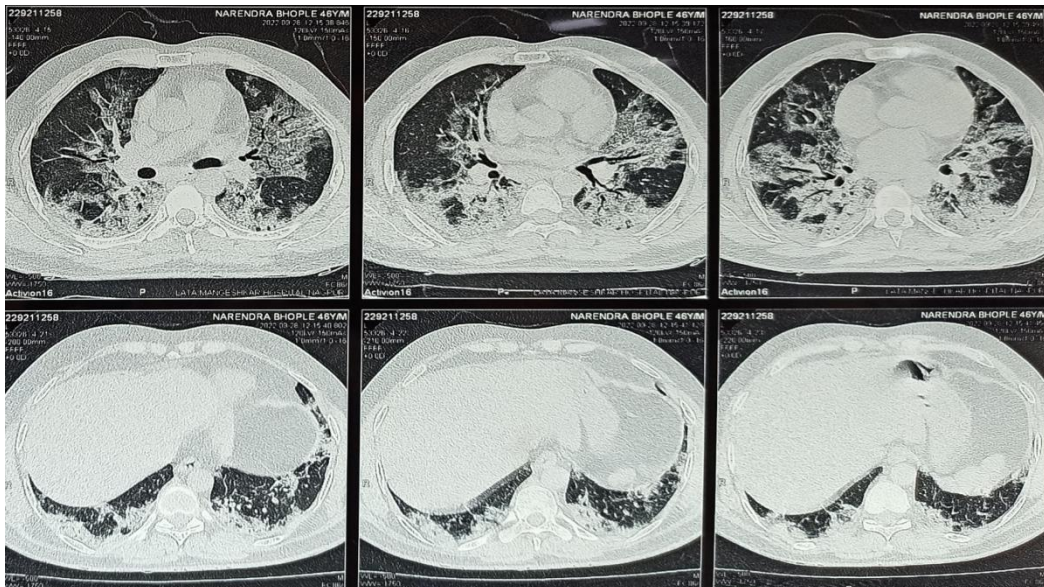


Image 2

HRCT Thorax shows multiple consolidatory changes with ground glass opacification in Bilateral mid zone and lower zone.

4. Main Results

There were 10 (66%) male and 5 (34%) female. Age ranged from 18 - 75 yrs. Age 30 - 60 have most cases and mortality. Most common sign was tachycardia and tachypnea and most common symptoms are fever and breathlessness. 73% patient developed ARDS and ALI Out of 15 Patients. 18% out of 11 intensive care patient could not be survived. Among the fatal cases both were positive for procalcitonin. Rest 82% develop acute lung injury and recovered.

5. Discussion

The swine flu virus is challenging to medical community because of its spread among young and previously healthy people. In this study 80% of cases are within the age group of 30 - 60 yrs and fatal in 16% (2/12). Study by Chako et al have majority of cases in the range of 19 - 55 yrs (1) and study by Chandrashekhar Nagesh Kumar et al have majority of cases within the age group of 15 - 45 yrs. Immunity in older people may be due to acquired immunity due to pre exposure to influenza virus. In this study fatality is equal in both male and female in contrast to recent Indian studies where fatality was mere among female i.e. 75% (2). The chief presenting complaint were fever (100%), dyspnoea (80%) & cough (75%) as comparable to studies by Rao et al (3). Patients presented with co-morbidities like pre-existing respiratory illness like Post-covid status, Bronchial Asthma, COPD, DM, Ischemic Heart Disease in 53% of patients as compared to Chandrashekhar et al study 46% and 52% in Kherkhovo et al study (4). Symptomatically all patients had tachypnea and tachycardia as seen in study by Bewick et al. Laboratory data shows raised TLC among three patients in contrast to other study by Bewick et al (5). In this study procalcitonin was positive in both the fatal cases suggesting that viral pneumonia is also important. All patients are culture negative due to use of antibiotic. Chest x-ray of all the patients shows heterogeneous opacifications as compared to study by Choudasama et al (6) with 93% shows lung infiltration. A high number of undiagnosed cases

of sickness may exist among people seeking primary care or not seeking care at all. Additional research is critically needed to investigate the entire clinical spectrum of illness (7). Critical illness caused by 2009 influenza A (H1N1) developed quickly after hospitalisation, often in young adults, and was linked with severe hypoxemia, multisystem organ failure, the need for extended mechanical ventilation, and the frequent use of rescue therapy (8). Age-specific immunity to, and incidence of infection with, the 2009 pandemic influenza A H1N1 virus is required for predicting disease burden and the efficiency of measures such as vaccination (9). Patients with underlying disorders such as cardiovascular and pulmonary disease, as well as pregnant women, should be given special consideration (10).

6. Conclusion

SpO₂/Fio₂ less than 150 associated with significant mortality. Acute Lung Injury may progress to ARDS which significantly associated with mortality. Tablet Oseltamavir started for 5 Days as soon as possible. Delay in initiation may lead to disease progression and development of complications hence earlier studies conclude that early the treatment initiation less is the disease progression and less is the mortality.

References

- [1] Chacko J, Gagan B, Ashok E, Radha M, Hemanth HV. Critically ill patients with 2009 H1N1 infection in an Indian ICU. *Indian J Crit Care Med.* 2010 Apr; 14 (2): 77 - 82. doi: 10.4103/0972 - 5229.68220. PMID: 20859491; PMCID: PMC2936736.
- [2] Kumar TC, Shivakumar NS, Deepak TS, Krishnappa R, Goutam MS, Ganigar V. H1N1 - infected Patients in ICU and Their Clinical Outcome. *N Am J Med Sci.* 2012 Sep; 4 (9): 394 - 8. doi: 10.4103/1947 - 2714.100984. PMID: 23050248; PMCID: PMC3456478.

- [3] Jagannatha Rao SR, Rao MJ, Swamy N, Umapathy BL. Profile of H1N1 infection in a tertiary care center. *Indian J Pathol Microbiol.* 2011 Apr - Jun; 54 (2): 323 - 5. doi: 10.4103/0377 - 4929.81618. PMID: 21623082.
- [4] Van Kerkhove MD, Vandemaële KA, Shinde V, Jaramillo - Gutierrez G, Koukounari A, Donnelly CA, Carlino LO, Owen R, Paterson B, Pelletier L, Vachon J, Gonzalez C, Hongjie Y, Zijian F, Chuang SK, Au A, Buda S, Krause G, Haas W, Bonmarin I, Taniguichi K, Nakajima K, Shobayashi T, Takayama Y, Sunagawa T, Heraud JM, Orelle A, Palacios E, van der Sande MA, Wielders CC, Hunt D, Cutter J, Lee VJ, Thomas J, Santa - Olalla P, Sierra - Moros MJ, Hanshaoworakul W, Ungchusak K, Pebody R, Jain S, Mounts AW; WHO Working Group for Risk Factors for Severe H1N1pdm Infection. Risk factors for severe outcomes following 2009 influenza A (H1N1) infection: a global pooled analysis. *PLoS Med.* 2011 Jul; 8 (7): e1001053. doi: 10.1371/journal.pmed.1001053. Epub 2011 Jul 5. PMID: 21750667; PMCID: PMC3130021.
- [5] Bewick T, Myles P, Greenwood S, *et al* Clinical and laboratory features distinguishing pandemic H1N1 influenza - related pneumonia from inter-pandemic community - acquired pneumonia in adults *Thorax* 2011; 66: 247 - 252.
- [6] Chudasama, Rajesh & Patel, Umed & Verma, Pramodb. (2010). Hospitalizations associated with 2009 influenza A (H1N1) and seasonal influenza in Saurashtra region, India. *Journal of infection in developing countries.* 4.834 - 41.10.3855/jidc.1049.
- [7] Centers for Disease Control and Prevention (CDC). Outbreak of swine - origin influenza A (H1N1) virus infection - Mexico, March - April 2009. *MMWR Morb Mortal Wkly Rep.* 2009 May 8; 58 (17): 467 - 70. PMID: 19444150.
- [8] Kumar A, Zarychanski R, Pinto R, Cook DJ, Marshall J, Lacroix J, Stelfox T, Bagshaw S, Choong K, Lamontagne F, Turgeon AF, Lapinsky S, Ahern SP, Smith O, Siddiqui F, Jouvett P, Khwaja K, McIntyre L, Menon K, Hutchison J, Hornstein D, Joffe A, Lauzier F, Singh J, Karachi T, Wiebe K, Olafson K, Ramsey C, Sharma S, Dodek P, Meade M, Hall R, Fowler RA; Canadian Critical Care Trials Group H1N1 Collaborative. Critically ill patients with 2009 influenza A (H1N1) infection in Canada. *JAMA.* 2009 Nov 4; 302 (17): 1872 - 9. doi: 10.1001/jama.2009.1496. Epub 2009 Oct 12. PMID: 19822627.
- [9] Miller E, Hoschler K, Hardelid P, Stanford E, Andrews N, Zambon M. Incidence of 2009 pandemic influenza A H1N1 infection in England: a cross - sectional serological study. *Lancet.* 2010 Mar 27; 375 (9720): 1100 - 8. doi
- [10] 10.1016/S0140 - 6736 (09) 62126 - 7. Epub 2010 Jan 21. PMID: 20096450. Sertogullarindan B, Ozbay B, Gunini H, Sunnetcioglu A, Arisoy A, Bilgin HM, Mermit Cilingir B, Duran M, Yildiz H, Ekin S, Baran A. Clinical and prognostic features of patients with pandemic 2009 influenza A (H1N1) virus in the intensive care unit. *Afr Health Sci.* 2011 Jun; 11 (2): 163 - 70. PMID: 21857845; PMCID: PMC3158518.