

Swine flu outbreak 2015-Paediatric Experience in a Tertiary Care Centre.

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Abstract:

Background & Aim: To study and analyse the clinical profile and outcome of children admitted with Influenza A positive cases at our Tertiary Care Centre in 2015. **Materials & Methods:** Prospective study conducted in a tertiary care centre (Civil Hospital) B. J. Medical College, Ahmedabad from Jan 2015 to March 2015. 340 Children presenting with clinical features compatible with category C were admitted and 199 patients having laboratory confirmed influenza A (H1N1) were included in our study. Details regarding clinical features, examination findings, investigations, complications and treatment were recorded and analysed in a systemic manner. **Results:** Study showed that highest incidence of influenza A was seen in 1-3 years age group (41.7%) Male-female ratio was 1.18:1 indicating similar affection of both sexes. Maximum patients presented within first 3 days of illness (53.2%) with fever (82.9%) followed by dry cough (74.6%) and sore throat (52.7%) as presenting symptoms. Leucopenia (79.4%) was the most common laboratory finding and lobar pneumonia (81.1%) was the most common radiological finding followed by bronchopneumonia (18.9%). Conjunctivitis (20.1%) and otitis media (6.03%) were the common complications. Mortality rate in our set up was 6.5% (13 out of 199); with maximum from 1-3 year age group (46.1%), most common cause being ARDS (46.1%). **Conclusion:** The outbreak of influenza A (H1N1) 2015 predominantly affected young population with significant morbidity and mortality. With the efforts of healthcare authorities worldwide, we have still not lost the race against fighting this virus.

Key Words: Influenza (H1N1), Resurgence (2015)

Introduction:

Influenza is an acute respiratory disease which affects the upper and/or lower respiratory tracts. Influenza occurs globally with an annual attack rate estimated at 5 %-10% in adults and 20-30% in children¹. H1N1 was responsible for the 1918 pandemic (Spanish flu) causing an estimated 20-40 million or more deaths worldwide. In the year 2009, there were global outbreaks caused by type A strain designated as A (H1N1) pdmo9 strain².

Out of the three types of influenza viruses - A, B, and C, the type A virus causes the most severe disease.

Children, particularly below 2 years of age, have a high disease burden. The year 2015 has witnessed a major pandemic caused by Influenza A (H1N1) in our country.

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We report our experience with Influenza A (H1N1) in the 2015 outbreak amongst paediatric patients at a tertiary care centre in Western India.

Material & Methods:

Prospective study was conducted in tertiary care centre (Civil Hospital) B.J. Medical College, Ahmedabad from Jan 2015 to March 2015.

Influenza A H1N1 virus screening categorised as:

Category A:

Mild fever plus cough / sore throat with or without bodyache, headache, diarrhoea and vomiting. Only monitoring, no testing and no Oseltamivir needed.

Category B: In addition to above symptoms under Category A

- i. Patient has high grade fever and severe sore throat, may requires home isolation and Oseltamivir, no testing.
- ii. Patient has one or more of following: children less than 5years, pregnant women, persons aged 65 years or older, patients with chronic organ involvement and on long term cortisone therapy. Treated with Oseltamivir, no testing needed.

Category C: Signs and symptoms of A and B. patient has one or more of the following:

- Breathlessness, Chest pain, drowsiness, fall in blood pressure, sputum mixed with blood, bluish discolouration of nails.
- Irritability among small children, refusal to accept feed
- Worsening of underlying chronic conditions

Such patients require testing, immediate hospitalization and treatment.

Total 340 Children presenting with clinical features compatible with category C were admitted and tested for Influenza A (H1N1) using RT-PCR in which panel of oligonucleotide primers and dual labelled probes were designed specifically to detect swine H1 influenza. Respiratory specimens Including throat swab, and nasopharyngeal /nasal swabs were taken from ambulatory admitted patients. From intubated patients admitted in the ICU the sample was tracheal aspirates. Samples were transported in special viral transport medium, packed in such a way that there was no chance of contaminating the environment or it being a risk to those handling the box.

199 patients having laboratory confirmed Influenza A (H1N1) were included in our study. Details regarding clinical features, examination findings, Investigations, complications and Treatment were recorded in Individual Case Record form. The data was then analysed by standard methods.

Observation & Result:

There were a total of 199 patients having laboratory confirmed influenza A (H1N1) admitted at our institute during study period comprising 5.3% of total admissions

The highest incidence was seen between the age of 1-3 years (41.7%) with 54 patients belonging to this group; followed by age group of 0-1 year (27.1%) amongst which 5 patients

(9.2%) were newborns. Out of 199 patients, 108 (54.3%) were males and 91 (45.7%) were females with male:female ratio of 1 18:1 Majority of patients were from urban areas (54.7%) whereas 36% patients were from rural area and 9% from tribal areas indicating the far flung reach of influenza. The highest number of patients belonged to lower socioeconomic scale (78.5%) as per Kuppaswamy Classification; this could be because our hospital mainly caters to patients coming from lower socioeconomic class who have poor access to health care system. This outbreak occurred between month of January to March, indicating higher susceptibility in winter season. None of the patient had received influenza vaccine with respect to routine immunization. Amongst proven cases, 82.9% (165) were fully immunized, while 12.6% (25) were partially immunized and 4.5% (9) were unimmunized.

Table 1: Age distribution

Age	Percentage (No. of patients)
<1 year	27.1% (54)
1-3 years	41.7%(83)
3-5 years	15.5%(31)
6-9 years	11%(22)
>10 years	4.5%(9)

At the time of presentation, 106 (53.2%) patients had duration of illness of only 1-3 days, while 80(40.2%) patients had duration of illness of 4-7 days. Thus, nearly 93.4% presented within 7 days of start of symptoms, indicating the rapid progression of disease. The commonest clinical features were fever, dry cough, sore throat which was seen in almost all patients. Amongst the newborns, 3 had nonresolving pneumonia picture on chest X ray while 2 were tested as they were exclusively breast fed and mother found to be H1N1 positive later on. To sum up, mothers of 4 out of total 5 newborns turned to be positive.

Table 2 Clinical features

Clinical feature	No. of patients	Percentage
Fever	165	82.9
Dry cough	149	74.6
Sore throat	105	52.7
Rhinorrhea	95	47.7
Breathlessness	86 (including newborns)	43.2
Feeding difficulties	40	20.1
Headache	27	13.5
Productive cough	22	11
Abdominal pain	8	4
Seizures	4	2

Many of the patients had associated co-morbidities like 8 patients had asthma, 5 patients had acyanotic congenital heart disease, 3 patients were known case of cerebral palsy, 2 patients were known cases of nephrotic syndrome, 2 patients had liver disease and 1 patient had skeletal dysplasia indicating that yearly influenza vaccine should be offered to such high risk patients.

80% of patients were under-nourished with 34% having PEM grade III and IV. 132(66%) had anaemia and 5 (2.5%) patients had severe anaemia. Leukopenia (Total W8C <4000) was found in 158 patients (79.4%) and 13 patients (6.5%) showed thrombocytopenia.

Radiological investigations showed lobar pneumonia in 161 patients (81.1%) while bronchopneumonia was seen in 37 patients (18.9%).

All patients were given oseltamivir in weight-appropriate dosages. 71 patients (35.6%) required oxygen support, while 23 patients (11.5%) required ventilator support. Broad spectrum antibiotics like amoxyclav, ceftriaxone and azithromycin were given to all proven cases with stepping up to higher antibiotics as and when required.

Complications were seen in 64 patients (32.2%), with the commonest being Conjunctivitis 40 (62.5%) followed by otitis media 12 patients (18.75%), ARDS 11 cases (17.2%), 11 pleural effusion 8 cases (4%), DIC in 7 cases (10.94%), Empyema in 4 cases (6.25%) and pneumothorax in 3 cases (4.7%) and encephalitis in 3 cases (4.7%).

Table 3 Complications

Complications	No of pts.	Percentage
Conjunctivitis	40	20.1
Otitis media	12	6.03
Pleural effusion	8	4
Empyema	4	2
Pneumothorax	3	1.5

Out of 199 patients, 165 patients were discharged, 21 patients took discharge against medical advise (DAMA) and 13 patients (6.5%) expired. The overall Death estimate in our Country during 2015 outbreak is 1731(5.8%) deaths out of 30000 patients affected³. This indicates that Influenza A (H1N1) 2015 had a high fatality rate. Among the nonsurvival group, 6 patients (46.1%) were 1-3years age group, followed by 4 (30.7%) of less than 1 year age. 2 patients (15%) of 4.7years age and 1 patient (7.6%) of >10 years age.

Most common radiological finding among nonsurvivable group was bronchopneumonia-8 patients (61.5%) followed by lobar pneumonia (38.5%). The major contributing factors were ARDS and DIC.

DISCUSSION

The influenza virus is a single stranded RNA virus belonging to the Orthomyxoviridae family. The influenza virus type A causes moderate to severe illness in all age-groups in humans as well as other animals. Influenza A virus is known for its high rate of mutation in hemagglutinin (HA) and neuraminidase (NA) antigenic epitopes. Influenza virus is characterized by frequent mutations-antigenic drifts (minor antigenic change) and antigenic shifts (major antigenic change).

Swine Influenza was first proposed to be a disease related to human flu during the 1918 flu pandemic, when pigs became ill at the same time as humans. The first identification of an influenza virus as a cause of disease in pigs occurred about ten years later, in 1930 and while historic transmissions to people have been "sporadic", the human infection rate is

rising. The latest influenza pandemic due to Influenza A (H1N1) 09 (pdm H1N1) began in May 2009, spread to all over the world and became global by July 11, 2009. The presently ongoing resurgence since December 2014 however appears to be worse than the previous one, leading to over 31156 positive cases and 1841 deaths countrywide (as of 28th March, 2015).⁴

The detection of D.222G mutation in HA gene of Indian Isolates by Mullick et al., is a cause of concern.⁵ These mutant strains have the capability of binding to both a2-3/a2-6- sialic acid linkage and thus can lead to more severe disease⁶. The absence of D222G mutant strain in other Indian studies indicates its minor contribution towards the burden of severe disease⁷. The role of D222G strain in current resurgence however cannot be commented at this stage.

The attack rate and frequency of Influenza are highest in young children as was seen in our study.

The Pathogenesis involves desquamation of the epithelial layer, loss of ciliary function and decreased mucus production permitting secondary bacterial Infection. It is a disease of the colder months which spreads by small particle aerosol. The Incubation period can be as short as 48 -72 hours.⁸

The clinical features include fever and upper respiratory symptoms such as cough and sore throat as seen in our study. Headache, bodyache, fatigue, diarrhea, and vomiting have also been observed. There is insufficient information to date about clinical complications of this variant of swine origin of influenza A (H1N1) virus infection. Clinicians should expect complications to be similar to seasonal influenza: sinusitis, otitis media, croup, pneumonia, bronchiolitis, status asthmaticus, myocarditis, pericarditis, myositis encephalitis, seizures and secondary bacterial pneumonia with or without sepsis. Routine investigations include haematological biochemical, radiological and microbiological tests are necessary.

Prompt measures to restrict spread of virus like cover nose/mouth with a handkerchief/ tissue paper while coughing/ sneezing; Hand washing with non-antimicrobial soap and water. Reinforce standard infection precautions while entering the room like wearing high efficiency mask, gowns, gloves, goggles, cap and shoe cover. The drug of choice for prophylaxis and treatment is Oseltamivir. Dose and duration modified as per clinical condition. It causes gastric side effects like nausea, vomiting commonly

The flu vaccines cause mild but common reactions. There are two kinds of vaccine available given with needle, in the arm and nasal spray are made by growing the virus in chicken eggs (live attenuated freeze dried vaccines available). Approved vaccines -- including the 2015 HIM swine flu vaccine -- are calculated to be much less risky than the diseases they prevent. For example out of every million people who get a flu shot, one or two will get a serious neurological reaction called Guillain-Barre syndrome (GBS)⁹.

In that context, Oseltamivir prophylaxis also provides equivalent efficacy with lesser side effects. Hence all high risk population like health care workers like dedicated doctors, nurses and paramedical staff should receive antiviral prophylaxis.

Conclusion:

Our study shows that there were significant numbers of positive Influenza A (H1N1) cases presented to a tertiary care centre in Jan-March 2015 indicating a recent resurgence of Swineflu. As compared to outbreak in 2009 which occurred worldwide and lasted for almost one and half year, the duration this time had cut down to nearly 3months predominantly affecting India.

Measures to limit the outbreak includes training of health care providers in case management and Infection control, vaccination of health care workers, creation of isolation wards and administration of oseltamivir to Category C patients, and community health education about social distance and personal hygiene measures.

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