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Swine Flu (Swine Influenza-A (H1N1) Virus): A Review

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Abstract: Swine flu has been confirmed in a number of countries and it is spreading from human to human, which could lead to what is referred to as a pandemic flu outbreak. Pandemic flu is different from ordinary flu because it's a new flu virus that appears in humans and spreads very quickly from person to person worldwide. The World Health Organization (WHO) is closely monitoring cases of swine flu globally to see whether this virus develops into a pandemic. Because it's a new virus, no one will have immunity to it and everyone could be at risk of catching it. This includes healthy adults as well as older people, young children and those with existing medical conditions. Tamiflu (Oseltamivir) and Ralenza (Zanamivir) can treat the H_1N_1 swine flu strain. Swine flu virus is never before super flu virus but whenever three known virus such as a swine flu strain, bird flu strain and human flu virus combine with each other than makes H_1N_1 swine flu virus which is not danger if we take some protect against it such as a wear three layer mask on nose, wash the hands after coming home, not involve at place where big crowd attended.

Key words: Influenza-A · Tamiflu · Oseltamivir · Zanamivir

INTRODUCTION

Swine flu (swine influenza) is a respiratory disease caused by viruses (influenza viruses) that infect the respiratory tract of pigs and result in nasal secretions, a barking-like cough, decreased appetite and listless behavior. Swine flu produces most of the same symptoms in pigs as human flu produces in people. Swine flu can last about one to two weeks in pigs that survive. Swine influenza virus was first isolated from pigs in 1930 in the U.S. and has been recognized by pork producers and veterinarians to cause infections in pigs worldwide. In a number of instances, people have developed the swine flu infection when they are closely associated with pigs (for example, farmers, pork processors) and likewise, pig populations have occasionally been infected with the human flu infection. In most instances, the cross-species infections (swine virus to man; human flu virus to pigs) have remained in local areas and have not caused national or worldwide infections in either pigs or humans. Unfortunately, this cross-species situation with influenza viruses has had the potential to change.

Influenza-A (H_1N_1) (Earlier know as swine flu) is a new influenza virus causing illness in people. First detected in Mexico in April, 2009, it has spread to many countries in the World. Swine flu is basically a misnomer. This was originally referred to as "swine flu" because laboratory testing showed that many of the genes in this new virus were very similar to those found in pigs in North America. Further on, it has been found that this new virus has gene segments from the swine, avian and human flu virus genes. The scientists call this a "quadruple reassortant" virus and hence this new (novel) virus is christened "influenza-A (H1N1) virus.

On June 11, 2009, the World Health Organization (WHO) signaled that a global pandemic of novel influenza A (H1N1) was underway by raising the worldwide pandemic alert level to Phase 6. This action was a reflection of the spread of the new H1N1 virus, not the severity of illness caused by the virus. At the time, more than 70 countries had reported cases of novel influenza A (H1N1) infection and there were ongoing community level outbreaks of novel H1N1 in multiple parts of the world [1].

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Nomenclature: The initial outbreak was called the "H_1N_1 influenza". In July 2009, WHO experts changed the name to pandemic H_1N_1/09 virus to distinguish it from the current seasonal H_1N_1 virus and as of August, 2009, the CDC began referring to it as the novel H_1N_1 virus [2].

Classification: The three genera of influenza viruses that cause human flu, two also cause influenza in pigs, with influenza-A being common in pigs and influenza-C being rare [3]. Influenza-B has not been reported in pigs. Within influenza-A and influenza-C, the strains found in pigs and humans are largely distinct, although due to reassortment there have been transfers of genes among strains crossing swine, avian and human species boundaries.

Influenza-A: Swine influenza is known to be caused by influenza-A subtypes H_1N_1, H_1N_2 [4], H_2N_3 [5], H_3N_1 [6] and H_3N_2 [4]. In pigs, three influenza-A virus subtypes (H_1N_1, H_1N_2 and H_3N_2) are the most common strains worldwide [7]. In the United States, the H_1N_1 subtype was exclusively prevalent among swine populations before 1998; however, since late August 1998, H_3N_2 subtypes have been isolated from pigs. As of 2004, H_3N_2 virus isolates in US swine and turkey stocks were triple reassortants, containing genes from human (HA, NA and PB_1), swine (NS, NP and M) and avian (PB_2 and PA) lineages [8].

Influenza-C: Influenza-C viruses infect both humans and pigs, but do not infect birds [9]. Transmissions between pigs and humans have occurred in the past [10]. For example, influenza-C caused small outbreaks of a mild form of influenza amongst children in Japan and California [11]. Due to its limited host range and the lack of genetic diversity in influenza-C, this form of influenza does not cause pandemics in humans [12].

Transmission: Influenza virus is present in respiratory secretions of infected persons. As a result, influenza virus can be transmitted through sneezing and coughing via large-particle droplets [13, 14]. Transmission via contact with surfaces that have been contaminated with respiratory droplets or by aerosolized small-particle droplets may also occur, although these modes of transmission have not been proven. In addition to respiratory secretions, certain other body fluids (e.g. diarrheal stool) should also be considered potentially infectious [13].

Role of Pigs: Pigs play an important role in interspecies transmission of influenza virus. Susceptible pig cells possess receptors for both avian (alpha 2-3-linked sialic acids) and human influenza strains (alpha 2-6-linked sialic acids), which allow for the reassortment of influenza virus genes from different species if a pig cell is infected with more than one strain [15].

How infectious is it?

Because this virus is new, people have no immunity to it so it will spread more quickly and widely than the seasonal flu. The pandemic situation could mean lots of people become sick at the same time and this could have a big impact on our day-to-day lives and place considerable pressure on the health services. Infected person may be able to infect others beginning one day before symptoms develop and up to seven or more days after becoming sick.

Symptoms [16-18]: The most common clinical findings of the 2009, H_1N_1 influenza-A are shown in Figure 1.

Typical Symptoms:

- A sudden fever - 100 degrees F or above
- A sudden cough

Other Symptoms:

- Tiredness
- Chills
- Malaise
- Myalgias
- Cough and sneezing
- Headache
- Weakness and fatigue
- Aching muscles and joints
- Sore throat
- Runny nose
- Diarrhoea or stomach upset
- Loss of appetite

You must See a Doctor Immediately If:

- You have a serious existing illness that weakens your immune system, such as cancer
- You are pregnant
- You have a sick child under one
- Your condition suddenly gets much worse
- Your condition is still getting worse after seven days (five for a child)

Fig. 1: Symptoms of Swine Flu

High-Risk Groups:

- Chronic (long-term) lung disease
- Chronic heart disease
- Chronic kidney disease
- Chronic liver disease
- Chronic neurological disease (neurological disorders include motor neuron disease, multiple sclerosis and Parkinson's disease)
- Immunosuppression (whether caused by disease or treatment) or
- Diabetes mellitus

Children [19]: Young children are less likely to have the usual influenza signs and symptoms (eg, <5 years of age) are at increased risk for influenza complications.

- Fever and cough
- Apnea
- Tachypnea
- Dyspnea
- Cyanosis
- Dehydration

Pregnant Women: During previous influenza pandemics, increased rates of spontaneous abortion and preterm birth have been reported among pregnant women, especially those with pneumonia [20]. Of five pregnant women requiring hospitalization for pandemic H1N1 influenza-A, two developed complications including spontaneous abortion (at 13 weeks of gestation) and premature rupture of membranes (at 35 weeks of gestation) [21].

Treatment: Empiric antiviral treatment is recommended for any ill person suspected to have swine influenza A (H1N1) virus infection. Antiviral treatment with either zanamivir alone or with a combination of oseltamivir and either amantadine or rimantadine should be initiated as soon as possible after the onset of symptoms. Recommended duration of treatment is five days. Recommendations for use of antivirals may change as data on antiviral susceptibilities become available.

Antiviral Chemoprophylaxis: For antiviral chemoprophylaxis of swine influenza A (H1N1) virus infection, either oseltamivir or zanamivir are recommended. Duration of antiviral chemoprophylaxis is 7 days after the last known exposure to an ill confirmed case of swine influenza A (H1N1) virus infection.

Confirmed Cases: For antiviral treatment of a confirmed case of swine influenza A (H1N1) virus infection, either oseltamivir (Tamiflu) or zanamivir (Relenza) may be administered. Recommended duration of treatment is five days. These same antivirals should be considered for treatment of cases that test positive for influenza A but test negative for seasonal influenza viruses H3 and H1 by PCR.

Pregnant Women: Oseltamivir, zanamivir, amantadine and rimantadine are all "Pregnancy Category C" medications, indicating that no clinical studies have been conducted to assess the safety of these medications for pregnant women.

Infectious Period: Persons with swine influenza-A (H1N1) virus infection should be considered potentially contagious for up to 7 days following illness onset. Persons who continue to be ill longer than 7 days after illness onset should be considered potentially contagious until symptoms have resolved. Children, especially younger children, might potentially be contagious for longer periods. The duration of infectiousness might vary by swine influenza-A (H1N1) virus strain. Non-hospitalized ill persons who are a confirmed or suspected case of swine influenza A (H1N1) virus infection are recommended to stay at home (voluntary isolation) for at least the first 7 days after illness onset except to seek medical care.

Alternative Treatment [22]

Homeopathy: Homeopathy can both prevent and cure swine flu, without sans any side effects, say doctors who practice this alternative medicine system in India where 'Homeopathy can prevent, cure swine flu' over 700 people have been diagnosed with the disease. Based on the symptoms, homeopathy can offer an effective cure to swine flu.

Ayurveda: The Panchgavya Medical Research Centre, Jodhpur, which deals with Ayurved have formulated an alternative remedy Swine flu. It claims to be more effective and safe then the conventional allopathic treatment, the preparation has been named as "Flu-go".

Nature Cures: More Herbs for Flu: Ramdev said that yoga had the power to cure Influenza-A (H1N1). While addressing a press conference Baba Ramdev said, "There is no need to panic". He further assured the masses that the way he had successfully treated many patients suffering from diseases like chicken pox and dengue with the help of Indian medicinal plants, swine flu also can be treated with the help of these.

How to Keep Away from Getting the Flu?

Currently available seasonal influenza vaccine does not protect against H1N1 flu. There are everyday actions that can help prevent the spread of germs that cause respiratory illnesses like influenza [22].

Wash and Dry Your Hands Frequently: Wash your hands for at least 20 seconds and dry them for 20 seconds, or use an alcohol-based hand rub. Wash your hands before preparing food and eating or smoking; after coughing, sneezing, wiping children's noses, visiting the toilet or changing nappies.

Cover Your Coughs and Sneezes: Cover your mouth and nose with a tissue when you cough or sneeze and put your used tissue in a bin (if you don't have a tissue, cough or sneeze into your upper sleeve - not your hands). Remember to wash your hands afterwards. Avoid touching your nose, mouth or eyes. Germs spread that way.

Stay Away from Other People If You or They Are Sick: If you become unwell, stay away from other people. Try to stay, a meter away from sick people to reduce the spread of germs. Reduce time spent in crowded settings.

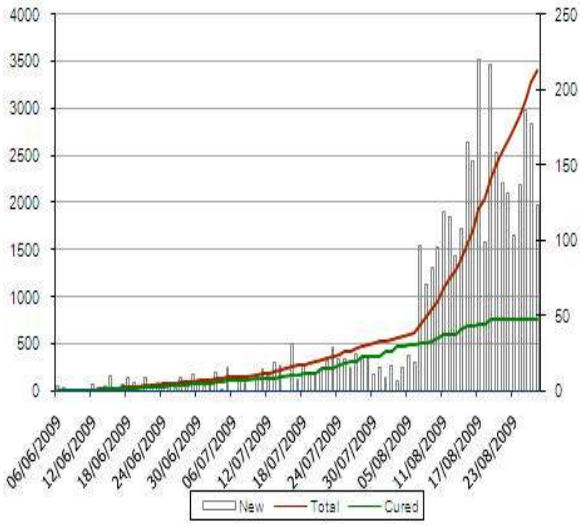

Fig. 2: Swine Flu status graph in India

Contamination and Cleaning: Regularly clean flat surfaces such as bathroom sinks, bedside cabinets, desks and table tops where germs can live for up to 48 hours. Wipe them down with a household disinfectant.

If You've Got Flu Symptoms: Stay at home until essentially well, that is not sneezing and coughing as this is how the virus spreads. This is usually around three to four days after symptoms start, but coughing may last up to two or three weeks.

Get Medical Advice If You Have a Serious Condition: This includes if you have respiratory disease, heart disease, liver disease, blood disorders and neurological conditions or immunosuppression (including immunosuppression caused by medications or by HIV).

Try to stay in good general health. Get plenty of sleep, be physically active, manage your stress, drink plenty of fluids and eat nutritious food. The graph (Figure 2) giving the information about swine flu status in India on dated 23 august 2009 [23].

Types of Face Masks and Respirator: Facemask refers to disposable masks cleared by the U.S. Food and Drug Administration (FDA) for use as medical devices (Figure 3).

- One type is affixed to the head with two ties, conforms to the face with the aid of a flexible adjustment for the nose bridge and may be flat/pleated or duck-billed in shape.

Fig. 3: Facemask for prevention from swine flu

- Second type of facemask is pre-molded, adheres to the head with a single elastic band and has a flexible adjustment for the nose bridge.
- A third type is flat/pleated and affixes to the head with ear loops.

Facemasks cleared by the FDA for use as medical devices have been determined to have specific levels of protection from penetration of blood and body fluids. Unless otherwise specified, "respirator" refers to an N95 or higher filtering face piece respirator certified by the U.S. National Institute for Occupational Safety and Health (NIOSH).

CONCLUSION

Swine flu is a new virus that the world has never seen before, it has many similarities to the past pandemics and could ultimately turn into another 1918, however unlikely that sounds at this moment in time. Since it's discovery in April it has spread around the globe and has caused infections in 74 countries, but the real number will be much closer to 500000. The spread of this virus is far from over and the threat of a 2nd more severe wave in the autumn or winter has the world hanging on by a knife point. This virus could mutate and become far dangerous, current estimations calculate that 120 million people may die from this newly discovered to which we have no immunity to them. All in all this situation is likely to get worse in the next couple of months and we should now focus our efforts on helping developing countries like India and also saving as many as we can, too carry on life if an unprecedented amount of people die.

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