



THE REVIEW ON STUDY OF SWINE FLU DISEASE

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Abstract:

Swine flu has been creating a terror effects all round the globe and has been declared epidemic in most part of the world. Swine flu refers to swine influenza or the viral infection caused by any of the several types of swine influenza virus. Only people who used to have direct contact with pigs were observed to get swine flu in the past. But, H1N1 virus is a new swine flu virus and it contains the genetic material of swine, bird and human influenza virus. H1N1 is an Influenza A virus. Swine flu can produce a number of symptoms in both adults and children. In India day by day the graph of infected person has been climbed up so, it is important to take into consideration about this disease as it may prove deadly one. The intensity of this disorder can be lowered by diagnosing and taking proper treatments.

Keywords: Swine flu, H1N1, Ayurveda, Influenza



Introduction:

Swine flu is an emerging viral infection that is a present global public health problem. There are many thousands cases of swine flu in the present day. This new infection can be seen around the world in the present day. This infection is a kind of variant of H1N1 influenza infection. The problematic virus was firstly detected in America in 2009 and this virus is the most widely studied virus in the present day. Due to the nature of respiratory virus, the transmission of this pathogenic virus is air borne transmission. Hence, the rapid spreading and difficulty in control of this infection can be expected[1]. Swine flu, also called pig influenza, swine influenza, hog flu and pig flu. Swine influenza virus (SIV) or S-OIV (swine-origin influenza virus) is any strain of the influenza family of viruses that is endemic in pigs[2]. As of 2009, the known SIV strains include influenza C and the subtypes of influenza A known as H1N1, H1N2, H3N1, H3N2, and H2N3. Swine flu viruses have been reported to spread from person-to-person, but in the past, this transmission was limited and not sustained beyond three people. In March/April 2009 human cases of influenza swine fevers (H1N1) were first reported in California and Texas then later in other states and even

in Mexico. In 2009 the media labeled as "swine flu" the flu caused by 2009's new strain of swine-origin A/H1N1 pandemic virus just as it had earlier dubbed as "avian flu" flu caused by the recent Asian-lineage HPAI (High Pathogenic Avian Influenza) H5N1 strain that is still endemic in many wild bird species in several countries[3]. The classical swine flu virus an influenza type A (H1N1) virus was first isolated from a pig in 1930. Swine flu viruses cause high level of illness, but low death rates in pigs. Like all influenza viruses, swine flu viruses change constantly. Pigs can also be infected by avian influenza and human influenza viruses. When influenza viruses from different species infect pigs, the viruses can reassort (i.e. swap genes) and new viruses that are a mix of swine, human and/or avian influenza viruses can emerge.

History:

Swine influenza was first proposed to be a disease related to human flu during the 1918 flu pandemic, when pigs became sick at the same time as humans[4]. The first identification of an influenza virus as a cause of disease in pigs occurred about ten years later, in 1930[5]. For the following 60 years, swine influenza strains were almost exclusively H1N1. Then, between 1997 and 2002, new strains of three different subtypes and five different genotypes emerged as causes of influenza among pigs in North America. In 1997–1998, H3N2 strains emerged. These strains, which include genes derived by reassortment from human, swine and avian viruses, have become a major cause of swine influenza in North America. Reassortment between H1N1 and H3N2 produced H1N2. In 1999 in Canada, a strain of H4N6 crossed the species barrier from birds to pigs, but was contained on a single farm.

The phylogenetic origin of the flu virus that caused the 2009 pandemics can be traced before 1918. Around 1918, the ancestral virus of avian origin, crossed the species boundaries and infected humans as human H1N1. The same phenomenon took place soon after in America, where the human virus was infecting pigs; it led the emergence of the H1N1 swine strain, which later became the classic swine flu. The new human H1N1 flu strain of avian origin, was kept transmitting among human populations until around 1957, when there was a co-infection between this strain and the avian H1N1 in humans. There was a reassortment event leading to the development of a new strain (H2N2). New events of reassortment were not reported until 1968, when the avian strain H1N1 infected humans again; this time the virus met the strain H2N2, and the reassortment originated the strain H3N2. This strain has remained as a stable flu strain until now. The critical moment for the 2009 outbreak was between 1990 and 1993. There was a triple reassortment event in a pig host. The reassortment of North American H1N1 swine virus, the human H3N2 virus and avian H1N1 generated the swine H1N2 strain. Finally, the last step in S-OIV history was in 2009 when the virus H1N2 coinfecting a human host at the same time as the Austroasiatic H1N1 swine strain. This led to the emergence of a new human H1N1 strain which caused the 2009 pandemic[6].

Common features:

The typical signs seem after an incubation duration of 1 to 7 days. The maximum typically affected are younger adults. Usual signs are much like some other viral respiratory illness and encompass fever, cough, sore throat and myalgia. Over 90% of people have fever and cough as a part of their illness. In a big majority the symptoms are confirmed to this. A function seen more regularly with swine starting place influenza is GI upset. Almost a fourth of sufferers can also present with vomiting and diarrhoea.

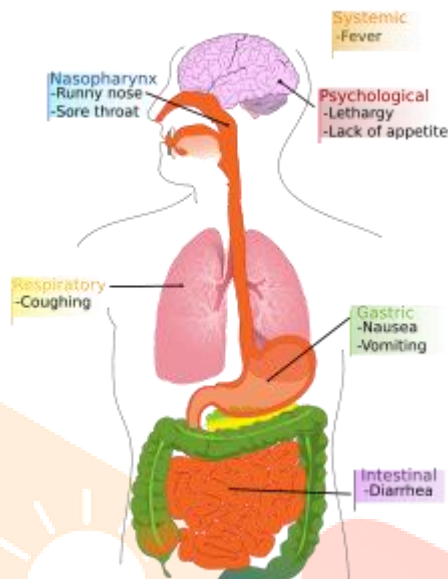
DIAGNOSIS: For diagnosis of swine influenza A infection, respiratory specimen (nasopharyngeal swab, throat swab nasal aspirate, nasal washing) would generally need to be collected within the first 4 to 5 days of illness (when an infected person is most likely to be shedding virus). Most of the tests can distinguish between A and B types. The test can be negative (no H1N1 infection) or positive for type A and B. If the test is positive for type B, the flu is not likely to be swine influenza (H1N1). If it is positive for type A, the person could have conventional influenza strain or swine influenza (H1N1) [7].

Sample Collection:

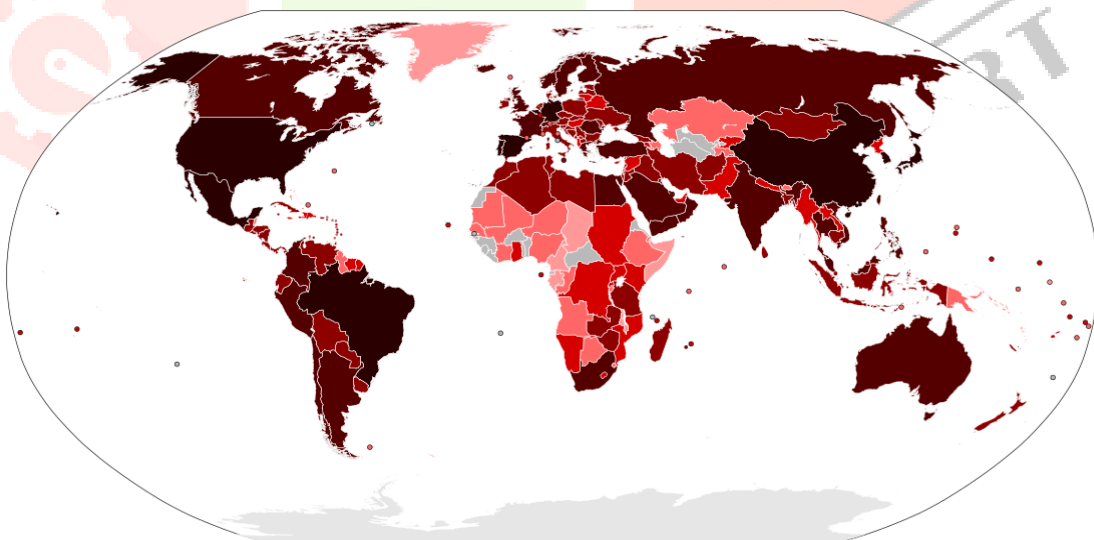
It should be labeled clearly and include patient's complete information and should be sent to NIV, Pune or NICD, Delhi within 24 hours for further investigations. Laboratory biosafety measures should be followed for collection, storage, packaging and shipping of influenza samples.

Signs and Symptoms:

Symptoms of Swine Flu



In Swine In pigs influenza infection produces fever, lethargy, sneezing, coughing, difficulty breathing and decreased appetite. In Humans Symptoms include fever, cough, sore throat, body aches, headache, chills and fatigue. The 2009 outbreak has shown an increased percentage of patients reporting diarrhea and vomiting[8].



The 2009 H1N1 virus is not zoonotic swine flu, as it is not transmitted from pigs to humans, but from person to person.

Treatment:

Vaccination:

Vaccines have been developed to protect against the virus that causes swine flu. There are two different brands of vaccine Pandemrix and Celvapan. Many people given the Pandemrix vaccine will only need one dose. People who have the Celvapan vaccine will need two doses three weeks apart. The swine flu vaccine is different from the seasonal flu vaccination that's offered every year. The seasonal flu vaccine does not protect against swine flu. The vaccine is being offered first to pregnant women at any stage of pregnancy, child and people who are most likely to become seriously ill if they catch swine flu. There are only a few people who cannot have the swine flu vaccine. The vaccines should not be given to anyone who has had a severe allergic reaction to a previous dose of the vaccine or any component of the Vaccine [9] .

Antiviral Therapy:

Two classes of antiviral drugs are available for the prevention and treatment of influenza: neuraminidase inhibitors and adamantanes, which inhibit a viral protein called M2. Influenza A H1N1, formerly known as swine flu, has been found to be resistant to adamantanes (Amantadine and Rimantadine). Oseltamivir (Tamiflu) and Zanamivir (Relenza) are the two neuraminidase inhibitors currently available by prescription. These drugs reduce the median duration of symptoms by approximately one day and reduce the chance of contracting influenza by 70 to 90 % when used for known influenza exposure. Zanamivir and Oseltamivir are structurally related drugs that have been approved by the United States Food and Drug Administration (FDA) for the prophylaxis and treatment of influenza. In addition to their activity against current influenza A and influenza B strains, they are also active against the strain that caused the 1918 pandemic and against avian influenza strains[10].

Swine Flu and Ayurveda:

Ayurveda promotes the concept that if one's immune system is strong, then even if the body is exposed to viruses, one will not be affected. During a pandemic or an epidemic, Ayurveda emphasizes on the immunity of people living in regions affected by viruses. This branch of medicine promotes the intake of special herbs or decoctions to increase the immunity level of the people. Ayurvedic remedies comprise pure natural herbs which are effective in preventing swine flu. Moreover, the herbs are used to relieve swine flu symptoms, and boost the immune system against the H1N1 virus. Ayurvedic treatment for swine flu involves the use of following herbs:

Basil:

Basil, *Ocimum basilicum* is a great Ayurvedic treatment option for swine flu. Ayurvedic practitioners claim that basil not only keeps the nasty swine flu virus at bay, but it also assists in the fast recovery of an affected person. They claim that basil improves the body's overall defense mechanism, thereby increasing its ability to fight viral diseases. It is also believed to strengthen the immune system of the afflicted person. For the control and prevention of swine flu, basil must be consumed in the fresh form. The paste or juice of a minimum of 25 leaves (medium size) should be consumed twice a day. Moreover, it should be had on an empty stomach. Basil is safe, with no side effects and is great to prevent swine flu from spreading like wildfire.

Ginger:

Ginger, *Zingiber officinalis* is one of the natural remedies for swine flu prevention. It boosts the body's immunity level and helps protect the body. Ginger has been known to fight cold, fever and flu conditions, and is also good to reduce inflammation.

Garlic:

Garlic, *Allium sativum* on the other hand is a powerful natural antibiotic, which features an unusual property of repelling bacteria and viruses

Gooseberry:

Gooseberry, *Embelica officinalis* is one of the best fruits known to boost the immune system of the body. Since gooseberry is rich in Vitamin C, it helps raise the body's resistance to flu viruses. If fresh gooseberry is not available in the market, then the form of jam or juice is also great.

Aloe vera:

Aloe vera is an easily available plant and is also beneficial to boost immunity. One should consume a teaspoon of gel with water on a daily basis.

Camphor and Eucalyptus:

Oil Camphor has great ability to keep different air borne diseases under control. It is available in the form of camphor oil, which can be burnt in the room or office all the time. Inhaling the steam of Eucalyptus oil is also good. Just add a few drops of Eucalyptus oil into lukewarm water and inhale the steam. This helps to clear the nasal track and promotes the health of the respiratory tract.[11,12]

Classification of swine flu:

Influenza A:

Swine influenza is known to be caused by influenza A subtypes H1N1, H1N2, H2N3, H3N1, and H3N2. In pigs, three influenza A virus subtypes (H1N1, H1N2, and H3N2) are the most common strains worldwide. In the United States, the H1N1 subtype was exclusively prevalent among swine populations before 1998; however, since late August 1998, H3N2 subtypes have been isolated from pigs. As of 2004, H3N2 virus isolates in US swine and turkey stocks were triple reassortants, containing genes from human (HA, NA, and PB1), swine (NS, NP, and M), and avian (PB2 and PA) lineages. According to the National Center for Immunization and Respiratory Diseases (NCIRD), Influenza A viruses are divided into subtypes based on two proteins on the surface of the virus: the hemagglutinin (H) and the neuraminidase (N). There are 16 different hemagglutinin subtypes and 9 different neuraminidase subtypes. Influenza A viruses can be further broken down into different strains.[13]

Influenza B:

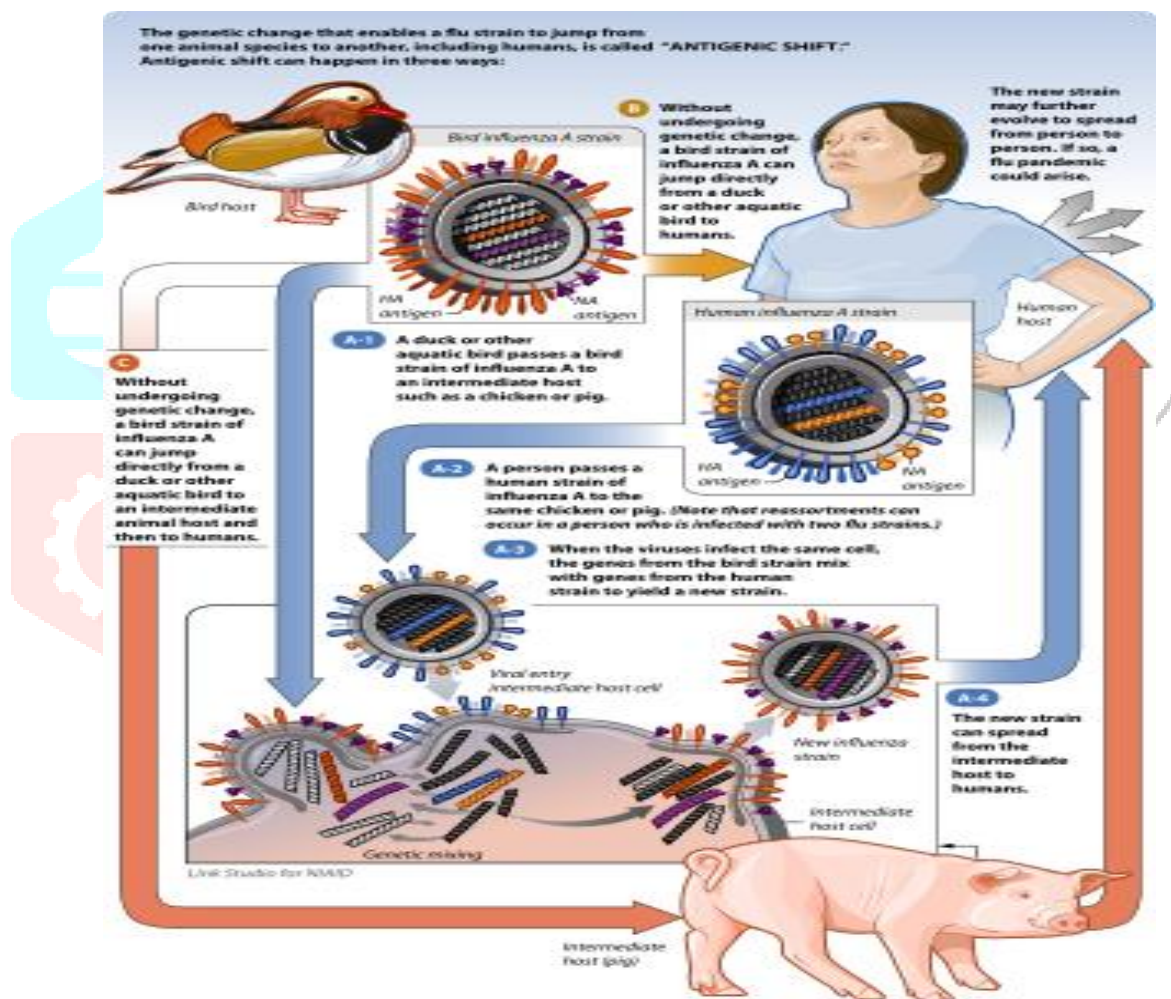
Influenza B viruses are only known to infect humans and seals, giving them influenza. This limited host range is apparently responsible for the lack of Influenza virus B caused influenza pandemics in contrast with those caused by the morphologically similar Influenza virus A as both mutate by both genetic drift and reassortment.

Influenza C:

Influenza C viruses infect both humans and pigs, but do not infect birds. Transmissions between pigs and humans have occurred in the past. For example, influenza C caused small outbreaks of a mild form of influenza amongst children in Japan and California. Because of its limited host range and the lack of genetic diversity in influenza C, this form of influenza does not cause pandemics in humans. Some viruses also encode a protein called PB1-F2 from an alternate reading frame within the PB1 gene; this protein is also produced during infection and is associated with increased virulence and pathogenicity. Influenza viruses are named on the basis of their surface proteins – HA, which is required for virus binding to the target cell, and NA, which is required for virus release from infected cells. For influenza A viruses 16 HA serotypes (H1–H16) and 9 NA serotypes (N1–N9) are known, of which only the H1, H2, H3 and H5 viruses, and rarely the H7 and H9 viruses have been found to infect humans. Influenza viruses evolve through ‘antigenic drift’, and occasionally by ‘antigenic shift’. The viral RNA dependent RNA polymerase (replicase) lacks proof reading activity and is therefore unable to correct random errors introduced in the genome during replication. The effects of this are most obvious in the HA protein, which shows high rates of amino acid substitutions in its epitope.[14,15,16]

Transmission:

The SO-IAV has efficiently transmitted between humans since its first detection in April 2009. So far it has spread in the Northern hemisphere outside of the flu season and in the Southern hemisphere during its flu season. It has caused mild disease, and that is in accordance with absence of the pathogenicity marker PB1-F2. As seasonal influenza A (H1N1) viruses are also circulating in humans since 1977, mild disease could also be due to partial immunity in the population. It will now be critical to watch how the virus behaves as it comes back to the Northern hemisphere in the next wave with the approaching flu season. All previously characterized pandemics have been due to viruses generated by antigenic shift involving the HA gene of avian lineage – H1 for 1918 virus, H2 for 1957 virus and H3 for 1968 virus. Though still of the H1 serotype, the HA of SO-IAV is different from the H1 HAs of seasonal influenza viruses; the inclusion of a porcine H1 in human influenza A viruses has been considered an antigenic pseudoshift. Although SOIAV is of zoonotic origin, it's HA may not be sufficiently divergent to call it a true antigenic shift⁵. Compared to viruses that caused previous pandemics, SO-IAV is at present not sufficiently virulent. But, it is already transmitting like a pandemic virus and is undergoing adaptive mutations. Whether it will remain mild or develop into a highly pathogenic fully pandemic virus remains to be seen.[17,18]



Clinical manifestations:

Signs:

Swine flu, or H1N1, is a type A influenza virus that can infect humans. It is similar to the seasonal influenza virus, but can be more severe in people who may be at high risk because of a preexisting condition. According to the Centers for Disease Control, risk factors include chronic medical conditions such as diabetes, heart disease, and asthma. [19]

Aches and Fevers:

Swine flu is severe body aches, this can include muscle weakness and difficulty standing up or walking. Headaches in combination with body aches are also quite common.

Upper-Respiratory Symptoms:

A common element of swine flu is upper-respiratory symptoms. These can be similar to a cold, except more severe. A runny or stuffy nose combined with head congestion is typically present. Itchy or watery eyes may also be a symptom.[20,21]

Weakness:

Feelings of general malaise or weakness are common with swine flu, as is overall discomfort. Many people infected with the virus are tired and too weak to complete most normal day-to-day activities, and may sleep longer and more often than usual. Staying home and getting plenty of rest is the best way to fully recover from swine flu.[22]

Gastrointestinal:

In some cases of swine flu, people experience gastrointestinal effects. These can range from stomachaches and cramping to nausea and vomiting, and diarrhea. Swine flu may be confused with food poisoning because of the symptoms of stomach pain and upset.[23]

Warning Signs :

Other signs to watch for may indicate that swine flu is developing into a secondary medical condition that can be serious or life-threatening. Because swine flu involves the respiratory tract, there is a risk for developing pneumonia, respiratory failure, and bronchitis. According to the Centers for Disease Control and Prevention (CDC), in humans, the symptoms of the 2009 "swine flu" H1N1 virus are similar to those of influenza and of influenza-like illness in general. Symptoms include fever, cough, sore throat, body aches, headache, chills, and fatigue.[24]

Vaccine:

A vaccine has been produced to defend humans against the H1N1 strain of swine flu. This was introduced following a pandemic of swine flu in 2009 and 2010. The fame of swine flu has modified from a virulent disease to a seasonal form of human influenza. The specialised vaccine has now been replaced through greater trendy seasonal flu pictures. People who are over 10 years old simplest require one shot of the vaccine. The U.S. Food and Drug Administration (FDA) recommends pictures for kids below this age, to be taken 4 weeks apart. People with an egg hypersensitivity reaction and children with intense bronchial asthma are liable to a damaging reaction to this vaccine and need to talk the shot with a healthcare professional. These are special regimens designed to help the pour bodies of people who revel in those reactions be given the vaccine.[25,26]

Conclusion:

H1N1 influenza or swine flu is a contagious disease that is caused by the influenza virus. Infection with the H1N1 influenza virus can result in severe illness and life-threatening complications. Symptoms of H1N1 flu are similar to those of the common flu and scientists are actively studying the situation to better understand its range of symptoms and how it is spread. For healthy people, resting and drinking plenty of fluids usually allows infected people to recover from the flu. For people at high risk of developing flu complications, medications and hospitalization may be needed. The flu can be prevented by avoiding close contact with sick people and by washing your hands frequently. If you have the flu, you can help stop the spread of this infectious disease by staying home while you are sick and by covering your mouth and nose as you cough or sneeze.

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the flu, you may help forestall the spread of this infectious disease with aid of staying home while you are unwell and by overlaying your mouth and nostril as you cough or sneeze

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