

Herbal Prospects for Treatment of Swine Flu: A Review

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Abstract – The novel Swine-origin influenza A ((S-OIV; H1N1) virus is become pandemic of 21st century for human civilization and was first recognized at the border between Mexico. Common pneumonia symptoms like fever, cough, and sore throat; and in a fewer cases like diarrhea, vomiting, Myalgia and joint pains may become threatening to life. Currently available drugs like neuraminidase inhibitors such as Tamiflu (oseltamivir), Zanamivir like antivirals have potential and resistance problem. Therefore the prospects for the control of H1N1 by existing anti-viral drugs are limited. This article collects the information about the possible herbal therapy like *Sambucus nigra*, *Echinacea purpurea*, *Wasabia japonica* and various immunoenhancer like *Allium sativum*, *Ocimum sanctum* etc. The main object of this review article is to have a closer look to herbal drugs for the treatment of swine flu.

Keywords – Swine flu, Tamiflu, *Echinacea purpurea*, *Allium sativum*, *Sambucus nigra*.

INTRODUCTION

Swine flu, also known as Influenza A (H1N1), pig influenza, swine flu, hog flu and pig flu is a new influenza virus causing illness in people. It infect the respiratory tract and result in nasal secretions, a barking like cough, decreased appetite and listless behaviour. It has been found that this new virus has gene segments from the swine, avian and human flu virus genes, hence named “swine flu”. The scientists call this a ‘quadruple reassortant’ virus and hence this new (novel) virus is christened “influenza-A (H1N1) virus.” Influenza A H1N1 is a circulating seasonal influenza virus was first reported in Mexico on 18th March, 2009 and then spread to neighboring United States and Canada. As on 8th June, 2009, World Health Organization has reported 25,288 laboratory confirmed cases of influenza A/H1N1 infection with 139 deaths from 73 countries spread over America, Europe, Asia and Australian continent [1].

TRANSMISSION OF VIRUS TO HUMAN

Transmission of the virus from pigs to humans is not common and does not always lead to human influenza, often resulting only in the production of antibodies in the blood. If transmission does cause human influenza, it is called zoonotic swine flu. People with regular exposure to pigs are at increased risk of swine flu infection. The meat of an infected animal poses no risk of infection when properly cooked.

SYMPTOMS OF SWINE FLU

The U.S Centre’s for Disease Control and Prevention (CDC) includes symptoms for Swine-Flu infection are fever, cough, sore throat, diarrhea, vomiting, myalgia and joint pains. Infants and elderly are more

susceptible for serious infection. Pregnant women, people with chronic medical problems such as asthma, cardiovascular diseases, and diabetes are at high risk. The most common causes of death due to swine-flu are respiratory failure, pneumonia, sepsis, dehydration (from excessive vomiting), high fever and electrolyte imbalance [2].

DIAGNOSIS:

The Centers for Disease Control and Prevention (CDC) recommends Real-time Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) as the method of choice for diagnosing H1N1[3]. Usually, a quick test (for example, nasopharyngeal swab sample) is done to see if the patient is infected with influenza A or B virus. If the test is positive for type B, the flu is not likely to be Swine-Flu (H1N1). If it is positive for type A, the person could have a conventional flu strain or Swine-Flu (H1N1).

PHARMACOLOGICAL TREATMENT

Neuraminidase inhibitor antiviral medications:

Oseltamivir (Tamiflu), a prodrug that is hydrolyzed by the liver to its active metabolite, oseltamivir carboxylate, with an elimination half-life of about 6–10 h. and **Zanamivir (Relenza)** is given as inhalational or administered orally. These medications target the early phase of the infection. However, this strain is resistant to adamantanes, such as Amantadine and Rimantadine. The potential, resistant and having different adverse reactions like cough, diarrhoea, dizziness, headache, nausea, sinus inflammation, sore throat, stuffy nose, vomiting. bronchospasmis the major problem of these drugs[4, 5]

In the U.S., on April 27, 2009, the FDA issued Emergency Use Authorizations to make available Relenza and Tamiflu antiviral drugs to treat the swine influenza virus in cases for which they are currently unapproved [6].

Immunization by vaccines

The U.S. Food and Drug Administration (FDA) approved the new swine flu vaccine for use in the United States on September 15, 2009. Studies by the National Institutes of Health (NIH) show that a single dose creates enough antibodies to protect against the virus within about 10 days [7]. But unfortunately, this according to update reports in Reuters [22]; eight hundred children in Europe have developed narcolepsy an incurable sleep disorder after taking the swine flu vaccine Pandemrix H1N1 vaccine which is made by GlaxoSmithKline [22].

HERBAL PROSPECTS OF TREATMENT

There are a lot of herbs have evaluated for the beneficial effects in swine flu which are described below.

***Echinacea purpurea* (Family: Asteraceae); Syn: Purple coneflower**

Pleschka S *et al* used a standardized alcohol extract of fresh *Echinacea purpurea* herb (95%) and root (5%) was used *in-vitro* infection model Five influenza A strains were investigated: H3N2 (e.g. „Hong Kong flu“ or seasonal influenza), H5N1 (e.g. „bird flu“, human pathogen), H7N7 (e.g. avian influenza, also human pathogen), H1N1 (human influenza) and H1N1 („Mexico influenza“, swine flu, current pandemic). Virus inhibition at doses of 1.6 µg/ml and higher, the *Echinacea* extract inhibited the infectiousness of all examined influenza viruses by over 99%, including the pathogens of the current pandemic swine flu. Resistance Treatment with *Echinacea* did not lead to viral resistance in any of the cases, not even following several treatment cycles. In contrast, almost 100% of the viruses were resistant to the conventional Rx antiviral substance (Tamiflu), which was tested in parallel, after the third treatment cycle. Even these influenza strains were inhibited over 99.9% by the *Echinacea* fresh-plant extract [8].

Sharma M *et al* showed that *Echinacea purpurea* fresh alcohol plant extract can block the replication of relevant respiratory tract pathogens *in-vitro* [9].

Brazilian propolis:

Brazilian Green propolis derives mainly from vegetative apices of *Baccharis dracunculifolia* (alecrim plants) [10]; Suggestions have been made that probable sources of Brazilian propolis are *Araucaria heterophylla*, *Clusia major*, *Clusia minor* and species of *Baccharis*. [11] Other possible sources of Brazilian propolis that have been suggested are *Araucaria*

angustifolia, *Baccharis dracunculifolia* and *Eucalyptus citriodora* [12].

Shimizu T *et al* found the ethanolic extract of Brazilian propolis at a dose of 10mg/kg, p.o significantly reduced virus yields in the bronchoalveolar lavage fluids of lungs in infected mice in compared to oseltamivir at 1 mg/kg twice daily from day 1 to day 4 after infected with influenza virus. The extract were given for seven successive days after infection [13].

***Sambucus nigra* L (Family: Adoxaceae); Syn: Elderberry fruit**

Roschek B Jr *et al* found that the elderberry extract inhibited Human Influenza A (H1N1) infection in vitro with an IC(50) value of 252±34 microg/mL. The Direct Binding Assay established that flavonoids from the elderberry extract bind to H1N1 virions and, when bound, block the ability of the viruses to infect host cells. Two compounds were identified, 5,7,3',4'-tetra-O-methylquercetin (1) and 5,7-dihydroxy-4-oxo-2-(3,4,5-trihydroxyphenyl)chroman-3-yl-3,4,5 trihydroxy cyclohexane carboxylate (2), as H1N1-bound chemical species. Compound 1 and dihydromyricetin (3), the corresponding 3-hydroxyflavone of 2, were synthesized and shown to inhibit H1N1 infection in vitro by binding to H1N1 virions, blocking host cell entry and/or recognition. Compound 1 gave an IC(50) of 0.13 microg/mL (0.36 microM) for H1N1 infection inhibition, while dihydromyricetin (3) achieved an IC(50) of 2.8 microg/mL (8.7 microM). The H1N1 inhibition activities of the elderberry flavonoids compare favorably to the known anti-influenza activities of Oseltamivir (Tamiflu; 0.32 microM) and Amantadine (27 microM) [14].

***Litchi chinensis* (Family: Sapindaceae); Syn: Lychee fruit**

Leila Gangehei *et al* found that Oligonol, a low molecular weight polyphenol of obtained from lychee fruit extract inhibits proliferation of influenza virus by blocking reactive oxygen species-dependent ERK [15].

***Wasabia japonica* (Family: Brassicaceae); Syn: Japanese wasabi**

Kyo M *et al* studied the ethanolic extract of summer harvested leaves of Japanese wasabi (*Wasabia japonica*) for anti-influenza activity where winter harvested leaves were used for foods and spice. They investigated 70% ethanolic extract of leaves harvested in July have activity (98% or higher replication inhibition) against H1N1 influenza along with simple influenza viruses. Therefore, such extracts are expected to be a promising source of a novel anti-influenza virus agent [16]

Chinese Herbal Formulation:

Beijing Traditional Chinese Medicine Hospital has introduced an A/H1N1 swine flu prevention herbal medicine pack in which doctors at Ditan Hospital in

Beijing claimed that a combination of various Chinese herbs had a 75 percent cure rate in the 117 patients treated there for swine flu [17].

According to that article, the combination of the herbs is as follows:

Lonicera Japonica Thund (honeysuckle flower)-3 grams.

Isatis Indigodica- 3 gms.

Mentha Haplocalyx Brip (mint).-3 gms.

Glycyrrhiza Glabra(licorice)-3 gms..

Ayurvedic herbal formulation:

The Ayurvedic treatment of swine flu is aimed at treating the symptoms, controlling the virus, and preventing complications by boosting the immune status of the body. Medicines like Tribhuvan-Kirti-Ras, Sitopaladi-Churna, Triphal-Guggulu, Maha-Sudarshan-Churna, Shwas-Kuthar-Ras, Laxmi-Narayan-Ras, Sut-Shekhar-Ras and Samshamani-Vati can be used to treat the flu-like symptoms of fever, bodyache and cough. Herbal medicines like Chirayta (*Swertia chirata*), Tulsi (*Ocimum sanctum*), Pippali (*Piper longum*), Vishwa (*Zinziber officinalis*), Haridra (*Curcuma longa*), Som (*Ephedra vulgaris*), Dhatura (*Dhatura fastiosa*) and Kantakari (*Solanum xanthocarpum*) can also be used for this purpose. Gastro-intestinal symptoms can be treated using medicines like Panchamrut-Parpati, Kutaj-Parpati, Kutaj-Ghan-Vati, Laghu-Sutshekhar-Ras and herbal medicines like Vishwa, Kutaj (*Holarrhina antidysentrica*), Musta (*Cyperus rotundus*) and Bilva (*Aegle marmelos*).

Herbal medicines with antiviral activity can be used to prevent or reduce the effects of the viral infection. These medicines include Yashtimadhuk (*Glycyrrhiza glabra*), Tulsi, Bhumiamalaki (*Phyllanthus niruri*), Haridra, Daruharidra (*Berberis aristata*), Kutki (*Picrorrhiza kurroa*), Chitrak (*Plumbago zeylanica*) and Amalaki (*Embllica officinalis*). In the case of swine flu, the earlier these medicines are started, the better the therapeutic effect [18].

DISCUSSION

A large number of herbal drugs are mentioned in different websites, article and news forum that they can prevent swine flu. Most of literature has given emphasis on mainly antiviral herbs and immunity booster herbs. Among them Tulsi (*Ocimum sanctum*) [19], Neem (*Azadirachta indica*) [20], citrus fruits [21] and common ayurvedic plants. Researcher should have a closer look to various chemical composition and pharmacological profile of this herbal drugs to obtain a definite anti-swine flu herbal drugs. It can be possible to make an effective herbal formulation of various drugs by elaborate phytochemical studies of these drugs. By this way it can have cost effective, lesser side effect and potent herbal choice for endemic swine flu.

CONCLUSION

In view of the challenges posed by the current swine flu pandemic, each additional prophylactic or therapeutic option is a desirable gain for disease control from a virological point of view. The fact that an established medicinal plant with a known, multiple spectrum of effect is also discovered to have a direct antiviral effect against swine flu and other influenza viruses is surprising. Few of the antiviral drugs are available in the market for treating this wide spread infecting disease but due to their immense side effects, scientists are now, turn their attention towards herbal therapy.

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