CLINICAL MANAGEMENT OF SWINE INFLUENZA

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Abstract

Swine influenza (also called swine flu, hog flu, pig flu and sometimes, the swine) is an infection caused by any one of several types of swine influenza virus. Swine influenza virus (SIV) is any strain of the type A influenza family of viruses that is endemic in pigs. Individuals at both extremes of age and with preexisting medical conditions have a higher risk of complications and exacerbation of the disease. Oseltamivir is the recommended drug for both prophylaxis and treatment. Supportive therapy is also necessary. Prevention is recommended to all contacts.

Key words: swine flu, oseltamivir, prevention

INTRODUCTION

Swine influenza (also called swine flu, hog flu, pig flu and sometimes, the swine) is an acute, highly contagious, respiratory disease that results from the infection with type A influenza virus. Pigs are the principal hosts of classic swine influenza virus. Human infections have been reported, but porcine strains of influenza A do not appear to easily spread in the human population. However, deaths have occurred in immuno-compromised people.

The disease in swine occurs commonly in the mid western USA (and occasionally in other states), Mexico, Canada, South America, Europe (including the UK, Sweden, and Italy), Kenya, China, Japan, Taiwan, and other parts of eastern Asia. WHO has heightened the pandemic level to Phase 5 implying widespread human infection.

The first case of swine influenza in Romania was identified on the 23rd of May 2009 in a young woman returned from USA and by 24 September 2009 the number of reported cases was 333.

Etiology

Swine influenza virus (SIV) is an orthomyxovirus of the influenza A group with hemagglutinating antigen H1 and neuraminidase antigen N1 (H1N1). Recently, new subtypes of SIV have been reported (H3N2, H1N2). Influenza B and C viruses have been isolated from pigs, but have not caused the classic disease. Genetic sequencing shows that new subtypes of influenza A (H1N1) virus have segments from four influenza viruses: North American Swine, North American Avian, Human Influenza and Eurasian Swine.

The classic type A infection with isolates of mild virulence may favor replication of pseudo rabies virus, Haemophilus parasuis, Actinobacillus pleuropneumoniae, and Mycoplasma hyopneumoniae, any of which may complicate outbreaks. The mixing of carrier and nonimmune pigs is an important predisposing factor. The virus is unlikely to survive outside living cells for less than 2 weeks, except in cold conditions. It is readily inactivated by disinfectants.

Epidemiology

In temperate regions outbreaks are most common in winter, often at the onset of particularly cold weather. In warmer areas of the world, infection may occur at any time.

Usually, an outbreak is preceded by one or two individual cases and then spreads rapidly within a herd, mainly by aerosolization and pig-to-pig contact.
The virus survives in carrier pigs for up to 3 months and can be recovered from clinically normal animals between outbreaks. In antibody-positive herds, outbreaks of infection recur as immunity wanes. Up to 40% of herds may contain antibody-positive pigs. Carrier pigs are usually responsible for the introduction of SIV into previously uninfected herds and countries.
In humans, the majority of the cases have occurred in otherwise healthy young adults. The transmission is aerogenic by droplet infection or by contaminated objects. Incubation period is about 1-7 days.

Clinical Features

Important clinical features of swine influenza include fever, and upper respiratory symptoms, such as cough and sore throat. Headache, body ache, fatigue diarrhea and vomiting have also been observed. There is insufficient information to date about clinical complications of this variant of swine origin 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, rhabdomyolysis, encephalitis, seizures, toxic shock syndrome and secondary bacterial pneumonia with or without sepsis.
Individuals at both extremes of age and with preexisting medical conditions have a higher risk of complications and exacerbation of the disease.

MATERIALS AND METHODS

Investigations
Routine investigations required for evaluation and management of a patient with symptoms as described above will be required. These may include hematological, biochemical, radiological and microbiological tests as necessary.
A presumptive diagnosis can be made on clinical and pathologic findings, but confirmation depends on isolation of the virus or demonstration of virus-specific antibody. Virus can be isolated from nasal secretions in the febrile phase or from affected lung tissue in the early acute stage.
A retrospective diagnosis can be made by demonstrating a rise in virus-specific antibodies in acute and convalescent serum samples, using the hemagglutinating inhibition test. Both H3 and H1 subtype antigens should be included. This test is also used for herd surveys.
Confirmation of influenza A(H1N1) swine origin infection is through:

- Real time RT - PCR
- Isolation of the virus in culture
- Four - fold rise in virus specific neutralizing antibodies.

The samples as nasopharyngeal swab, throat swab, nasal swab, wash or aspirate, and tracheal aspirate (for intubated patients) should be collected by a trained physician or microbiologist, preferably before administration of the anti-viral drug. The specimens are preserved at 4°C in viral transport media until testing. The samples should be transported to designated laboratories with in 24 hours. If they cannot be transported then it needs to b stored at -70°C. Paired blood samples at an interval of 14 days for serological testing should also be collected.

RESULTS

Treatment

The guiding principles are:

- Early implementation of infection control precautions to minimize nosocomial or household spread of disease
- Prompt treatment to prevent severe illness and death
- Early identification and follow up of persons at risk.

Isolation facilities are important, so if dedicated isolation room is not available, then patients can be cohorted in a well ventilated isolation ward with beds kept one metre apart. Standard operating procedures have to be taken, i.e. restricting number of visitors and all those entering the room must use high efficiency masks, gowns, goggles, gloves, cap and shoe cover.

It is also important to make antiviral prophylaxis to health care personnel managing the cases and ask them to monitor their own health twice a day. Oseltamivir is the recommended drug both for prophylaxis and treatment. Doses for treatment are as follows:

By Weight:

For weight < 15kg 30 mg BD for 5 days
15 - 23kg 45 mg BD for 5 days
24 - 40kg 60 mg BD for 5 days
> 40kg 75 mg BD for 5 days

For infants:

< 3 months 12 mg BD for 5 days
3-5 months 20 mg BD for 5 days
6-11 months 25 mg BD for 5 days

If needed, dose and duration can be modified as per clinical condition. Oseltamivir is generally well tolerated, gastrointestinal side effects (transient nausea, vomiting) may increase with increasing doses, particularly above 300 mg/day. Occasionally it may cause bronchitis, insomnia and vertigo. Less commonly angina, pseudo membranous colitis and peritonsillar abscess have also been reported. There have been rare reports of anaphylaxis and skin rashes.

In children, the most frequently reported side effect is vomiting. Infrequently, abdominal pain, epistaxis, bronchitis, otitis media, dermatitis and conjunctivitis have also been observed. There is no recommendation for dose reduction in patients with hepatic disease. Though rare reporting of fatal neuro-psychiatric illness in children and adolescents has been linked to oseltamivir, there is no scientific evidence for a causal relationship.

Supportive therapy is consisting in:

- Parenteral nutrition
- Oxygen therapy and ventilatory support
- Antibiotics for secondary infection
- Vasopressors for shock
- Anti-inflammatory drugs
- Maintain airway, breathing and circulation
- Maintain hydration, electrolyte balance and nutrition.

Acetaminophen or ibuprofen is prescribed for fever, myalgia and headache. Patient is advised to drink plenty of fluids. Smokers should avoid smoking. For sore throat, short course of topical decongestants, saline nasal drops, throat lozenges and steam inhalation may be beneficial. Salicylate or aspirin is strictly contra-indicated in any influenza patient

due to its potential to cause Reye's syndrome. The suspected cases would be constantly monitored for clinical and radiological evidence of lower respiratory tract infection and for hypoxia (respiratory rate, oxygen saturation, level of consciousness).
Patients with signs of tachypnea, dyspnea, respiratory distress and oxygen saturation less than 90 per cent should be supplemented with oxygen therapy.
Patients with severe pneumonia and acute respiratory failure (SpO2 < 90% and PaO2 < 60 mmHg with oxygen therapy) must be supported with mechanical ventilation. Invasive mechanical ventilation is preferred choice. Non invasive ventilation is an option when mechanical ventilation is not available.
Immunomodulating drugs have not been found to be beneficial in treatment sepsis associated with multi organ failure. High doses of corticosteroids in particular have no evidence of benefit. Low doses of corticosteroids (Hydrocortisone 200-400 mg/ day) may be useful in persisting septic shock.

CONCLUSIONS

Chemoprophylaxis

Is indicated in all close contacts of suspected, probable and confirmed cases (close contacts include household or social contacts, family members, workplace or school contacts, fellow travelers etc.) and in all health care personnel coming in contact with suspected, probable or confirmed cases.
Close contacts of suspected, probable and confirmed cases should be advised to remain at home (voluntary home quarantine) for at least 7 days after the last contact with the case. Monitoring of fever should be done for at least 7 days. Prompt testing and hospitalization must be done when symptoms are reported.
Oseltamivir is the drug of choice. Prophylaxis should be provided till 10 days after last exposure (maximum period of 6 weeks).

For weight:	<15kg 30 mg OD
	15-23kg 45 mg OD
	24-40kg 60 mg OD
	>40kg 75 mg OD
For infants	< 3 months not recommended unless situation judged critical due to limited data on use in this age group
	3-5 months 20 mg OD
	6-11 months 25 mg OD

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