Case Study Exercise

Management of Human Cases of Avian Influenza (Phase-3)

Facilitator

Facilitator Instructions

1. Allow time for students to offer suggested answers to what should be done in this scenario.
2. Thank students for their suggested answers.
3. Review the suggested answers provided below.
4. Discuss whether student answers were similar to or different from the actual responses and actions taken/planned by human/animal health authorities.

Instructions

For this exercise, you will work with your group to complete a case study investigation. Each segment of case study information will be followed by a series of questions. Facilitator or one person in your group should read the information aloud to group members. Then, work as a group to generate possible answers for each question that the group thinks to be most appropriate. Record the answers in the space provided.

Case Study: I

Diagnosis of Avian Influenza in Humans

Time allotted: 40 Minutes

Background

Imagine that you are working at the state public health office in Imphal. It is exactly one month since an outbreak of avian influenza has been contained in east Imphal district. It is now August 18th, 2007. You are in your office when you receive a phone call from your colleague Dr. R.P.Singh at the local health department. He wants to talk to you about a phone call he has just received from a doctor at J N Hospital at Imphal. A 39-year old lady named Meera is admitted to JN Hospital. Her symptoms which began on August 13th included fever, diarrhoea, nausea, and vomiting. No respiratory problems were reported. Her white blood cell count was low (3,300 cells/mm3) as well as her lymphocyte count (640 cells/mm3, 19%). Platelet count was normal (400,000 cells/mm3). Tests on stool samples were negative. Norfloxacin was prescribed.

Question 1: Based on this information, what would you suspect this patient has?

Suggested answer
The patient could have a number of illnesses, but gastrointestinal illness is likely.

Additional Background

Dr. Singh continues. He tells you that today (August 18th) the patient began to cough and had shortness of breath. A chest x-ray was done. She had patchy infiltration in the lower region of both of her lungs. Treatment with ceftazidime and amikacin was started. Her doctors decided to transfer her to RIMS Hospital, Imphal.

Question 2: Do you think that Meera has influenza (human or avian)?

Suggested answer
Although she is now presenting with respiratory symptoms and other symptoms of influenza, you would likely not suspect that Meera has avian influenza H5N1 infection. The symptoms are not specific for influenza and may represent other respiratory illnesses.

Current Condition

When Meera arrived at RIMS, her new doctor checked her health again. She had a fever of 39.4°C and a high respiratory rate, 44 per minute. Her heart rate was also high, 140 beats per minute. Her blood pressure was 110/80 mm Hg. Her doctor decided to intubate her. He could also hear a crackling noise on auscultation when she breathed. Laboratory tests on her blood found a drop in white blood cell count. Lymphocyte count was low as well. Platelet count was normal. The clinical profile indicated she was developing acute respiratory distress syndrome. Meera's doctor gave her imipenem, azithromycin and doxycycline.

Question 3: To date, which symptoms might indicate human influenza infection? Which symptoms might indicate avian influenza H5N1 infection?

Suggested answer
- Symptoms that might indicate human influenza: fever, cough
- Symptoms that might indicate avian influenza: fever, diarrhoea, vomiting, and nausea. Respiratory symptoms of cough and shortness of breath have appeared. Her respiratory rate is high and a crackling sound on auscultation can be heard when she inhales.

Question 4: Dr. Singh asks you, "What do you think? Could this be avian influenza H5N1?" Why or why not? What other information would you like to know about?

Suggested answer
Based on her signs and symptoms, you may suspect that Meera may have avian influenza H5N1. However, to strengthen your suspicion, it would be good to know if she had any relevant exposures in the 7-14 days before her symptoms began. Other information you may want to know include, "Is there H5N1 activity in her area?" or, "Is anyone else in her family sick?" or, "What is her job?" and "Does she have contact with birds?" and "What kind of house and environment does she live in?"

H5N1 Activity

You tell Dr. Singh that you would like to get a little more information and ask him to contact Meera's husband. At the same time, you begin to do a little investigation to learn more about the H5N1 activity in Imphal. You learn that east Imphal had no reports of human cases of avian influenza based on the reports of active event based surveillance in affected area of east Chingmangrong.

Question 5: How is this information helpful for you?

Suggested answer
Since avian influenza was reported among poultry one month back, you should have a high index of suspicion that a patient with a severe respiratory illness such as pneumonia may have avian influenza.

Exposure

As you collect detailed information about H5N1 in east Chinmangrong, Dr. Singh calls you. He has just spoken to Meera's husband Kishan. Dr. Singh has learned that Meera lives in a rural area in central Manipur. A total of five people live at home but no one else in the family is sick. Kishan told Dr. Singh that several chicken had died during the outbreak in a household she visited 13 days back in east Chingmangrong neighbourhood around August 5.

Question 6: Do you think Meera is at risk for avian influenza H5N1 infection? If yes, why?

Suggested answer
Yes, it is reasonable to think that Meera is at risk for avian influenza H5N1 infection. Meera was exposed to an environment where chicken died of avian flu about three weeks back.

Question 7: What evidence do you now have that Meera has avian influenza H5N1 infection?

Suggested answer

- Meera has a number of signs and symptoms to suspect avian influenza H5N1 infection: fever, diarrhoea, vomiting, nausea, cough, shortness of breath, high respiratory rate and a crackling sound during inhalation. However, you know that this is not enough evidence to confirm H5N1 infection because the symptoms can also be caused by other illness. You know that Meera was exposed to an environment contaminated by infected poultry in an area where H5N1 infection in poultry was confirmed in the last month.

Given all of this evidence, you suspect that Meera has avian influenza H5N1 infection.

Testing

Dr. Singh and you agree that Meera is a suspect case of avian influenza H5N1. You also suggest that Dr. Singh speaks with Meera's doctor. The Rapid Response Team is deputed to contact Meera's neighbours and investigate them for signs of illness.

Question 8: What suggestion do you offer for Meera's care?

Suggested answer

Meera should immediately be started on treatment with antiviral medications. A neuraminidase inhibitor, either oseltamivir or zanamivir, should be used. However, before beginning treatment, Meera's pregnancy status or whether she is nursing an infant would need to be determined.

Conclusion

The rapid influenza test was negative. Antiviral medication given by Meera's doctor was not found effective. Unfortunately she began to have organ failure and died the next day. Based on clinical features and information about Meera's exposure to an environment were birds had died a month earlier due to confirmed avian influenza, you were able to appropriately suspect that she had avian influenza H5N1 infection. Laboratory testing would later confirm your suspicions. Samples from Meera tested positive by reverse transcriptase-polymerase chain reaction (RT-PCR) for H5N1.

Case Study: II

Collection, Storage and Transportation of Samples for Testing for a Suspect Avian Influenza Case

Time Allotted: 20 minutes

Scenario

A six year-old girl from another locality of east Imphal was admitted with high fever and difficulty in breathing to J.N. hospital on August 18th. Her mother reported that the girl's symptoms (fever, cough, and sore throat) started on August 14th. The mother reported that her school is only half a kilometre from the epicentre were chickens had been dying. During that time she had visited a friend and played around the cages were the sick birds had been kept.

The examining doctor suspected avian influenza and called you for advice.

Questions:

1. What type of specimens should be collected?

Facilitator answer: The optimal choice is a nasopharyngeal specimen (swab or aspirate). If it is not possible to collect a nasopharyngeal specimen (swab, aspirate), other options include a nasal wash, throat swab or nasal swab, or a combination of these. An acute blood sample should also be taken.

2. When should the specimens be collected?

Facilitator answer: The respiratory and acute blood serum specimens should be collected as soon as possible. A convalescent sample should also be taken about two weeks after onset. Often times, in the field, this is all that is possible and practical. However, if possible multiple sequential samples may be useful to better understand the natural history of the illness. The specimens collected may also depend on the clinical status of the patient.

3. If the girl had presented at the hospital 7 days after her symptoms began, would you change your choice of what specimens to collect?

Facilitator answer: No. Even though one is most likely to isolate influenza virus when the sample is taken within 3 days of symptom onset, it is also possible to recover the virus in samples taken at a later time.

4. How should the specimens be stored before they are sent to the laboratory?

Facilitator answer: The specimens should be stored at 4°C (such as in a refrigerator) until they can be transported to the laboratory within 48 hours.

5. If there is a delay in sending the samples to the laboratory, what should you do with the samples?

Facilitator answer: Respiratory samples should be stored in a - 70°C freezer. If a - 70°C freezer cannot be located, keep samples in the refrigerator at – 4°C as long as they can be transported to the lab within 48 hours. Do not put them in a normal freezer. Serum samples can be kept either in a - 70°C freezer or a normal freezer (- 20°C). The most important point is to avoid freezing and thawing the samples multiple times.

Update

You advise the doctor on what specimens should be collected. Later that day, the doctor calls you again. He tells you that the girl's mother has refused to allow nasal swabs to be collected from her child, and that she refuses to have more samples taken over the next several days. The doctor himself does not understand why so many specimens are necessary.

6. You must explain to the doctor why multiple samples are necessary, so he can explain this to the patient's mother. What do you tell him?

Facilitator answer: Explain to the doctor the status of avian influenza in the country (this will change over time) and the importance of correctly diagnosing avian influenza in order to contain the infection. The ability of a laboratory test to detect the virus will depend on the amount of virus present in the patient sample, the storage, handling, and shipping conditions of the sample, and the accuracy and correct performance of the laboratory test. With so many potential problems, it is very important to take multiple samples on multiple days. The doctor may explain to the mother that the laboratory tests will help determine the best way to treat the child and improve her illness. The doctor should find a way to work through cultural or religious sensitivities if this becomes a problem (solution will vary depending on the situation).

Case Study: III

Infection Control Practices

Time allocated: 20 minutes

A highly pathogenic avian influenza subtype has been identified in poultry in Aizwal. You are called to advise a RRT that is being sent to Aizwal, Mizoram to investigate a possible case of human avian influenza. The possible human case lives on a farm with live poultry, although the RRT will not have extensive interaction with the birds, the RRT members have limited quantity of Personal Protective Equipments (PPE). They have to provide PPE to a number of persons and they need your infection control expertise to help them prepare for the trip.

Question 1: What all infection control supplies you would think of listing?

Facilitator answer: Soap, gloves, three layered surgical masks, N 95 masks, full PPE kit, may be required.

Question 2: Based on what you know about infection control, what priority PPE would you advise to different categories of people knowing that you have limited stocks?

Facilitator answer: Healthcare workers managing the suspected cases of human case of avian influenza are at high risk and need full complement of PPE.

The cullers are another high risk group requiring full PPE. Health manpower involved in medical examination of cullers/para veterinary staff may require N-95 mask

The surveillance and supervisory staff need N-95/surgical masks depending upon the extent of disease among poultry in the community. The contacts of suspected cases require surgical masks

Question 3: What particular infection control measures you would recommend for the public?

Facilitator answer: Stressing hand hygiene would be very important, especially since the investigation will take place on a farm. If possible, the team may want to bring an alcohol-based hand rub, in case running water is not available.

Case Study: IV

How to Communicate with the Public

Time allotted: 20 minutes

Background (hypothetical)

The following situation was reported by IDSP unit of Orissa on 12th November, 2007. You know that:

1. Three workers from Orissa's Chilka lake (a large brackish water lake bird sanctuary and tourist venue) have been hospitalised with influenza like illness.
2. The lake perimetre was closed after 8 wild birds were found dead and tested positive for the H5N1 virus.
3. Those hospitalised include a 28 year old guide, a 39 year old vendor, and another food worker. A total of 143 of 500 employees are considered at high risk for exposure to the virus.

Question 1: Based on the information that you have, how would you communicate with the public about this situation?

Facilitator answer: When possible, it is important to have public health experts and authorities available. An expert can provide information that is beneficial to the public, helps them take the correct actions, and assist with rapid and efficient recovery from the event. Experts can also assist individuals or communities in making the best possible decisions within time constraints.

In this event, the following would be the actual responses that the central government/ Orissa health authorities undertake:

- The Chief Minister of Orissa would inform the public through the print and electronic media of the situation and total number of cases and the action taken
- The Secretary (H) and DGHS/identified authority would brief media on the situation and action taken on to reduce human risk
- Inform that the environment authority announced the closure of the lake for the public
- All sanctuary workers were put under surveillance and chemoprophylaxis
- Officials urged the public to remain calm, assuring them that hospital beds and free medications were available

- Request all those who visited Chilka lake in the past 10 days to self monitor for fever and report to the nearest health facility. Also to communicate their name and contact details to investigating authority (district CMO/state DHS/NICD)
- Detecting the cases early makes the disease amenable to treatment
- Hospitals were prepared to treat a number of avian influenza cases if needed.

Scenario

As district CMO you are aware that the risk has to be communicated to the public. No material is available in Oriya language. You are also not sure about the distribution of the exposed population. You are aware that some foreign tourists have also visited the lake

Question 2: What would be your communication strategy?

Facilitator answer: Take stock of all communication materials available for a bird wise campaign and seek treatment campaign. Arrange communication experts to give voice over to available IEC material in local language in local networks and popular channels and also in local/national print media.

Question 3: What could be done about the foreign visitors.

Media coverage suggesting self monitoring of fever and to report to health authorities if suffering from fever.

Inform higher authorities who in turn would inform WHO/embassies/through GOI.