
Leptospirosis Case Involving a Thai Laborer in Taichung City

Abstract

At 2:30 p.m. on 25 September 2000, a regional hospital in Taichung City reported a suspected plague case involving a Thai laborer. The Thai entered Taiwan on 5 September, and became ill on 12 September. Symptoms were lymphadenitis of the groins and fever. He was operated lymphangiectomy on emergency basis at another hospital. The fever remained, and conditions worsened. He was referred to this hospital on 23 September. Upon arrival, he showed symptoms of pneumonia and multiple organic failures. The case mentioned that there have been cases of similar symptoms back home with several deaths. Plague was then suspected and was reported to the authorities by telephone. The Branch Bureau of the Center for Disease Control immediately dispatched a team for epidemiological investigation and an expert for consultation. Relevant control measures were taken at the same time. It was fortunate that no other suspected cases were found and no outbreaks occurred. In the process of epidemiological investigation, it was noted that the case had close contacts with rodents, his hometown was recently flooded, and he showed clinically symptoms of jaundice and multiple organic failures,

an infection of leptospirosis was then suspected. Later laboratory testing confirmed this suspicion. With the use of penicillin, the case was cured and discharged. He then returned to his country. Leptospirosis is an unfamiliar disease to most physicians and the general public in Taiwan. More needs to be done by clinicians and public health workers for its monitoring, diagnosis, treatment and control.

Introduction

Plague is caused by plague bacillus. Incubation period ranges from one to seven days. Symptoms are fever, headache, myalgia, nausea, and localized lymphadenitis (90% around the groin areas). This is bubonic plague. 20% of them may progress to secondary pneumonic plague with complications of pneumonia. They may transmit the infection through droplets. Bubonic plague requires body fluid isolation; whereas pneumonic plague requires respiratory (air) isolation⁽¹⁾. Leptospirosis is a zoonosis caused by leptospire of some 230 serotypes. Hogs, dogs and rodents are their hosts; more in hogs and rodents. They are the major sources of infection. Infection is induced through contacts of wounds and skin mucous membranes with urine of carrier animals or water contaminated by urine of carrier animals. Some high-risk groups are farmers, butchers, veterinarians and workers of slaughterhouses⁽²⁾. Incubation period is 7-20 days. Major symptoms in the early stage of infection are fever, myalgia, weakness, conjunctival suffusion, pains of calves, and enlargement of lymph nodes. Symptoms such as jaundice, acute liver and renal failures, hematuria, and multiple organic failures appear in the later stage. If the infection is not timely diagnosed and treated with adequate antibiotics such as penicillin and tetracycline, case-fatality can be as high as 20%^(2,3).

Communicability is relatively low. Transmission is more likely at times of floods when people are more exposed to contaminated water. Transmission from person to person is rare⁽³⁾.

Leptospirosis is, to most people in Taiwan, an unknown infection. It has, however, caused several outbreaks in China, India, Thailand, Malaysia and other Asian countries. In Thailand in the year 2000, some 5,000 people had been infected with 168 deaths⁽⁴⁾. Dr Pan MC of the National Taiwan University pointed out that the infection was not uncommon in Taiwan; it was that it was less studied and therefore less diagnosed⁽⁵⁾. Dr Yang CW of the Artificial Kidney Department of the Linkou Chang Gung Memorial Hospital had diagnosed 12 cases of leptospirosis between 1996 and 1999. Four of them, for not being timely diagnosed and treated with antibiotics, had died. Many people from Taiwan visit Asian countries frequently for trade and tourism, and laborers are brought in from Thailand in increasing number, the threat of this emerging disease should not be overlooked. The disease has been, as pointed out by experts, around in Taiwan unnoticed and undiagnosed. The Center for Disease Control of the Department of Health thus in March 2000 made this disease reportable on one hand, and at the same time, asked Dr Pan MC to conduct testing and monitoring of the pathological agents in laboratories under contract, hoping to understand the extent of infection in Taiwan, to reduce case-fatality, and thus to effectively control the spread of leptospirosis in Taiwan⁽²⁾. Leptospirosis is fairly common in China, Thailand, Malaysia and some other Asian countries. Treatment is relatively simple and successful if it is diagnosed early. Education of physicians and the public on this disease should help reduce its mortality. Maintenance of good environmental sanitation, however, is essential to the prevention and control of this infection^(5,6).

At 2:30 p.m., 25 September 2000, a regional hospital in Taichung City reported by telephone a suspected case of plague involving a Thai laborer. Symptoms were lymphadenitis at the groin areas, pneumonia and fever. It was suspected plague and therefore was reported immediately. To control the infection, the Third Branch Bureau of the Center for Disease Control immediately dispatched a team for epidemiological investigation.

Definition of Case and Results

1. Definition of Case

A leptospirosis case is defined by the WHO and the US CDC⁽⁷⁾ as one from his/her urine, blood or cerebrospinal fluid, pathological agents are isolated, or detected nucleic acid of virus directly by PCR, or noted by MAT increase in antibodies in the early and later stages, and has close contact with animals⁽²⁾.

2. Study Method

A structured questionnaire was used to collect from the case, his contacts, employers and employees, and physicians and nurses in contact with the case, personal information, history of previous infections, symptoms, contacts with animals, and likely sources of infection.

3. Results

1) The Case

(1) Background Information:

A Thai of 21 years, married, working as operator of stacker at a factory in

Houli Township of Taichung County; previously a farmer in Thailand; entered the country on 7 September.

(2) Medical Care

The case was normal upon entry on 7 September. He developed fever on 12 September, and was sent by the employer to a nearby clinic for care. On 16 September, for extended fever and enlargement to an egg size of lymph nodes on both sides of the groins, the case was admitted to a surgical hospital in Taichung County. There, lymphadenitis of groins with unknown fever was diagnosed and the patient was operated lymphangiectomy on both sides. Pathological examination of the lymph nodes did not exclude the possibility of lymphatic cancer. Sore throat and fever continued even after the operation. In unconscious condition, the patient was referred to a regional hospital in Taichung City on 23 September and was immediately admitted to the ICU for emergency care. Symptoms such as jaundice, fever, lymphadenitis, pneumonia, sore throat and unconsciousness developed on 25 September. Laboratory testing showed renal failure. Antibiotics including Cefazolin and Gentamycin were used for treatment.

2) Epidemiological Investigation

In the seven days prior to the onset of the infection, the patient had not handled any carcasses of animals; he had not been bitten by fleas or animals, nor scratched by animals. He had had no contact with persons of similar symptoms, either. He is a farmer in Thailand. He often catches rats in the field and shares the meat with families. Rodents are also around the houses.

Newspapers reported that on 24 September, there were in the Thai-Myanmar border outbreaks of anthrax, bacillary dysentery, and typhoid, killing tens of thousands of people. Troops were then called in. According to the ProMED-mail⁽⁴⁾, the Thai government announced that because of the floods, some 5,000 people had been infected with leptospirosis; of them, 186 had died. To be cautious, the Branch Bureau and the Taichung City Health Bureau had requested a specialist of the Center for Disease Control for consultation. By the clinical symptoms, laboratory testing findings, pathological examination, and previous close contact with rodents, infections of anthrax, hanta virus, AIDS, plague and leptospirosis were suspected.

3) Laboratory Testing Findings

Of the infections suspected, only leptospirosis was confirmed by laboratory testing. Findings of laboratory testing are listed in Table 1.

4) Sources of Infection

Leptospirosis has an incubation period of 7-10 days. The case became ill on 12 September, he could have been infected on and around 2 September. He entered Taiwan on 5 September; he was most likely infected while in Thailand. Other evidence included:

The case said that there were floods in Thailand recently, and that many people had symptoms similar to his. On 8 September, the International Epidemiology Report confirmed outbreaks of leptospirosis in Thailand. Leptospirosis has some 230 serotypes. The antibody titer of the case positive to *balcanica* and *naam*, by laboratory testing, was as high as 800X. This was the serotype of the Thai outbreaks. It was, therefore, decided that the source of infection was in Thailand.

5) Disease Control Measures

The incident was initially reported as bubonic plague, hanta virus or anthrax infection, control measures against respiratory communicable diseases and rodents were immediately adopted. When it was finally confirmed leptospirosis, the following control measures were taken:

- (1) Reporting: On 14 September, a physician noticed a suspected case of Class 1 communicable disease. Acting on the Law for the Control of Communicable Diseases, he reported the case immediately to health authorities by telephone.
- (2) Isolation: Bubonic plague is transmittable by air. The first important step in the control of plague is patient isolation. The regional hospital in Taichung City is equipped with isolation wards. Soon after the patient was suspected pneumonic plague, he should have been placed in the isolation ward. Staff in contact with the patient should wear masks and isolation robes. All articles in contact with the patient should be either disinfected or incinerated.
- (3) Specimen collection and laboratory testing: Serum specimens of patients of high communicability should, to avoid contamination in the process of mailing, be delivered by the health bureau in person to the Center for Disease Control.
- (4) Surveys of contacts: All contacts of the patients in the seven days prior to the onset of infection, including his colleagues of the same batch arriving Taiwan, fellow workers of the same work place and dormitory, medical and nursing staff of the hospitals, and persons he had met. No other suspected cases were found.
- (5) Prophylactic medication of contacts: There were 40 medical and nursing workers in the ICUs of the regional hospital in Taichung City. In the operation room and ward of the surgical hospital in

Taichung County, there were 27 workers caring for patients. All of them were given tetracycline supplied by the Center for Disease Control for seven days for prophylactic medication against plague. When the case was confirmed leptospirosis by laboratory testing three days later, the medical staff in question was told to terminate medication. Leftovers of medicines were collected for use on other occasions.

(6) Disinfection of environment:

- i) medical care institutions: as the pathogenic agents of leptospirosis can be discharged through urine to infect others, bedside workers were told to take all necessary aseptic precautions as in the case of handling patients of intestinal communicable diseases. They were told to wear gloves, incinerate diapers soiled with urine, and discard urinals used by the patient after his discharge.
- ii) work place and dormitory: the employer was told to clean up the environment; rodent control was enforced with the assistance of the Taichung County Environmental Protection Bureau.

Discussion

The case in this incident was confirmed leptospirosis based on his clinical symptoms, which were fever, jaundice, pains of calves, and multiple organic failures; on some epidemiologically noted facts that he was a farmer back home, had close contact with rodents, his hometown was flooded recently, and he became ill soon after entry to Taiwan; and on findings of the laboratory testing which confirmed the case positive of leptospires of serotypes *balcanica* and *naam* fairly prevalent in Thailand. This was an imported leptospirosis case.

With more frequent international trade and tourism, the arrival of the global village has brought about more threat of the emerging and re-emerging communicable diseases. Early detection is essential to the prevention of these diseases. These communicable diseases, for being either emerging or re-emerging, are not familiar to most physicians and the public, their early detection and prevention are not easy. A feasible way is to set up a reporting system for diseases of unknown nature to allow specialists to investigate the diseases and assess their causes. In this way, the threat of these emerging and re-emerging communicable diseases to the health of the people could be minimized. In the handling of the present incident, physicians of the reporting hospital and infection control specialists of two medical centers in Taichung City were invited for clinical assessment. The laboratory of the Center for Disease Control, with the assistance of the Sanhsia Institute of Preventive Medicine, and the National Taiwan University Veterinary Department, made assessment of the pathological agents. Staff of the Center for Disease Control, the case himself and family, medical and nursing staff of the hospitals concerned, the nosocomial infection control team, the employer and other specialists were all involved in the epidemiological investigation. With the joint efforts, the epidemiological investigation of the incident, assessment of pathological agents, and control of infection had been handled promptly without delay. The question of when and whether to announce outbreaks is often a headache to health authorities and hospitals. Premature announcement of outbreaks may cause panics, and delayed announcement may make control measures ineffective. When is the most appropriate time for announcing an outbreak? By the Law for the Control of Communicable Diseases, the Class 1 notifiable diseases must be announced by the central competent authorities, the Department of Health. When and after the infection is

confirmed and announced by the central competent authorities, physicians may report on the treatment of the patient, and local health authorities may release information on control measures. The present incident was originally reported as a suspected case of plague. During the entire process of disease investigation, the members involved were most cautious to take all relevant measures to prevent the spread of the infection on one hand, and at the same time, to prevent any leak of information. An outbreak of plague could have caused serious public panics to make the situation uncontrollable. Leptospirosis, confirmed later, is a notifiable disease of the 4th Class. After the central competent authorities confirmed the diagnosis, local health authorities were permitted to release information concerning the infection, and physicians in attendance were allowed to report on the treatment of the patient.

Alien labors though are helpful in improving productivity and reducing labor costs of local industries, they bring in to Taiwan serious threats to the control of communicable diseases. Communicable diseases have incubation periods of different duration. A person in incubation period could be tested negative. This case for instance, he was found no abnormal symptoms of any kind upon entry, his health examination soon after entry found no infection of any communicable diseases, either. Yet, he became ill on the fifth day after entry. This is a loophole in the control of communicable diseases. If the case were indeed pneumonic plague, in the 13 days between onset to reporting by the hospital (equivalent to two incubation periods), he could have infected his colleagues and the medical staff of the hospitals, and through them, many more family members, co-workers, and patients at the clinics and hospitals he visited. The infection could have become a serious and uncontrollable outbreak. The health management of alien labors should be most careful.

Recommendations

1. The central competent authorities, the medical associations, other relevant medical associations, and local health authorities should join together to do the following:
 - 1) To promote a reporting system for syndromes: Clinically unknown diseases should be reported promptly by syndromes for the early detection of any likely emerging communicable disease.
 - 2) Most primary care workers are unfamiliar with the emerging communicable diseases. Training programs should, therefore, be organized for them in the reporting, diagnosis, specimen collection and control of these diseases.
 - 3) International epidemiological information should be collected earlier to serve as a warning to the local disease control systems. Convenient and immediate channels for access to disease information, such as the 24-hour telephone service, the Internet, FAX reply system, and periodicals, should be set up to disseminate timely disease information to primary care workers and local health authorities.
 - 4) Databases of specialists on emerging communicable diseases should be set up for the consultation of primary care workers and local health authorities.
2. The central competent authorities should work jointly with the Council of Labor Affairs and labor agents on ways to strengthen the health management for alien labors.
3. The central competent authorities should work jointly with the Ministry of Transportation and Communications, tourism associations and tour agents

to do the following:

- 1) Before departure, collect disease information of the countries to be visited for the information of visitors. Inform visitors the precautions to be taken.
 - 2) On touring, monitor the health conditions of visitors.
 - 3) Upon return, urge visitors to complete the health statement at the airport.
 - 4) Soon after return, health authorities should immediately follow-up any unusual conditions of visitors. In case of any outbreaks, the tour agents should provide lists of passengers and help health authorities take necessary disease control measures.
4. Disease control organizations, local health authorities, medical care institutions and the media should:
- 1) Release information on the situations of the emerging communicable diseases to inform the public ways to early detect these diseases and control them.
 - 2) Health education of those health, medical and nursing workers involved in the investigation and control of the outbreak is also important. They should be told how to control the infection, how to protect themselves, how to remain free from fear, and how to handle the media.
 - 3) Media should be used to propagate the system and channels for disease reporting such as the 24-hour telephone service, the FAX reply system, etc.

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Table 1 Laboratory Testing of Patient for Suspected Infections

Suspected Infection	Specimens	Test Items	Findings	Reading
Plague	Serum, Blood	antigen PHA	(-)	Excluded
		ELISA	(-)	
		plague bacillus in blood culture	(-)	
Anthrax	Serum, Blood, Lymph Nodes	PA antigen ELISA	(-)	Excluded
		anthrax bacillus in blood culture	(-)	
		Lymph nodes PA antigen IFA	(-)	
Hanta virus infection	Serum	IFA	(-)	Excluded
Plague	Same as above			
HIV Infection	Serum	PA	(-)	Excluded
Lymphatic carcinoma	Lymph nodes of groins	Pathological testing	lymphoid cell neoplasm	Non-infectious, No repeated testing
Leptospirosis	Serum, Urine	MAT	(+)	Postive
		<i>balcanica ; naam</i>	800x	
		<i>icterohaemorrhagiae ; bratislava</i>	400x	
		<i>shermani ; semaranga ; lai</i>	200x	
		Mc test	(+)	
		Urine PCR	(-)	

Correction

“Transfusion-Transmitted Virus (TTV): Positive Rates in Healthy Individuals and Cases with Hepatitis C Antibody” in Epidemiology Bulletin Vol.17, Oct.25, 2001, the co-author Tschen SY, Schleicher S, Flehmig B. took service in Department of Medical Virology and Epidemiology of Viral Diseases, Hygiene Institute, University of Tuebingen, Germany.