



Outbreak, Surveillance and Investigation Reports

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First Documented Zoonotic Case of Q Fever in Penang, Malaysia

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Abstract

Q fever is a zoonotic disease caused by *Coxiella Burnetti*. In April 2007, Penang hospital notified a case of brucellosis through the syndromic notification which was later confirmed as Q fever. The patient presented with fever for two weeks and a history of handling the abortus of a goat. An epidemiological investigation was initiated to identify source of infection and prevent transmission. Blood samples from farm worker, contacts and animals from affected and neighboring farms were tested for Q fever. The universal precaution practices of the veterinary and laboratory staff were observed and their blood specimens were taken for Q fever serology. The patient was tested positive IgM and IgG for Q fever. Out of the 49 blood samples from farm workers, and veterinary and laboratory staff, 12 were positive for IgM, two were positive for IgG, seven were positive for both IgM and IgG, and 67 (27.2%) of the animal farms were positive for Q fever. There were minimal personal protective equipments used by the veterinary staff when handling the animals. There were goats imported from endemic countries. Prior to this outbreak no screening of imported animals for Q fever from endemic countries was instituted. Overall the farms were kept clean and well managed. All the contacts and animals tested positive for Q fever were treated.

Keywords: Q fever, goat farm, livestock, zoonosis, Malaysia

Introduction

Q fever is a rickettsial disease caused by *Coxiella burnetii*. The disease is also known as Query Fever due to its dubious etiology and pathogenesis. Q fever was first identified in Queensland Australia in 1935, since then the disease has been reported worldwide in farm animals¹. In 1959, there was an outbreak in Queensland, Australia associated with sheep contacts² and in 1969, in the Brisbane meat works with a 7.9% incidence³. It is highly infectious as clinical illness can be produced by a single inhaled organism. Virulence is low as most patients experience asymptomatic seroconversion⁴. Bush reported the first probable case of human clinical infection in Selangor, Malaysia in 1952⁵. This outbreak was thought to be caused by infection of infected milk. Q fever was also reported in Malaya in 1955⁶ during a World Health Organization-assisted survey, but there had not been any references to it in Peninsular Malaysia since. The disease was also not listed as a notifiable disease under the Control of Communicable Act Malaysia 1988⁷. Livestock in Malaysia were subjected to stringent

screening measures by the Veterinary Department, but not for Q fever.

Chronology of Events

Dr. P was a General Practitioner in Penang State, who started goat farming in 2006 at Valdor in the District of Province Wellesley South, near the town of Sungai Bakap in mainland Penang. He reared a range of animals, mostly goats, chickens and geese in his farm. There were about 100 goats in his farm, mostly local breed with some Boers and Anglo-Nubians that he had purchased locally. He ran the farm with two other workers; a local and a foreigner who resided on the farm.

The figure 1 showed the chronology of events leading to the diagnosis of Q fever in Dr. P. The Veterinary Department was then notified of the result.

Immediately, the health and veterinary teams carried out the active case detection and investigation in Dr. P's farm and the neighboring farms within the vicinity; farm A and farm B. This paper aimed to describe the epidemiology of Q fever and the investigations carried out during the event.

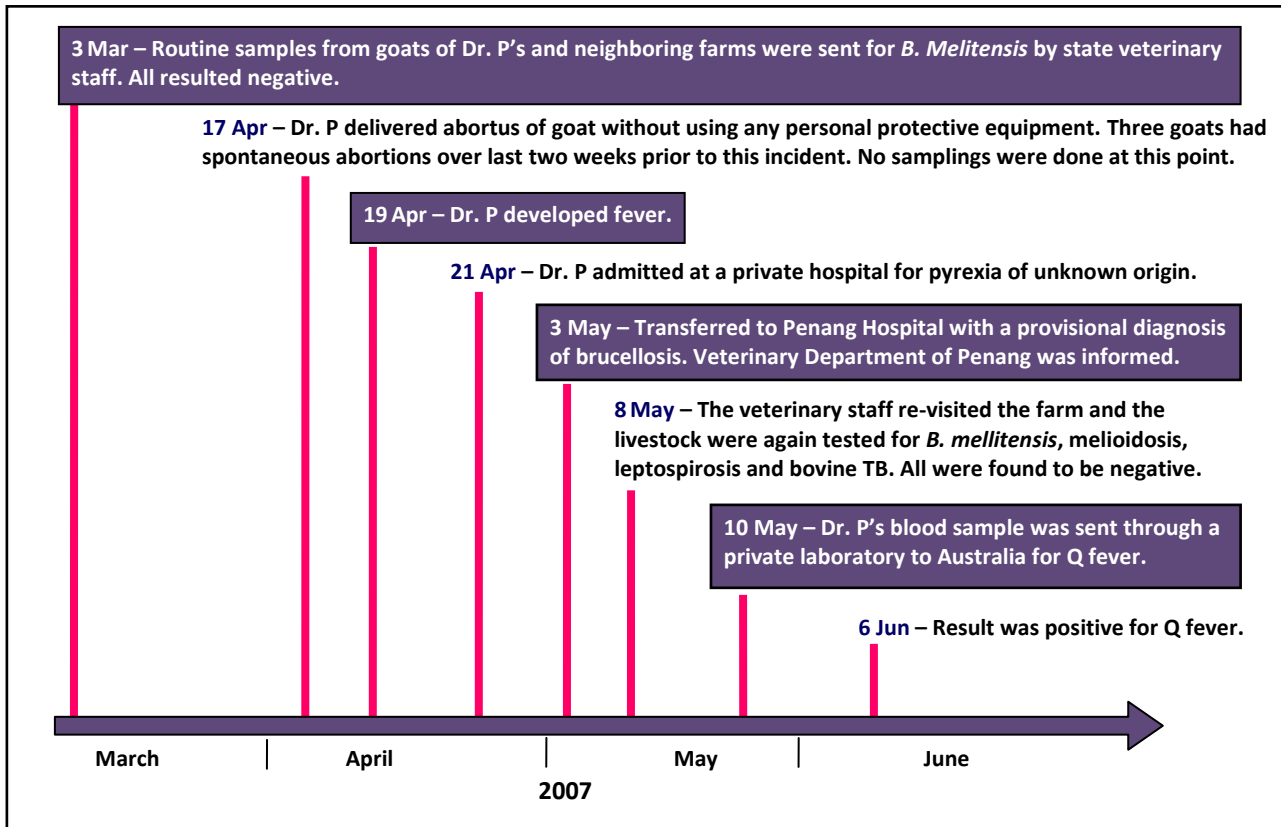


Figure 1. Chronology of Events leading to diagnosis of Q fever in Dr. P, 2007

Methods

This was a descriptive study. A probable case was defined as any farm worker from Dr. P's farm, farm A, farm B or veterinary staff presenting with fever from 1 Mar to 31 May 2007. A confirmed case was defined as a farm worker or veterinary staff with IgG and or IgM positive of Q fever.

The cases were interviewed using a standard questionnaire which included their daily habits and exposure at the farm. Active case detection was carried among the farm workers and amongst Dr. P's family members. Environmental assessment was carried out in all the farms, observing the general conditions and sanitation.

A review on the use of Personal Protective Equipment (PPE) and infection control procedures used by the veterinary staff while they were carrying out their routine activities at the farms were conducted. All those who came in contact with the animals were traced and screened at Bukit Mertajam Hospital and examined by physicians. Their blood samples for IgG and IgM Q fever serology were sent to the Institute of Medical Research in Kuala Lumpur.

The livestock at Dr. P's farm, farm A and farm B were sampled for Q fever and sent to Veterinary Department.

Results

Dr. P's farm was adjacent to the two farms and was located in Valdor, Sungai Bakap. Farm A shared a common fence with Dr. P's farm whilst farm B was located across a narrow dirt road from his farm (Figure 3).

Farm A had three workers including one migrant worker. The owner imported goats from Australia and redistributed the stock to other farms nearby. Dr. P bought his imported goats from farm A. Farm B had two workers including one foreigner. All the three workers in farm A and two of the three in farm B were serology positive and were probable cases. There were no more symptomatic cases found in our investigations.

Dr. P was married with two children. They spent a lot of their time in the farm; however, the wife and the children were asymptomatic at the time of the investigation.

The environmental assessment showed that Dr. P's farm was located on the fringe of an oil palm estate. The conditions in all the farms including the workers quarters located within the farm were generally clean and well-maintained, but dusty.

We reviewed the screening procedures by the Veterinary Department staff handling the animals and noted that they had very close contact with the

animals during rounding up and blood-taking procedure. Most of them wore masks and gloves, and some used aprons.

Table 1. Results of sampling of livestock at farms for Q fever by laboratory examination

	Number of sample	Number of sample positive (%)	Treatment
Farm Dr. P	126 goats	32 (25.4)	Oxytetracycline LA
	83 cows	28 (33.7)	
Farm A	14 goats	2 (14.3)	Oxytetracycline LA
	11 cows	1 (9.1)	
Farm B	12 cows	4 (33.3)	Oxytetracycline LA

Forty-nine blood samples taken from farm workers, veterinary staff and laboratory staff were sent for IgM and IgG serology, 21 (42.8%) were laboratory confirmed. Twelve (57%) had IgM positive, seven (33.3%) had both IgM and IgG positive and two cases with IgG positive.

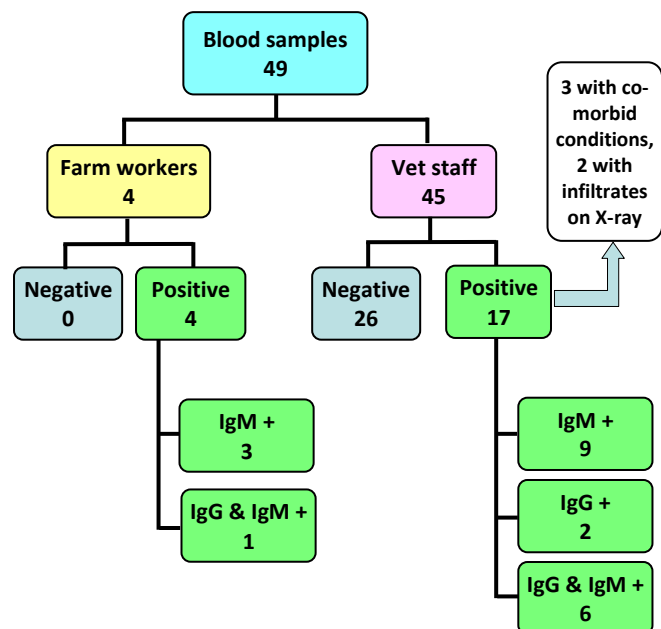


Figure 2. Results of screening for Q fever among the farm workers and Veterinary Department staff from May to July, 2007

Clinical and Preventive Measures

All the serology positive cases were treated with doxycycline for two weeks and their medical status were monitored by a physician from Bukit Mertajam Hospital. The two cases who presented with infiltrates in their chest x-ray were put on long-term follow up. Three farm workers who presented with co-morbid conditions were treated and discharged well.

All the workers in the farms, veterinary staff as well as Dr. P and his family were advised on precautions

to be taken when handling animals. The farmers were advised on the proper use of PPE especially when handling the births of animals. They were also advised to maintain cleanliness of the farm and surroundings, to segregate ill stock from the rest and to practice personal hygiene. This included advice on washing hands and changing their clothes after handling animals. Those who did not turn up during the scheduled Q fever screening session were advised to do so at a later date and were advised to seek medical treatment if they developed fever.

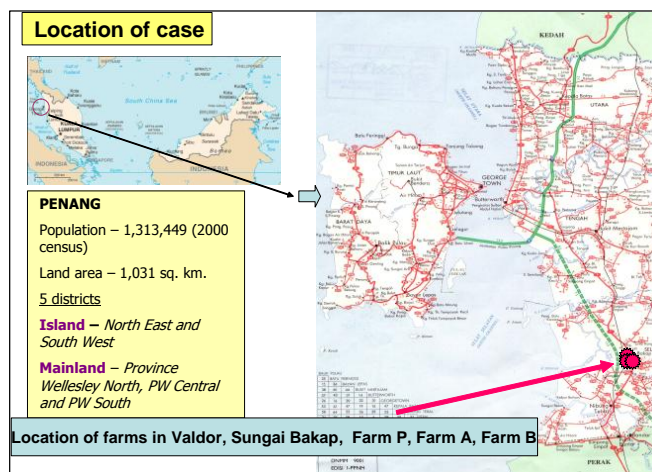


Figure 3. Location of the farms affected with Q fever in Penang

Discussion

Dr. P had Q fever from his infected goat. Since, all the goats in his farms were purchased locally, it showed that Q fever has been in circulation amongst his livestock and the farms in the vicinity. The incubation period of this disease is 18 to 21 days, with a range of four to 40 days, and it was probable that Dr. P was infected even before he handled the abortus of the goat on 17 Apr 2007.

There had been a series of abortions in his farm prior to this day, and he had been in close contact with his animals.

Coxiella burnetii is known to be an important cause of epidemic abortion among farm animals⁸. Veterinary and hospital laboratories in Malaysia do not routinely test for Q fever among animals and human respectively, however, a serological survey in Sarawak, East Malaysia conducted in 1988 detected Q fever among febrile patients in an Iban village⁹. It is possible that the disease is present in West Malaysia too.

Q fever is commonly transmitted through airborne dissemination, raw milk from infected cows and direct contact with infected animals¹⁰. Laboratory acquired Q fever has also been reported¹¹ and this could account for some of the cases among the laboratory staff in the veterinary department.

This disease is easily treatable. Tetracyclines¹² and its analogues is the mainstay of therapy amongst animals and livestock.

In conclusion, this was the first documented zoonotic case of Q fever in Penang. The disease was probably present among the farm animals in Penang. Since there was no mandatory screening of imported animals for Q fever, the introduction of the disease from an endemic country was possible. Higher number of serology confirmed cases among laboratory staff of the Veterinary Department staff was probably because of poor handling of infected animals without adequate PPE.

Public Health Actions and Recommendations

Dr. P was initially treated for brucellosis because there was poor awareness of Q fever among medical staff in Penang. In the last three decades, there had been no documented case of Q fever in Penang. On follow-up, Dr. P recovered and was discharged well after 20 days in the hospital. The goat whose abortus he handled had also been treated and had subsequently given birth to a healthy offspring.

However, when Q fever serology was also detected among the veterinary staff, there was panic not only in Penang, but also the rest of the country. This was followed by a high demand for screening. The Institute of Medical Research being the reference laboratory for the country was unable to cope with the sudden surge and the service of a private laboratory in Australia was required.

Following this incident, we traced back previous unaccounted cases of fever among animal farm workers in the Penang. There was a suspected case of brucellosis in farm C, located in Province Wellesley North in March 2007, but serologically negative for brucellosis. Traced back investigation was carried out, and the case was confirmed positive for Q fever. Three out of the four goats in his farm were also positive for Q fever. Four other workers in the farm who were also tested positive for Q fever were treated. All the animals were also treated.

This incident had triggered the Veterinary Department to place Q fever surveillance amongst livestock. Since February 2008, livestock imported from endemic countries were screened for Q fever. The use of proper PPE during all procedures involving animals was emphasized. In addition, routine preventive measures as personal hygiene and hand washing were stressed on as well. The veterinary staff now have to undergo regular screening. Medical officers in Penang were alerted on the possibility of Q fever among farm workers and

those dealing with livestock. Two national laboratories now have the capability to test for Q fever.

This incident has resulted in a better collaboration between the State Health Department and Veterinary Department of Penang. Q fever is now a permanent agenda in the State Zoonosis Committee Meeting. Guidelines on the proper use of PPE for veterinary staff and farm workers are now available. Q fever is also a regular topic for presentation during Continuous Medical Education forums in Malaysia.

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References

1. Derrick EH. "Q" fever, a new fever entity: clinical features, diagnosis and laboratory investigation. *Rev Infect Dis.* 1983 Jul-Aug;5(4):790-800.
2. Derrick EH, Pope JH, Smith DJ. Outbreak of Q fever in Queensland associated with sheep. *Med J Aust.* 1959 May 2;46(18):585-8.
3. McKelvie P. Q fever in Queensland meat works. *Med J Aust.* 1980 Jun 14;1(12):590-3.
4. Kagawa FT, Wehner JH, Mohindra V. Q fever as a biological weapon. *Semin Respir Infect.* 2003 Sep;18(3):183-95.
5. Bush F. *Proc Alumni Ass King Edw VII Coll Med (1952) 5, 84 (Abstracted in Excerpta Med (Amst) Sect IV) 1953; 6, 536.*
6. Kaplan MM, Bertagna P. The geographical distribution of Q fever. *Bull World Health Organ.* 1955; 13(5):829-60.
7. *Laws of Malaysia Act 342. Prevention and Control of Infectious Diseases Act 1988. Malaysia: Commissioner of Law Revision, 1988.*

8. Rousset E, Berri M, Durang B, Dufour P, Prigent M, Delcroix T, Touratier A, Rodolakis A. Characteristics of *Coxiella burnetii* shedding routes and antibody response after Q fever abortion outbreak in dairy goat herds. *Appl Environ Microbiol.* 2009 Jan; 75(2):428-33.
9. Tay ST, Ho TM, Rohani MY. Serological findings of *Coxiella burnetii* infection among patients with fevers in a health center in Sarawak, Malaysia. *Southeast Asian J Trop Med Public Health.* 1998 Mar; 29(1): 94-5.
10. Heymann DL. Control of communicable diseases manual. 18th ed. Washington DC: American Public Health Association, 2004.
11. Johnson JE, Kadull PJ. Laboratory-acquired Q fever: A report of fifty cases. *The Am J of Med.* Sep 1966;41(3):391-403.
12. Gorbach SL, Bartlett JG, Blacklow NR. Infectious diseases. WB Saunders Company: Philadelphia, 1992.