OCCUPATIONAL HEALTH

BIOLOGICAL HAZARD
(Biohazards)

Q fever

L XII
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Q fever

- **Q fever**, also called **query fever,** is
- A bacterial infection caused by the bacteria ***Coxiella burnetii.***
- **Affects humans and other animals**
- It is a zoonotic
- **Most** common **animal reservoirs** are **cattle,** sheep, and goats
- **and other domestic mammals including cats, and dogs**.
- **Humans typically get the infection as a results from**
  - **Inhalation** of **a spore in dust** that **was contaminated by infected animals**
  - from **contact with** the **milk, urine faeces vaginal mucus** or **semen of infected animals.**
  - **Rarely,** the disease is **tick -borne.**
- **Humans are vulnerable to Q fever**, and infection can result **from even a few organisms**

- The **highest amounts** of bacteria are found in the **"birth products"** (**placenta, amniotic fluid**) **of infected animals**
  - **Farmers,**
  - **veterinarians**, and
  - people **who work with these animals in labs**

are **at the highest risk** of being infected.

- **The disease may cause mild symptoms similar to the flu.**
- **may clear up in a few weeks without any treatment**
- However, **many people have no symptoms at all.**

- **In rare cases, a more serious form of disease develops if the infection is chronic,**
- means it **persists for six months** *(and there are some case reports indicating that it may persist* ***for more than six months****).*

❖A **more serious** form also can develop if the
❖ **infection is recurrent**,
❖People with
heart valve problems or
weak immune systems

are **at the highest risk of developing these types of Q fever**

The animals transmit the bacteria in:

➢ **Urine, faeces, milk, fluids from giving birth**

❖ **These substances can dry inside a barnyard where**

➢ **contaminated dust** can **float in the air.**

❖ **Humans get Q fever when they**

➢ **breathe in the contaminated air.**

❖ In rare cases, **drinking unpasteurized milk** can cause infection.

➢ **cannot be spread directly from one human to another.**

❖ The exact frequency of Q fever isn't known because most cases aren't reported.

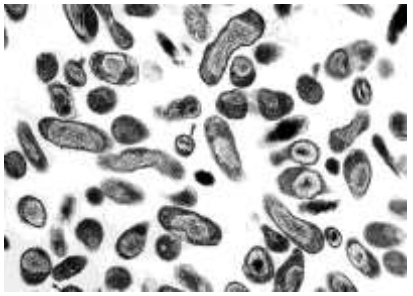
Signs and symptoms

- **Incubation period** is usually **2-3weeks.**
- **Symptoms can vary significantly from one person to another.**
- The most common manifestation is **flu-like symptoms** with
- **abrupt** onset of **fever, malaise, profuse perspiration**, **sever headache muscle pain, loose of appetite, upper respiratory** problems, **dry cough**, **confusion, chills, and gastro intestinal symptoms** such as **nausea vomiting,** and diarrhoea
- **About half of infected** individuals exhibit **no symptoms**.
- **During its course, the disease can progress to an**
- **atypical pneumonia** which can result in
- a **life-threatening acute respiratory distress syndrome**
- whereby such symptoms usually occur
- **during the first 4-5 days of infection**.

Signs& Symptoms Cont. ..

- Less often, Q fever causes **hepatitis,** which may be
  - **asymptomatic or**
  - **becomes symptomatic with malaise, fever, liver enlargement, and pain in the right upper quadrant of the abdomen**
  - **transaminase values are often elevated**
  - **jaundice is uncommon.**
- **Retinal vasculitis is a rare manifestation of Q fever.**

- **The chronic form** of Q fever ⇒ **endocarditis** which can occur **months or decades following the infection.**
- **It is usually fatal if untreated.**
- However, with **appropriate treatment,**
- **the mortality falls to around 10%.**



Who Is at Risk for Q Fever?

Since the bacteria usually infect cattle, sheep, and goats, people who are at highest risk for infection include:

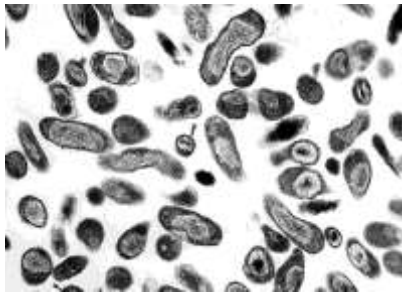
- ✓ **farmers**
- ✓ **veterinarians**
- ✓ people who **work around sheep**
- ✓ people who work in the **dairy industry**
- ✓ people who work in a **meat processing facilities**
- ✓ people who work in **research laboratories with livestock**
- ✓ people who work in **research laboratories** with *C. burnetii*
- ✓ people who **live close to a farm**

❑ Q Fever Diagnosed

It's difficult to diagnose Q fever based on symptoms alone.

- ❖ **suspect of Q fever**
- ❖ **any case of the flu-like symptoms or serious complications of Q fever** and **work or live in an**
- ❖ **environment that puts him at high risk for exposure**
  - **ask questions about the job** or
  - if he **recently been exposed to barnyard or farm animals.**

- ❖ **Q fever is diagnosed** with a **blood antibody test.**

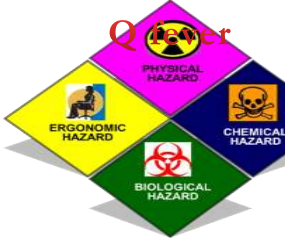


- ➢ **According to the Centers for Disease Control**
- ➢ **antibody test frequently appears negative**
- ➢ **in the first 7- 10 days of sickness.**

➢ In a **chronic infection,**

Q Fever Diagnosed

- **In a chronic infection.**
  - **Serology allows the detection of chronic infection by the appearance of high levels of the antibody**
  - **chest X-ray** and
  - **echocardiogram** to **look heart valves.**
  - **elevation of alanine transaminase and aspartate transaminase,**
  - **hepatitis liver biopsy**
- **Molecular detection** of **bacterial DNA** is increasingly used.
- **Culture is technically difficult and**
- **not routinely available in most microbiology laboratories.**



❑ Complications of Q Fever?

- ❑ Sometimes Q fever can persist or come back.
- ❖ This can lead to more serious complications if the infection affects
- ➢ Heart, liver, Lungs, brain
- ❑ high risk of developing chronic Q fever when :
  - have an existing heart valve disease
  - have blood vessel abnormalities
  - have a weakened immune system
  - Pregnant
- ❑ According to the CDC
- ❖ chronic Q fever occurs in less than 5%of infected patients.
- ❖ The most common and serious complication of Q fever
- ❑ is a heart condition ,bacterial endocarditis.

This may be fatal if it isn't treated.

Other serious complications

Complications of Q Fever Cont. ..

- Other serious complications are less common. They include:
  - pneumonia or other lung issues
  - pregnancy problems, such as miscarriage, stillbirth, low birth weight, premature birth,
  - Hepatitis,
  - Meningitis,

- At risk" occupations include.
  - ✓ Veterinary personnel
  - ✓ Stockyard workers
  - ✓ Farmers
  - ✓ Sheep shearersجزاز
  - ✓ Animal transporters
  - ✓ Laboratory workers handling potentially infected veterinary samples or visiting abattoirs
  - ✓ Hide (leather), tannery workers

Epidemiology

Q fever

- **Q fever was first described in 1935 by** Edward Holbrook *Derrick in slaughterhouse workers in Brisbane, Queensland. The "Q" stands for "query" and was applied at a time when the causative agent was unknown;*

- the Q fever-causing agent *C. burnetii*,
- **The pathogenic agent is found everywhere**
- **except New Zealand.**
- The bacterium is **extremely sustainable and virulent:**
- a **single organism** is able to **cause an infection.**
- **The common source** of infection is
- **inhalation** of contaminated dust,
- **contact with contaminated milk, meat, or wool, and**
- **particularly birthing products.**
- **Ticks can transfer the pathogenic agent to other animals.**
- **No transfer between humans**
- **Some studies have shown more men to be affected than women,???**

❑ Treatment of acute Q fever

❖ antibiotics is very effective and should be given

❖ Commonly used antibiotics include doxycycline , tetracycline chloramphenicol ofloxacin Profloxacin, .

❑ Treatment depends on the severity of symptoms.

❖ Mild Infection Q fever

usually resolve within a few weeks without any treatment

❖ More Severe Infection

Doxycycline is the antibiotic of choice

begin taking it immediately if Q fever is suspected even before laboratory results are available.

2-3 weeks.

The symptoms, including fever, should subside within 72 hours.

Failure to respond to doxycycline may suggest that the illness isn't Q fever.

Q fever

- **Chronic Infection**
  - **Antibiotics are typically given for 18 months**
  - **Chronic Q fever is more difficult to treat and**
  - **can require up to four years of treatment with doxycycline.**and quinolones or doxycycline with hydroxychloroquine.

- **What Is the Outlook After Treatment?**
  - **Antibiotics are usually very effective,**
  - **endocarditis, and fatality from the disease is very *uncommon.***
  - **People with however, need an early diagnosis.**

Prevention

- The Q fever vaccine (Q-VAX®)
  - has been licensed for use in Australia since 1989
  - has shown to be highly effective in preventing Q fever infection in humans.
  - Protection is offered by Q-Vax,
  - Since the introduction of the vaccination for high- risk occupations, the rates of Q fever infection have dropped markedly.
- The vaccine is made in Australia
- The vaccine is a single injection.
- 0.5 ml sub-cutaneous injection given in the upper arm
- (assuming both blood and skin tests are negative
  - protective immunity lasts for many years.
  - Revaccination is not generally required
  - pre-vaccination ????

Prevention Cont. ..

- **What is pre-vaccination screening?**
  - To avoid the risk of a severe reaction
  - the vaccine should only be given to those
  - who have not been in contact with the bacteria in the past.
  - identify pre-existing immunity,
- because vaccinating people who already have an immunity can result in a severe local reaction
- **Pre-vaccination screening has 3 stages**:

i. an interview about Q fever infection or past vaccination
ii. blood test to check for immunity
iii. skin test to check for immunity.

- It is possible to have been in contact with Q fever bacteria and not get sick
- so pre-vaccination screening is essential

- **Annual screening is typically recommended.**
  - **Skin reactions such as redness are common 3 to 4 days after skin testing, however these generally**
  - **resolve by day 7** when the skin test is read.
- **What should be considered *after* vaccination?**
  - **Allow 15 days after vaccination before starting work in an at-risk environment.**
- **Keep the worker's record in a safe place as is important particularly if the worker change his jobs as the new employer will need this evidence**
  - **In 2001, Australia introduced a national Q fever vaccination program for people working in "at risk" occupations.**
  - **Vaccinated or previously exposed people may have their status recorded on the Australian Q Fever Register**
  - **which may be a condition of employment in the meat processing industry**

- **The vaccine is long-lasting immunity (excess of 5 years).**

Possible Side Effects

- **Up to 50%** of those vaccinated will have **local tenderness, redness and swelling at the injection site.**
- In **around 10%** of vaccine recipient's side effects will include **mild influenza-like symptoms, such as headache, fever, chills and minor sweating.**
- **Serious side effects are very rare**

Who should be vaccinated?

- The **vaccine is strongly recommended for people**
- **who work in high-risk occupations**
- **People whose** work in **contact with high-risk animals** or
- **animal products**
- **People can also be infected outside of work especially in**
- **live or visit. rural areas by breathing in infected particles and dust in the environment.**

❑ **High risk people for Q fever** and **not vaccinated**,

❖ **Should take the following preventive steps:**

- **Properly disinfect** and **decontaminate** exposed areas.
- **Properly dispose of all birth materials** after a livestock animal has given birth.
- **Washing hands** properly.
- **Quarantine infected animals.**
- **Milk pasteurization**
- **Test animals routinely for infection.**
- **Restrict the airflow from barnyards and animal holding facilities to other areas.**

- **Preliminary results suggest vaccination of animals may be a method of control.**
  - **Published trials proved that use of a registered phase vaccine** (Coxevac) **on infected farms is a tool of major interest to manage or prevent**
  - **early or late abortion,**
  - **repeat breeding,**
  - **decreases in milk**

Q ????


Good Luck
on your
Exams!