

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

# OCCUPATIONAL HEALTH

V



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Ramadan  
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David Bruce (1855-1931) Australian-born Scottish physician and microbiologist. Identified bacterium causing human undulant fever (Brucella, 1887) and in 1895 in South Africa,

# Brucellosis





## □ Brucellosis

- ❖ is one of the major bacterial zoonosis, and in humans is
- ❖ known as: Undulant fever, Malta fever or Mediterranean fever.
- ❖ It is a bacterial disease caused by various Brucella species, which mainly infect cattle, swine, goats, sheep and dogs
  - ❖ It is occasionally transmitted to man by direct or indirect contact with infected animals.
- ❖ characterized by
- ❖ intermittent or irregular febrile attacks, with profuse sweating, arthritis and an enlarged spleen.
- ❖ The disease may last for several days, months, or years.
- ❖ Brucellosis is both a severe human disease & a disease of animals
- ❖ with serious economic consequences

Humans generally acquire the disease through

- ❖ Humans generally acquire the disease through
  - **Direct contact** with infected animals,
  - **By eating** or drinking **contaminated** animal products,
  - **By inhaling** airborne agents.



The majority of cases are caused **by ingesting unpasteurized** milk or cheese from infected goats or sheep.

- ❖ **Next** to this it is considered to be an **occupational** disease for people who work with animals or animal products

Person-to-person transmission is rare.

### Incubation period

Highly variable. Usually **1-3 weeks**, but may be as long as  $\geq 6$  Mths

## □ Diagnosis

- Isolation of the organism from **cultures** of blood, bone marrow,
- ❖ **CDC utilizes** a test called **the Brucella microagglutination test (BMAT)**, a **modified version of the serum (tube) agglutination test (SAT)**, that can **detect antibodies to Brucella species – abortus, melitensis or suis.**
  
- **How is brucellosis diagnosed in cattle?**
- ❖ Diagnosis can be done by **laboratory testing** of **blood or milk samples** **or by**
- ❖ **laboratory culture** of **brucella abortus** from the **placenta, vaginal discharge or the milk of infected cows**

- ❑ **Brucellosis** is a recognized **public health** problem
- ❑ with **WW** distribution.
- ❑ **It is endemic** wherever cattle, pigs, goats & sheep are raised in large numbers.



- ❖ **Important endemic** areas for brucellosis exist in **Mediterranean** zone,
- ✓ **Eastern Mediterranean** countries, Central Asia, Mexico and South America.
- ❖ in most **European** countries, **North America** and **Australia** it is **rare now**
- ❑ The prevalence of human brucellosis is difficult to estimate.
  - ❖ ➤ **Many cases remain undiagnosed**
  - ❖ either because they are **unapparent** or because
  - ❖ **physicians in many countries are unfamiliar** with the disease

Brucellosis	In Jordan	
	Incidence Rate	4.645/ 100 000

# Epidemiological Determinants

## □ Agent

- The agents are small, **gram-negative** rod shaped, **non-motile**,
- **non spore** & intracellular **coccobacilli** of the **genus *Brucella***.
- **Four species** infect man :
  - B. melitensis*** is the most **virulent and invasive** species;
    - it usually infects **goats** and occasionally sheep.
  - B. abortus*** is **less virulent** and is primarily a disease **of cattle**.
  - B. suis*** is of **intermediate** virulence and chiefly infects **pigs**.
  - B. canis*** is a disease of **dogs**.

## □ Host Factors

- ❖ Human brucellosis is **predominantly** a **disease of adult males??**.
- ❖ **Farmers, shepherds, butchers, and, veterinarians and laboratory workers** are particularly at **special** risk because of **occupational exposure**.
- **Immunity follows infection**





### ❑ Reservoir of Infection :

❖ **Main reservoirs of human infection;**

➤ **cattle, sheep, goats, swine, buffaloes, horses and d**

❑ **In animals** the disease can **cause abortion, premature expulsion** of the foetus **or death.**

❖ **Cross infections** can often occur between animal species.

❖ **The infected animals excrete** Brucella in the **urine, milk, placenta, uterine and vaginal discharges particularly** during a birth or abortion.

❖ **animals may remain infected for life**

## Epidemiological Determinants Cont. ..

### **□ Environmental Factors**

- Brucellosis is most prevalent under conditions of advanced domestication of animals in the **absence of correspondingly advanced standards of hygiene.**
- **Overcrowding** of herds, **high rainfall**, lack of exposure to **sunlight**,
- **unhygienic practices** in milk & meat **production**,  
all favour the spread of brucellosis.
- **The** organism **can survive for weeks, or months** in favourable conditions **of water, urine, faeces, damp soil and manure.**
- **The infection can travel long distances** in **milk and dust**

## □ Mode of transmission

- Transmission is usually from **infected animals** to man.
- There is **no evidence** of transmission from **man to man**
- **The routes of spread are :**



### (a) Contact infection :

- **Most commonly**, infection occurs by **direct contact** with infected *tissues, blood, urine, vaginal discharge, aborted foetuses and especially placenta.*
- ❖ **Infection takes place** through **abraded skin, mucosa** or **conjunctiva** (muco cutaneous route).
- This type of spread is **largely occupational** and occurs in persons involved in **handling livestock** and **slaughter house workers.**

(b) Air-borne infection :

### (b) Air-borne infection :

The environment of a cowshed may be **heavily infected**.

- people living in such an environment can be infected.
  - Brucellae may **be inhaled**

### (c) Food-borne infection :

- ❖ Infection may take place indirectly by the ingestion of
- ❖ **raw milk** or dairy products (cheese) **from infected animals**.
- ❖ **Fresh raw vegetables** if grown on soil containing manure from infected farms. can also carry infection
- ❖ **Water contaminated** with the excreta of infected animals may also serve as a source of infection

### □ Pattern of disease

Brucellosis in man ranging from

- **acute febrile** to a
- **chronic low-grade** ill-defined disease, lasting for **several days, months or occasionally years**.



Cotn. ....Pattern of disease

❖ The acute phase

Characterized by a **sudden** or **insidious** onset of illness with

(i) **swinging pyrexia** (up to 40-41 C<sup>o</sup>), rigors and sweating.

(ii) **arthralgia/arthritis** (*usually mono articular*) involving **larger joints** such as hip, knee, shoulder and ankle

(iii) **low back pain.**

(iv) **headache, insomnia.**

(v) **small firm splenomegaly and hepatomegaly.**

(vi) **leukopenia with relative lymphocytosis**



□ **The acute phase subsides within 2-3 weeks.**

❖ If the patient is treated **with tetracycline**, the symptoms may disappear quickly, but the infection, being intracellular, **may persist**

❖ **giving rise to subacute or relapsing disease.**

In a few patients (**up to 20%**), symptoms for prolonged periods.

# Control of Brucellosis

## I. In The Animals

- ✓ The most rational approach for **preventing human brucellosis**
- ❖ is the **control and eradication** of the infection from **animal reservoirs**
- ❖ **which** is based on the combination of the following measures :

### *(a) Test and slaughter :*

- ❖ **Case finding** is done by mass surveys.
- ✓ **Skin tests** are available.
- ✓ The complement fixation test is also recommended.
- ✓ Infected animals are **slaughtered**, with **full compensation** paid to farmers.
- ❖ *This is the only satisfactory solution aimed at eradication of the disease.*



**Vaccination:**

## (b) Vaccination:

- Vaccine of *B. abortus* **strain 19** is commonly used for young animals.
- A **compulsory vaccination** programme for all heifers in a given community
- on a **yearly basis** can considerably **reduce** the rate of infection.
- **Systematic vaccination for a period of 7 to 10 years may eliminate the disease.**
- ❖ Control of the infection caused by *B. melitensis* in **goats and sheep**
- ❖ has to be based mainly **on vaccination**

## (c) Hygienic measures:

- Provision of a **clean sanitary environment** for animals,
  - **Sanitary disposal** of urine and faeces,
  - **Veterinary care** of animals and
- **Health education** of all those who are occupationally involved



## II- In The Humans

### **(a) Early diagnosis and treatment:**

- ❖ In uncomplicated cases the **antibiotic** of choice is **tetracycline**.
- ❖ Adults ,**acute stage**, the dose is **500 mg/ 6 hrs** for **about 3 wks**.
- ❖ In complicated patients, **IM streptomycin 1 g/day** + **tetracycline**

### **(b) Pasteurization or Boiling of milk :**

*Render milk and milk products **safe for consumption**.*

***Boiling of milk is effective when pasteurization is not possible***

### **(c) Protective measures :**

- ❖ prevent direct contact with **infected animals** among persons at risk *such as farmers, shepherds, milkmen, abattoir workers* .
- ❖ Care in handling and disposal of **placenta, discharges** and **foetuses** from an aborted animal.

**clothing** →

- ✓ **Protective clothing** should be wear when handling **carcasses**
- **Exposed areas of the skin should be washed** and soiled clothing renewed.

**(d) Vaccination :**

**Human live vaccine** of *B. abortus strain 19-BA* is available,

- Brucellosis would disappear if it were eradicated from animals.**

Thank You

*Thank You*

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