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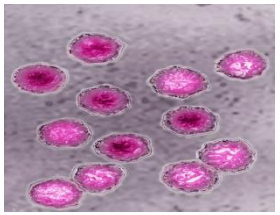
HEPATITIS E



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Viral Hepatitis

~~HAV. HBV, HCV. HDV~~ HEV and HGV

Dec 21 -2021

HEPATITIS E

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HEPATITIS E

- **Water-borne disease, caused by the HEV which was discovered in 1980,**
- **Formerly termed enterically transmitted HNANB**
- HEV infection is **most similar to HA** it **only has an acute state** and is
- **usually a self-limited disease.**
- Like HA, however, **some people may go on to develop**
- **fulminant hepatitis and die from the disease.**
- **Worldwide: WHO estimates that**
- **20 million new HE infections each year**

approximately 44 000 deaths in 2015 (*accounting for 3.3% of the mortality* due to viral hepatitis).

- **it's a serious problem in East and South Asia.**
- Over **60 %of** all HEV infections
- **65 %**of hepatitis deaths occur
- Seroprevalence rate of **25 %.**

in East and South Asia, where **Countries** with limited resources i.e.

- **limited access to essential water,**
- **sanitation, hygiene and**
- **health services are frequently affected.**

❖ Hepatitis E virus

❖ HEV is **RNA virus** with **4 genotypes** (**type 1, 2, 3 & 4**).

❖ HEV is found worldwide and

✓ **Different genotypes of the HEV** determine **differences in epidemiology**

- ✓ **genotype 1** is usually seen in **developing** countries and
- ✓ **Causes community-level outbreaks while**
- ➢ **genotype 3** is usually seen in the **developed** countries, and
- ✓ **does not cause outbreaks.**

Transmission

❑ HEV is transmitted **mainly through the faecal-oral route**, **faecal contamination of drinking water**.

❑ **Other transmission routes have been identified, which include** :

(a) **food-borne transmission**

(b) **transfusion** of infected **blood products**; and

(c) **vertical transmission** from a pregnant woman to her foetus

Incubation period

From **3-8 weeks**, with a **mean of 40 days**.

period of communicability; is unknown

❖ **Deaths: in 2015 ,44,000 people died from HEV infections**

transmission

The virus is via the **fecal-oral route**, principally via contaminated water.

Hepatitis E is found worldwide, but the disease is most common in East and South Asia.

A vaccine to prevent hepatitis E virus infection has been developed and is licensed in China, but is not yet available elsewhere

The virus has at least 4 different types:

genotypes **1, 2, 3 and 4.**

Genotypes 1 and 2 have been found only in humans.

Genotypes 3 and 4 circulate in several animals including pigs, wild boars and deer without causing any disease, and occasionally infect humans.

- Normally, **pregnant women with HEV-1** infection have the **worst outcome** and have been considered the main **target group to receive vaccinations**

The only vaccine that is commercially available is the HEV 239 vaccine (Hecolin, Xiamen Innovax Biotech, China), which has been registered in China since 2011

The **vaccination schedule** in China with HEV 239 vaccine involves **three doses** administered **intramuscularly** at months **0, 1, and 6.**

The vaccine's efficacy is greater **than 90%** for 1 year after **one dose** and for **4.5 years after three doses** .

Additionally, the HEV 239 vaccine is **safe for both pregnant** women and the fetus

- **Passive immunoprophylaxis** has not succeeded in preventing infection, but only the symptoms of hepatitis.

Diagnosis

- clinically **no distinguish HE from** other types of acute viral hepatitis.
- Diagnosis of HE infection is, usually based on **the detection of**
- **specific IgM and IgG** antibodies to the virus in **the blood.**
- Additional tests include **RT-PCR to detect the hepatitis E virus RNA** in **blood and/or stool,** but *this assay may require specialized laboratory facilities*

Symptoms

- **In children**, HEV is frequent & mostly **asymptomatic** or causes a
- **very mild illness without jaundice that goes undiagnose**d.

- Adults aged **15-40 years Symptomatic HEV** is **more common**
- **The typical symptoms** are ***jaundice, loss of appetite, abdominal***
- ***pain ,nausea and vomiting, fever and enlarged and tender liver.***
-

- **In rare cases, acute hepatitis E** can result in **fulminant hepatitis (acute liver failure**) and **death.**

- **Fulminant hepatitis** occurs **more frequently during pregnancy**
- **It can be a very dangerous disease for pregnant women**
- **Pregnant women at greater risk** of **obstetrical complications**
- and **Mortality** from hepatitis which can induce a

- **mortality rate of 20%** among pregnant women in their third trimester.

Treatment

- **Hepatitis E is usually self-limiting.**
- **there is no specific treatment for acute hepatitis.**
- Hospitalization for fulminant cases and in symptomatic pregnant women.
- **Recovery from disease is always complete.**
- **No specific immunoglobulin prophylaxis is available.**

Prevention

Transmission can be reduced by

- Maintaining quality standards for **public water** supplies and establishing
- **proper disposal** systems to eliminate sanitary waste.

- **On an individual level, infection risk can be reduced by** :

(a) maintaining **hygienic practices** such as **hand washing** with safe water, **particularly before handling food**;

(b) avoiding drinking water and/or ice of unknown purity; and

(c) adhering to **WHO safe food practices.**

In 2011, the first vaccine to prevent hepatitis E infection was registered in China, although it is not available globally

HEPATITIS G

- Hepatitis G virus HGV was discovered **in 1996.**
- The prevalence of this infection is still not known
- Most infected persons are asymptomatic.

Transmission

- Blood and sexual contact
- Transplacental, rarely

Risk Groups

- Transfusion and organ transplant recipients
- Injection drug users
- Hemodialysis patients
- Men who have sex with men

- **Incubation period is unknown.**

Testing

- Currently, no serologic test is available.
- PCR tests for HGV are not widely available

Prevention

- No specific measures have been identified

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

Brucellosis

❑ Brucellosis

- ❖ **is one of the major bacterial zoonosis, and in humans** is also
- ❖ **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 and 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, or**
  - **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 ≥ 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

❑ 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**

❑ Agent

- ❑ The agents are small, **gram-negative** rod shaped, **non-motile**,
- ❑ **non spore** &intracellular **coccobacilli** of the **genus *Brucella*.**

❑ **Four species** infect man **:**

I. ***B.melitensis*** **is the most virulent and invasive species;**

- ➢ **it usually infects goats and occasionally sheep.**

II. B.abortus is **less virulent** and is primarily a disease **of cattle**.

III. B.suis is of **intermediate** virulence and chiefly infects **pigs.**

1V. B.canis is a disease of **dogs.**

- **Reservoir of Infection** :
  - **Main reservoirs of human infection**;
    - **cattle, sheep, goats, swine, buffaloes, horses and dogs.**
  - **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 Cº), 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

Qs ???

QS ???