Brucellosis (Malta fever)

Bacteriology

Brucella is Gram ′s negative coccobacillus bacteria ,it is enzootic disease (infect animals and infection transmitted to human from animals) so it is common in countries has large lands of rural areas and harboring animals there are six species of brucella bacteria only four types are pathogenic to human .*Brucella (B.) melitensis* it is the most sever type of infection ,it infect goats ,sheep and camels , *B. abortus* usually infect cattle . *B. suis* usually infect pigs and has tendency for abscess formation . *B. canis* usually infect dogs .

Epidemiology : The disease is common in Iraq and all nearby countries , it is also common in most of Asia especially India and Africa .

Path biology : Brucellosis is intracellular bacteria in the reticuloendothelial system so it has the tendency for chronicity and relapses of infection .Usually it infect animals where it lived in there breast so it discharged with their milk ,it cause bacteremia in the animals lead to seeding of bacteria in genitourinary system , muscles, respiratory system …..etc . Human get infection either through consuming of infected animals product like infected unpasteurized milk and its products (cheese ,yogurt and butter) or under cooked meat or offal .Or human get infection through contact with infected animal discharge like vaginal secretions ,stool ,urine it infect human through skin abrasions , respiratory system through aerosol or through conjunctiva . Bacteria taken by phagocyte cells where it resist lyses of bacteria and multiply inside the cells in the reticuloendothelial system and it cause infection locally and systemically through phagocyte cell transmission through blood and lymphatic system so any organ in the body may be infected and cause non caseating granuloma .

Clinical features

Brucellosis presented as acute ,sub acute ,chronic and focal presentation . It is systemic disease can affect any organ but has more tendency for locomotors system .The patients complains of undulant fever, joint and muscle pain ,headache ,drenching sweating ,depression and constipation . There may be enlarged lymphadenopathy or splenomegally and may develop hypersplenism . Brucellosis has tendency for chronicity and relapses even after treatment of the disease . Localized infection occur in 30% of conditions appear clearly if diagnosis and treatment delayed and these include :

A- muscloskeletal system : Arthritis like sacroiliatis and or peripheral oligoarthritis, spondylitis ,synovitis or tendinitis .
B- central nervous system : Brucella meningitis ,neuritis ,mylopathy .

C- Cardiovascular system : Endocarditis , carditis ,oartitis .
D- Ocular : Conjunctivitis ,uveitis and retinal thrombophlibitis .
E- Genitourinary system : epididmitis ,orchitis and epididimorchitis .
F- Grnulomatous hepatitis .
G- Bone –marrow involvement .

Investigations :

1- Cultures : By blood for culture prove the presence of bacteria but it take long time and carry risk of infection to health care worker so we rarely use it . Bone marrow culture only used in difficult complicated cases . CSF culture is positive in 30% of neurobrucellosis .
2- Serological tests :
   a- Rose –Bengle test : Slide method antigen –antibody test (slide agglutination test) to detect infection of brucellosis it need several weeks to became positive , it consider positive in endemic area when titer 1|320 or four fold rise in titer . This test usually remain positive after cure of infection for many years so it is called false positive test .
   In some cases false negative test appear need frequent dilution of the test it may reach 1| 640 till it became positive this is called prozen phenomena , this due to non agglutinating IgG or IgM block the agglutinating reaction overcome by dilution .
   b- Mercaptoethanol test :Is used to differentiated between new infection from past infection or relapse of infection after treatment these depend on IgM and IgG study .
   c- Standard tube agglutination test : Is more sensitive for diagnosis .
3- Polymerase chain reaction (PCR) test : To detect the DNA of brucellosis .

Treatment

Three antibiotics are used mainly for treatment of brucellosis : Doxycycline capsule ,Rifampicine and Aminoglycosides (streptomycine or Gentamycine).

Brucellosis has tendency for relapse after stopping antibiotics so better to use combination of treatment better than single drugs to reduce the rate of relapse of infection . Duration of treatment depend on organ infected if it is first attack or recurrent attack .

1- Adults with non localized disease : We use Doxycycline capsule 100 mg twice daily for 6 weeks plus Gentamycine 5mg |kg Iv. once daily for 7 days . Or another regimen used as doxycycline 100 mg twice daily for 6 weeks plus Rifampicine 600 -900 mg daily for 6 weeks ,in this regimen relapse rate is mild but if Streptomycin vial IM . for 2 weeks is added the relapse rate is very low .
2- Bone disease brucellosis : We use Doxycycline capsule 100 mg twice daily plus Rifampicine 600 -900 mg daily plus Gentamycine 5mg |kg Iv once daily for 7 days . OR ciprofloxacine tablets 750 mg twice daily plus rifampicine 600 -700 mg daily for 3 months .

3- Neurobrucellosis : Doxycycline capsule 100 mg twice daily for 6 weeks plus Rifampicine 600 -900 mg daily for 6 weeks plus ceftriaxone vial 2gm IV. twice daily till CSF is clear .
4- Endocarditis : Almost always need surgical treatment with Doxycycline capsule 100 mg twice daily for plus Rifampicine 600 -900 mg daily for plus co-trimoxazole 5mg |kg for 6 months , plus gentamycine 5mg |kg IV once daily for 2-4 weeks .
5- Pregnancy : Rifampicine 600 -900 mg daily plus co-trimoxazole 5mg |kg for 4 weeks care of last month of pregnancy because displacement of bilirubin from albumin which pass placental barrier lead to kernicterus of the fetus .

Prevention

Brucellosis is common disease and endemic in our country so prevention is important which constitutes of two parts by protection of animals to protect human by vaccination of cattle by veternian doctors treatment of animal is difficult . Human must be educated about disease and good boiling of the milk to kill brucella bacteria through pasteurization of milk . good cooking of meat .Avoid contact with infecting animals .

ANTHRAX

It is Gram ′s positive spore forming bacteria (*Bacillus anthracis*) . Mode of transmission is zoon tic from animals herbivores to human, B. anthrcis secrete many toxins responsible for their clinical features .Anthrax enter in bioterrorism .

Clinical features

1- Cutaneous Anthrax : When human skin exposed to *B. anthracis* spores through their work with animals like hide spore in bones it lead to single lesion of irritable papule with oedematous hemorrhagic base rapidly progress to depressed black Eschar in the center with mild pain . Skin smear with Gram′ s stain can diagnosed .

2- Gastrointestinal anthrax : Following ingestion of contaminated meat with anthrax spores not well cooked ,the site of infection usually the caecum the patient develop nausea and vomiting followed by bloody diarrhea and abdominal pain ,if toxemia occur there is risk of death . Diagnosed by stool culture and sensitivity test or anti-anthrax antibody or anthrax toxin antibody in the blood .

3- Inhalation anthrax : When human inhale spores or by bioterrorism lead to respiratory anthrax which is fatal in 50 -90 % if no aggressive treatment at the onset of infection ,the patient has fever cough , dyspnoea ,and headache may be due to meningitis and septicaemia will occur after 3-14 days of exposure ,chest x-ray showed wide mediastinum with pleural effusion which is hemorrhagic at pleural aspiration . Diagnosed by culture and sensitivity test or anti-anthrax antibody or anthrax toxin antibody in the blood .

Management

Treated by benzyl penicillin 2.4 gm iv. 4 hourly or phenoxy methyl penicillin 500 - 1000 mg iv. 6 hourly if sever infection aminoglycosies is added to infection . Ciprofloxacin is another good choice where in respiratory anthrax ciprofloxacin 500 mg is given for 2 months or doxycycline capsules 100 mg 12 hourly is added .

Prophylaxis : Ciprofloxacin 500 mg 12 hourly when exposed to anthrax spores .