

Tick-Borne Diseases

Disease	Description	Clinical Features	Diagnosis & Treatment
Malaria	<ul style="list-style-type: none"> - Is a protozoal disease caused by the genus plasmodium, (which is a RBC parasite) . - Transmitted by tick bite of infected: anopheles mosquitoes. - You have 4 species: <ul style="list-style-type: none"> • Falciparum: Most deaths are due to falciparum • vivax, ovale: are responsible for several relapse. • malariae. <p style="text-align: center;">↓</p> <p style="text-align: center;">Add a 2-week regimen of : Primaquine</p>	<ul style="list-style-type: none"> - Hallmark is cyclical fever (which it coincides with RBC lyses by parasites) Fever patter : <ul style="list-style-type: none"> • Fever occurs every 48 hours with vivax & ovale. • every 72 hours with malariae, • Periodicity is NOT seen with falciparum (constant fever) - The typical episode consists of 3 stages : <ol style="list-style-type: none"> 1- Cold stage: chills & shivering → followed by 2- Hot stage: high grade fever → 2-6 hours later 3- Sweating stage: diaphoresis & resolution of the fever. <p style="text-align: right;">Contraindicated in Seizures & Psych.</p> <p style="text-align: center;">Contraindicated in patients with G6PD deficiency</p>	<ul style="list-style-type: none"> • Dx is made from : Giemsa-stained peripheral blood smear TTT: A) Treatment: <ul style="list-style-type: none"> - Chloroquine (safe in pregnancy) → If chloroquine resistance : a- Quinine & Tetracycline or (<i>P. falciparum</i> → IV Quinine & Doxycycline) b- Mefloquine & Atovaquone-proguanil <small># in Pregnancy & CRD</small> B) Prophylaxis : to all travels to malarious regions <ul style="list-style-type: none"> 1- Mefloquine : is the DOC for chemoprophylaxis against chloroquine-resistant malaria. - Started 1 week before travel → continued until 4 weeks after departure from an endemic area. 2- Primaquine (both for prophylaxis & ttt) is indicated against: p. vivax or p. ovale, (which can cause persistence in the liver).
Babesiosis <small>Clinically significant illness usually occurs in people: 1-Over age 40, pts 2-Without a spleen, or 3-Immunocompromised.</small>	<ul style="list-style-type: none"> - Is a protozoal disease caused by the genus babesia . - Transmitted by tick bite of infected: ixodes tick , in endemic area: <i>Etiology: B. microti in the northern & midwestern of US.</i> 	<ul style="list-style-type: none"> - Parasite enters the patient's RBC and causes hemolysis. - Clinical manifestations vary from : <ul style="list-style-type: none"> • Asymptomatic infection to • Hemolytic anemia associated with: jaundice, hemoglobinuria, renal failure, and death. → Unlike other tick-borne illnesses, rash is NOT a feature of babesiosis, except in severe infection where thrombocytopenia may cause a secondary petechial or purpuric rash. 	<ul style="list-style-type: none"> • Definitive dx is made from : Giemsa-stained thick & thin blood smear. TTT: <ol style="list-style-type: none"> 1- Quinine-Clindamycin or 2- Atovaquone-Azithromycin.
Lyme disease	<ul style="list-style-type: none"> - Is a tick-borne illness caused by the spirochete Borrelia Burgdorferi . - Transmitted by tick bite of infected: ixodes scapularis - History of: Outdoor activities (e.g., hiking, camping). 	<ol style="list-style-type: none"> 1-Early localized stage: <ul style="list-style-type: none"> - Skin: erythema chronicum migrans (Bull's eye) at site of tick 2-Early disseminated stage: (days to weeks to months after skin rash) <ul style="list-style-type: none"> - Fever + Chills, fatigue, arthralgias, headache - Neuro: -- Bell palsy (Cranial neuritis) -- sensory-motor neuropathies -- Aseptic meningitis (Brudzinski & Kernig signs negative). -- Encephalitis - Cardiac: AV block / Myocarditis / Pericarditis 3-Late disseminated stage: (few months to years later) : <ul style="list-style-type: none"> - Joint: Monoarthritis(Large especially knee) / chronic synovitis - Neuro: Encephalitis / Transverse myelitis 	<ul style="list-style-type: none"> • Dignosis clinical / +ve (ELISA) & Western Blot tests for antibodies. TTT: - Early Lyme Disease (Rash / Joint / Bell's palsy) : <ul style="list-style-type: none"> 1- Doxycycline (Oral) for 21 days → Contraindicated in: Pregnant / Child <8 y → Amoxicillin <i>Allergy: Erythromycin</i> 2- Amoxicillin / Cefuroxime - For Cardiac & CNS (other than Bell's palsy) : Ceftriaxone (IV)
Rocky mountain spotted fever <small>- The most serious tick-borne disease in the US</small>	<ul style="list-style-type: none"> - Is a tick-borne illness caused by the intracellular bacteria Rickettsia Rickettsii - Transmitted by tick bite of ticks feeding on animals - History of: Outdoor activities <p><i>Organisms enter the host cells via tick bites → multiply in the vascular endothelium → Damage to the vascular endothelium results in : microhemorrhages, and microinfarcts.</i></p>	<p style="text-align: center;">Typically 1 week after the tick bite.</p> <p>In the first 3 days: Indistinguishable from a self-limiting viral illness FAHM: Fever, Anorexia, Headache, Myalgias / Nausea, vomiting</p> <p>After 3 days of fever → Rash :</p> <ol style="list-style-type: none"> 1- Maculopapular rash: Starts peripherally (palms & soles) → Spread centrally (limbs/trunk/face) 2- then petechiae: Micro vascular damage as disease progress : - Petechiae + Hypotension & Non-cardiogenic pulmonary edema 	<ul style="list-style-type: none"> • Dx requires a high index of clinical suspicion TTT: <i>ABC's should always come first when treating any pt. check vitals to make sure that the pt is stable.</i> - If signs of shock (hypotensive) : The best NEXT best step is: IV fluids to replete intravascular volume. - After he is stable: DOC : Doxycycline (Oral/IV) for both adults & children. - In pregnant: Chloramphenicol
Ehrlichiosis	<ul style="list-style-type: none"> - Is a tick-borne illness caused by one of 3 different intracellular gram -ve bacteria , genus Ehrlichia - Transmitted by tick bite. <p>It infects and kills WBCs → show intracellular inclusions (morulae)</p> 	<p style="text-align: center;">Incubation period varies from 1 to 3 weeks.</p> <p>FAHM No Rash → its description as : "spotless rocky mountain spotted fever."</p> <p>Complications: Renal Failure / GIT bleeding</p> <p>LABS: ↓ leucopenia / thrombocytopenia ↑ aminotransferases.</p>	<ul style="list-style-type: none"> • Dx : Confirm by serology TTT: - Doxycycline (for 1 week)
Cestode			
Cysticercosis <small>NCC is the most common parasitic infection of brain</small>	<ul style="list-style-type: none"> - Is a parasitic disease caused by larval stage of the pork tapeworm: Taenia solium <p>Normal Life cycle of Taenia Solium:</p> <ul style="list-style-type: none"> * Definitive Host: Humans (only) * Intermediate host: pig * Infective stage: larva * Mode of infection: humans eat larvae in meat such as infected, undercooked pork. * Habitat: adult in upper jejunum → excretes its eggs into feces <i>If a pig consumes these eggs, it becomes an intermediate host, with larvae encysting in its tissues.</i> 	<p>If a person (rather than a pig "intermediate host") consumes the T. solium eggs excreted in human feces → Cysticercosis results.</p> <ul style="list-style-type: none"> - After ingestion, the embryos are released in the intestine → larvae invade the intestinal wall → disseminate hematogenously to encyst in: <ol style="list-style-type: none"> 1- Brain: Neurocysticercosis <ul style="list-style-type: none"> -- multiple, small (usually <1cm) , fluid-filled cysts in the brain parenchyma and have a membranous wall -- On neuroimaging: invaginated scolex 2- Skeletal muscle 3- Subcutaneous tissue 4- Eye 	<p>TTT:</p> <p>Treatment of Neurocysticercosis : Albendazole</p>
Echinococcosis <small>Hydatid cyst is a fluid filled cyst with an inner germinal layer and an outer acellular laminated membrane</small>	<ul style="list-style-type: none"> - Echinococcus tape worm has two main species: <ol style="list-style-type: none"> 1- E. Granulosus → causes: cystic echinococcosis (CE) 2- E. multilocularis → causes: alveolar echinococcosis (AE) <p>Normal Life cycle of E. Granulosus:</p> <ul style="list-style-type: none"> * Definitive Host: Dogs (& other canines) * Intermediate host: Cattle / Sheep * Infective stage: Embryonated Eggs in feces. * Mode of infection: Eating food contaminated with egg. * Habitat: Small intestine 	<p>If a human (rather than sheep) consumes infectious eggs excreted by dogs in the feces → Echinococcosis results.</p> <ul style="list-style-type: none"> - After ingestion, the oncospheres are hatched in the intestine → penetrate the bowel wall → disseminate hematogenously to various visceral organs → Formation Hydatid Cyst, mostly in : <ol style="list-style-type: none"> 1- Liver : RUQ pain, rupture to peritoneal cavity → anaphylaxis 2- Lung: cough / chest pain / dyspnea / hemoptosis → Germinal layer gives rise to numerous secondary daughter cysts. 	<ul style="list-style-type: none"> • Both be diagnosed with a combination of imaging and serology • In the absence of a positive serologic test: percutaneous aspiration or biopsy (may be required to confirm the diagnosis). TTT: <ol style="list-style-type: none"> 1- Surgical resection as in liver cysts. 2- Percutaneous management 3- Medical: Albendazole: 1 week prior to surgery/ 4 weeks postoperatively
Nematode			
Trichinosis (trichinellosis)	<ul style="list-style-type: none"> - It is caused by the roundworm trichinella spiralis - It is acquired by eating undercooked pork that contains encysted trichinella larva <p>Triad :</p> <ol style="list-style-type: none"> 1- Muscle pain (myositis) 2- Periorbital edema 3- Eosinophilia after eating raw meat = <i>Trichinella spiralis</i> (trichinosis) 	<p style="text-align: center;">3 phases + Eosinophilia.</p> <ul style="list-style-type: none"> • Initial phase: in 1st week → larvae invade the intestinal wall. GIT symptoms: abdominal pain, nausea, vomiting, diarrhea. • 2nd phase: in 2nd week of infection → larval migration : Local & Systemic hypersensitivity reaction Nail: "splinter" hemorrhages, Eye: conjunctival & retinal hemorrhages/per orbital edema/chemosis. • 3rd phase: larvae enter the pt's skeletal muscle: Muscle symptoms: muscle pain, tenderness, swelling, weakness. 	<ul style="list-style-type: none"> • Dx: Triad clinical symptoms confirmed by serology. TTT: 1- mild infection : No Antiparasitics Symptomatic treatment with analgesia & Antipyretics 2- In Systemic Symptoms : <ul style="list-style-type: none"> - Albendazole / Mebendazole - together with corticosteroids
Ascariasis	<ul style="list-style-type: none"> - It is caused by the roundworm Ascaris Lumbricoides - It is acquired by eating food that contains Embryonated egg (containing 2nd stage rhabditiform larva) <p>Notes : Ascariasis can also present with GIT symptoms + eosinophilia</p>	<p>Ascariasis often presents as :</p> <ol style="list-style-type: none"> 1- Lung phase with non productive cough → followed by : 2- Asymptomatic intestinal phase <p>Symptoms result from obstruction caused by the organisms, as: small bowel or biliary obstruction.</p>	<ul style="list-style-type: none"> • Dx : Egg seen in stool examination. TTT: 1- First line: Albendazole / Mebendazole → Contraindicated in: Pregnant → Pyrantel Pamoate 2- Alternative: Ivermectin / Nitazoxanide
Enterobiasis	<ul style="list-style-type: none"> - It is caused by the pinworm Enterobius Vermicularis. - Adult parasite thrives in the Cecum / appendix. 	<p>At night, females migrate out through the rectum onto the perianal skin to deposit eggs → Nocturnal Perianal Pruritis.</p>	<ul style="list-style-type: none"> • Dx is by the "scotch tape test" → demonstrates presence of eggs. • TTT: Albendazole or Mebendazole
Cutaneous larva migrans (creeping eruption)	<ul style="list-style-type: none"> - It is caused by dog & cat hookworm ancylostoma braziliense. - It's acquired after skin contact with soil/sand contaminated with dog or cat feces containing the infective larvae <p>Notes : Most common seen in the LE / but the UE can also be involved.</p>	<ul style="list-style-type: none"> - Initially : multiple pruritic, erythematous papules at the site of larval entry - Followed by: Migration Severely pruritic, elevated, serpiginous, reddish brown lesions on the skin, which elongate at the rate of several millimeters per day as the larvae migrate in the epidermis. 	<ul style="list-style-type: none"> • Dx is clinical in cutaneous disease/ & pulmonary disease : dry cough TTT: 1- Preferred : Ivermectin 2- Alternative: Albendazole No Antiparasites in Pulmonary disease since illness is mild & self-limited

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