

Infectious diseases

Bissan Abo Halaqa

brucellosis

- Gram negative, facultative, intracellular coccobacilli
- Transmitted from animals to humans (unpasteurized dairy products OR direct contact)
- No vaccine for humans only animals
- Tx: adult: rifampin + doxycycline (6 weeks)
- Children: rifampin + TMP-SMX (6 weeks)
- Antibiotic Tx for weeks, multidrug! (risk of prolapse)
- Children <8 years: **X doxycycline?** Tooth discoloration + affects bone growth
- Most virulent and pathogenic is **brucella melitensis**
- Most common focal complication is osteoarticular infections (bone/joint pain) = sacroiliitis
- MCC of death: endocarditis
- More common in males (occupational risk factors: farmers, vets)

Brucellosis

- B. canis: dogs
- B. melitensis: sheep + goats
- B. **melitensis**: most common + most serious in humans
- B. suis: swine
- B. suis: osteomyelitis, arthritis

Needle stick injury

- Rule of 3:
 1. HIV transmission chance: 0.3%
 2. HCV transmission chance: 3%
 3. HBV transmission chance: 30%
 - Immediate action after NSI:
 1. Wash your hands with water and soap
 2. Don't squeeze wound
 3. Don't use antiseptic directly on wound
 - NSI with Hep B (not vaccinated individual): give vaccine + Hep B immunoglobulins
- النسبة على عكس ترتيب الـ alphabet!

Vancomycin side effects

VANCOMYCIN SIDE EFFECTS

FONT

F-FLUSHING

(RED MAN SYNDROME)

Flushing, rash, pruritis (upper body + face)

O-OTOTOXICITY

N-NEPHROTOXICITY

Vancomycin + amino glycosides (gentamicin, amikacin) = nephrotoxicity

T-THROMBOPHELIBTIS

- Less common side effects: **HIND**
 1. Hypersensitivity reaction: rash, fever, eosinophilia
 2. Interstitial nephritis
 3. Neutropenia
 4. Drug fever

HIV

- Peak age in Jordan: 25-35
- Mother to child transmission: 25%
- Diagnoses:
 1. PCR viral load (7-10 days)
 2. ELISA
 3. Western blot

HIV defining illness:

1. Candidiasis (**NOT** oral)
2. Cryptococcus
3. Coccidioidomycosis
4. Cryptosporidiosis
5. CMV
6. Cervical cancer
7. Encephalopathy
8. HSV
9. Histoplasmosis
10. Isosporiasis
10. Kaposi sarcoma
11. Lymphoma
12. MAC
13. PML
14. PCP
15. Recurrent pneumonia
16. Salmonellosis
17. TB
18. Toxoplasmosis (brain)
19. Wasting

HIV Tx

- Antiretroviral therapy (ART) should be initiated **immediately** in HIV-positive individuals

بعض النظر عن:

1. Viral load
2. Pregnancy
3. CD4 count
4. Symptoms

مجرد ما شخصته عطول ببلش علاج

Norovirus

- Non-enveloped, ssRNA, caliciviridae family
- Acute gastroenteritis (all ages, worldwide): **Leading cause**
- Transmission: Feco-oral (contaminated food, water, surfaces)
- Highly contagious (10 virus particles can cause infx)
- Outbreaks: schools, nursing homes, cruise ships, families
- Incubation period 12-48 hrs
- Symptoms: sudden onset: abd. cramps, vomiting, **watery** diarrhea
- Low grade fever, malaise ممكن مش دائماً
- Self-limited: 1-3 days بس
- Dx:
 1. clinical: symptoms + outbreak pattern
 2. RT-PCR: stool (**most sensitive** + outbreak surveillance)
- Tx. Supportive: oral rehydration

Diarrhea

- Mcc of adult acute gastroenteritis: **Norovirus**
- Infants and young children: rotavirus

- Bloody diarrhea:
 1. Shigella
 2. Salmonella (travelers)
 3. Campylobacter

- Watery diarrhea:
 1. Norovirus
 2. Cholera (rice-water stool)

Pathogens + host

- Chlamydia: birds (parrots) = psittacosis
- Salmonella enteritidis: chicken
- Pasturella: cats
- Cryptococcus neoformans: pigeons
- Brucella canis: dogs
- Viruses (rabies, nipah, coronavirus) : bats

Pathogen + infx.

- GBS: neonatal infx, UTI in adults
- GAS: follicular tonsillitis
- Staph aureus: skin + soft tissue infx.
- S pneumonia: pneumonia + sinusitis
- Viridans streptococcus: normal oral flora, subacute endocarditis, dental infx.

Pathogens + isolation

- TB: airborne isolation (transmission: airborne droplets)
- MRSA: **contact** isolation
- Measles: airborne isolation
- Influenza: droplet precautions

COVID

- PCR testing: nasopharyngeal swab (**most sensitive**)

TB

- Doesn't stain with Gram stain due to lipid rich cell wall (mycolic acid)

يعني لا هي gram negative ولا gram positive

Acid fast bacilli: ziehl neelsen stain

- Intracellular
- Prolonged Tx course: >6 months
- Symptoms: productive cough + hemoptysis + weight loss + night sweats
- X-ray: right upper lobe cavity
- Laryngeal + cavitating pulmonary TB : most infectious (inhaled droplets with coughing, sneezing, spaking)

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Purified protein derivative (PPD) test for latent TB:

Induration Size	Positive Result Criteria
≥5 mm	<ul style="list-style-type: none">- HIV-positive- Recent TB contacts- Fibrotic changes on chest X-ray (consistent with TB)- Immunosuppressed patients (Long term corticosteroids, transplant)
≥10 mm	<ul style="list-style-type: none">- Recent immigrants (high prevalence countries)- IV drug users- High-risk settings (e.g., prisons, healthcare)- Children <4 years
≥15 mm	<ul style="list-style-type: none">- Individuals with no known risk factors

TB management

- Sputum: early morning + 3 days (occasions):
 - hospital: every 8 hours
 - Children: early morning gastric aspirate
- Bronchoscopy + Bx + bronchial washing
- bone marrow bx
- Liver bx
- Blood culture
- PCR on smear
- Hiv on X-ray

TB diagnosis

- **Active** TB: 3 sputum samples
- Latent TB: tuberculin skin test

worms

- *Ascaris lumbricoides*= roundworm: large (up to 30-40cm), smooth, brown, passed from anus
- *Trichuris trichuria*= whipworm: short (4-5cm), thin, whip-like, not passed through anus typically
- *Ankylostoma duodenale*= hookworm: small (1-2cm), live in small intestine, not visible if passed through anus (كميتهم صغيرة)
- *Necator americanus*= hookworm: small (1-2cm)
- *Enterobius vermicularis*= pinworm: very small (1cm), severe itching around anus at night

Ascaris lumbricoides

- Roundworm
- Large (up to 30-40cm), smooth, brown
- Passed from anus
- Eggs detected in stool
- Most common helminth worldwide
- Intestinal symptoms: abd. Pain, nausea, malnutrition (severe)
- Loeffler syndrome (larvae in lungs) -> eosinophilic pneumonitis: cough + wheezing + eosinophilia

Enterobius vermicularis

- Pinworm
- Very small (1cm)
- Severe itching around anus at night
- Children (mainly)
- Invisible eggs in stool

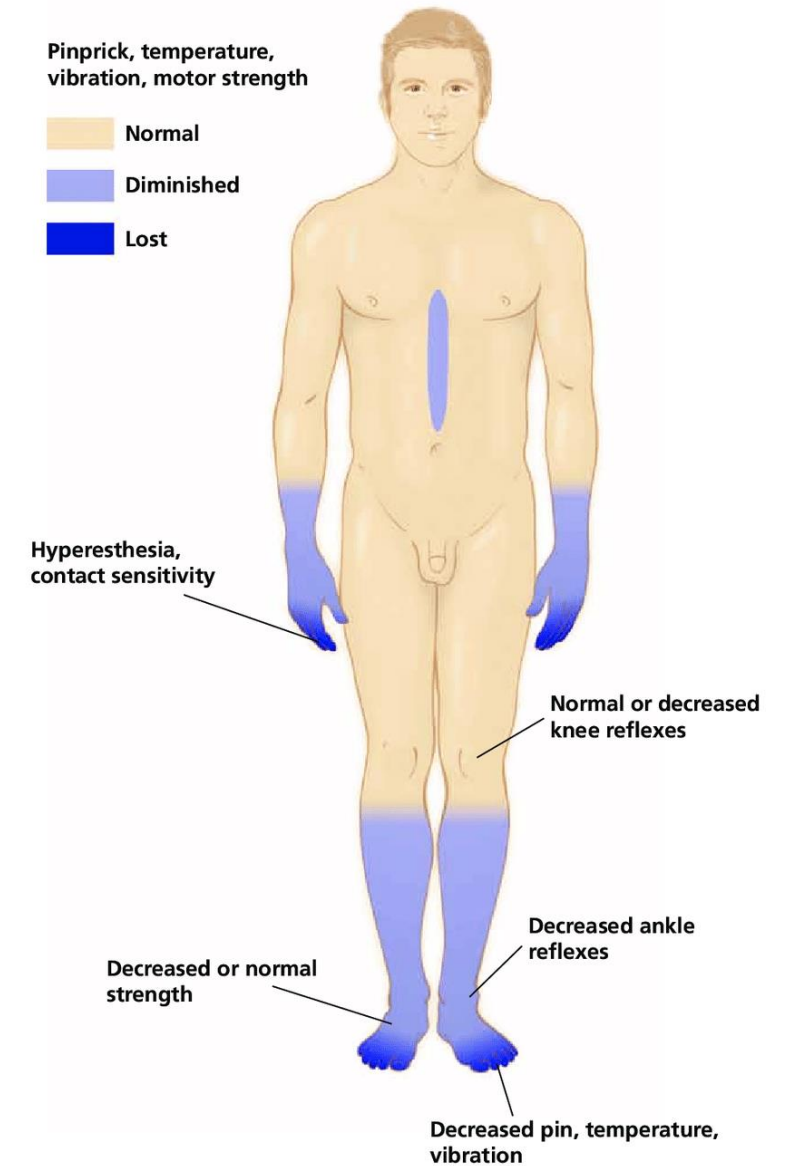
G6PD deficiency

- Hemolytic reactions triggers:

1. **Dapsone** antibiotic
2. Nitrofurantoin
3. TMP-SMZ

Sepsis

- Associated with:
 1. Dysesthesias in gloves-and-stockings distribution
 2. Abscent or reduced reflexes
 3. ARDS
 4. Hypotension
 5. Metabolic acidosis
 6. Hypothermia: poor prognostic factor



Influenza vaccine


- Annual
- Contraindicated in Guillian-Barre syndrome patients
- Composed of 3 strains = 2 influenza A + 1 influenza B
- Types: IM (inactivated intra-muscular) and LAIV (live attenuated)
- Inactivated is **safe** in:
 1. Pregnancy
 2. Immuno-compromised patients
 3. Bone marrow transplant patients
- Live attenuated is **contraindicated** in:
 1. Pregnancy
 2. Immuno-compromised patients
 3. Bone marrow transplant patients

Drugs + common side effects

- Clindamycin: GI symptoms + pseudomembranous colitis (c. difficile associated diarrhea) + rash (pruritis) + elevated liver enzymes
- Levofloxacin: GI symptoms + **arthropathy** (joint, tendon, cartilage) + photosensitivity + CNS symptoms + QT elongation (arrhythmias)
- Amoxicillin: rash + GI symptoms + hypersensitivity reaction (anaphylaxis) + yeast infx (oral/vaginal)
- Metronidazole: **metallic taste** + GI symptoms + dark urine + peripheral neuropathy (long-term use) + **headache** + **disulfiram-like reaction** (w. alcohol)
- Azithromycin: GI symptoms + QT elongation (arrhythmias) + hepatotoxicity + rash

- Pseudomonas aeruginosa: external ear pain + discharge

Antipseudomonal antibiotics



Antipseudomonal Antibiotics

@dr.fathimashameen

Penicillin-BLI	Piperacillin tazobactam 4.5g IV q6h Ticarcillin clavulanate 3.1g IV q4h
Monobactams	Aztreonam 2g IV q8h
Fluoroquinolones	Ciprofloxacin 400mg IV q8-12h Levofloxacin 750 mg IV OD
Carbapenems	Meropenem 1g IV q8h Doripenem 500 mg IV q8h Imipenem 500mg IV q6h
Aminoglycosides	Tobramycin Gentamicin Amikacin

Cephalosporins

- Ceftazidime 2g IV q8h
- Cefepime 2g IV q8 or 12h
- Cefoperazone 2g IV q12h

Polymyxins

- Colisitrn
- Polymyxin B

Advanced BLI combo

- Ceftazidime avibactam 2.5g IV q8h
- Ceftolozane tazobactam 1.5-3g V q8h
- Imipenem cilastatin -relebactam 1.25g IV q6h

Source - UpToDate

Immune deficient person and vaccines:

Safe:

- inactivated

1. Influenza (injectable)
2. Hep A
3. Hep B
4. Pneumococcal (conjugate and polysaccharide)
5. Meningococcal
6. Tetanus, diphtheria and pertussis
7. HPV vaccine
8. Polio vaccine
9. Rabies vaccine
10. Typhoid vaccine
11. Cholera vaccine
12. COVID-19 vaccine

- Recombinant:

1. shingles

contraindicated:

- Live attenuated

1. MMR (mumps, measles, rubella)
2. Varicella (chicken pox)
3. Yellow fever
4. Oral polio
5. Rotavirus
6. Live attenuated influenza vaccine
7. Live attenuated typhoid vaccine
8. BCG (for TB)

Same applies to pregnancy

*السؤال: أي دوا بقدر أعطيه لحدا
Immunodeficient, pregnant
أو أي دوا فيه
Live attenuated pathogen

Clostridium difficile

- Gram positive bacilli, anaerobic, spore forming
- MCC of hospital acquired diarrhea
- Positive in healthy people
- DX:

1. **Stool** toxin test: toxin A and B
2. Glutamate dehydrogenase (GDH) antigen test
3. PCR (NAAT) for toxin genes in stool

(X serology)

- Tx: **metronidazole** (drug of choice)
- High risk Abx: clindamycin, cephalosporin, fluoroquinolone
- Pathogenesis: **Toxin A and B production** (inflammation + cell death in colon)
- Recurrence: up to 20%
- Toxic megacolon
- Pseudomembranous colitis

C difficile risk factors

Antibiotic exposure

Older age (65 or older)

Prior, lengthy hospitalization or long-term care facility exposure

Comorbidities: malignancy, cystic fibrosis, inflammatory bowel disease, diabetes mellitus, cirrhosis, chronic kidney disease, immunodeficiency, solid organ or hematopoietic stem cell transplantation

Other medication exposure: chemotherapy, immunosuppressants, proton pump inhibitors

Prior gastrointestinal surgery

Consumption of processed meats

Presence of gastrostomy or jejunostomy tube

Adapted from refs. 1, 17, and 34.

H1N1 influenza A strain

- Prophylactic antibiotic
- Diagnosis confirmed: nasopharyngeal swab PCR
- Oseltamivir:
 1. Administered in case <48 hrs exposure
 2. Administration to household contacts
- Symptoms: cough, SOB, weakness

Bacterial pathogens that complicate influenza (H1N1)

- Streptococcus pneumonia (most common)
- Staph aureus (including MRSA)
- Haemophilis influenza

Hyper IgE syndrome = Job syndrome

- Very high IgE levels
- Recurrent cold staph abscesses (x warm, x red)
- Eczema-like skin rash
- Recurrent lung infix. = recurrent pneumonia -> pneumatocele
- Facial feature: coarse facial, retained primary teeth
- STAT3 mutation (autosomal dominant)
- Key issue: defective chemotaxis (esp. neutrophils)? Impaired IL-17 signaling + impaired Th17 cell funx

ESBL (extended spectrum beta lactamase) bacteria

- Resistant to 3rd generation cephalosporin (ceftriaxone, ceftazidime, ceftaxime)
- E. coli species
- Klebsiella species
- Plasma-mediated: resistance to other bacteria

Schistosoma

- *S. haematobium* = bladder cancer
- *S. mansoni* = liver cirrhosis + portal HTN
- *S. japonicum* = liver disease + intestinal disease

Syphilis tests

- Biopsy (**most definitive diagnostic** tool)
- Rapid Plasma Reagin (RPR): screening not diagnostic
- Venereal Disease Research Laboratory (VDRL): screening not diagnostic

Endocarditis causes

- Staph. aureus: mcc of **acute** endocarditis
- Strep. viridans: mcc of **subacute** endocarditis (**dental** procedures)
- Staph. epidermidis: chronic / indolent endocarditis (prosthetic valve patients, indwelling cath patients)
- E. faecalis: subacute endocarditis + prosthetic valve infx

HAV

- Viral shed in feces during incubation period **before** symptoms onset
- Incubation period 2-6 weeks
- Acute, self limited
- Hepatomegaly
- Jaundice
- Elevated liver enzymes
- Vaccine **safe** in pregnancy

Active HCV

- HCV antibody positive = HCV exposure
- PCR for viral load = confirm diagnosis

Unpasteurized milk pathogens

1. *Mycobacterium bovis*
2. *Brucella* species
3. *Listeria monocytogenes*
4. *Salmonella*
5. *Campylobacter jejuni*
6. *E. coli* O157:H7

Primary (congenital) immunodeficiency disorders

Category	Affected System
1. Humoral (B-cell)	Antibody production
2. Cellular (T-cell)	Cell-mediated immunity
3. Combined (B + T)	Both humoral and cellular
4. Phagocytic	Neutrophils, macrophages
5. Complement	Complement proteins

Disorder	Key Features
X-linked agammaglobulinemia (Bruton's)	failure of B cell maturation, absent IgG/IgA/IgM, recurrent sinopulmonary infections
Selective IgA deficiency	Most common primary immunodeficiency; often asymptomatic but may have GI infections, allergies, autoimmune disease
Common Variable Immunodeficiency (CVID)	Low IgG + either low IgA or IgM; adult onset; recurrent infections (not in childhood بس يكبر), risk of autoimmunity and lymphoma
Hyper-IgM syndrome	Defective class switching (; high IgM, low IgG/A/E; recurrent encapsulated bacterial infections

UTI involving cysts

- Autosomal dominant polycystic kidney disease (ADPKD)
- Multiple fluid filled cysts in kidneys
- Infected cyst -> pyelonephritis like symptoms
- Gram negative pathogen: **E. Coli** (mcc)
- Tx: **Ciprofloxacin**

Tinea

- Tinea **solium**:
 1. Found in **pork**
 2. Larvae infects muscle tissue, brain tissue => **cysticercosis**

Rubella

- 90% congenital rubella: mother infected in 1st trimester

Chronic meningitis

- CSF findings:

1. Low glucose
2. High protein
3. Lymphocytes

- Causes:

1. TB
2. Fungal infx.
3. Neoplastic conditions
4. Inflammatory conditions: **sarcoidosis**

Note: HSV= encephalitis **NOT** meningitis

Meningitis

- MCC of viral: **enteroviruses**: Coxsackie, Echo => children + young adults

Viral encephalitis

- HSV (mcc)
- CMV
- VZV
- EBV
- West Nile Virus

MCC viral encephalitis: HSV
MCC viral meningitis: enterovirus

Chylothorax

- Lymphatic fluid accumulation (chyle) in pleuritic cavity due to thoracic duct damage
- Triglycerides (TG) >110
- Cholesterol <200
- exudative

Common cold

- Viral infx
- Self limited
- Management: symptom relief:
 1. Decongestants
 2. NSAIDs
 3. Hydration

ما بعطي مضاد حيوي!!

CIPROFLOXACIN (CONT.)

Side effects

Nausea , vomiting & diarrhoea

CNS effects – confusion, insomnia, headache, dizziness & anxiety.

May damage growing cartilage

Tendinitis (rare but more serious)

Hepatotoxicity – rare

Phototoxicity – avoid excessive sunlight

Amoeba histolytica

- Tx: metronidazole (مش لحاله) + luminal
- Elevated alkaline phosphatase = liver abscess
- Blood = colon ulcers

Systemic Inflammatory Response Syndrome

Temperature $>38.3^{\circ}\text{C}$, or $<36^{\circ}\text{C}$

Heart Rate >90 bpm

Respiratory rate >20 breaths/min

White cell count <4 or >12 g/L

Blood glucose >7.7 mmol/L not diabetic

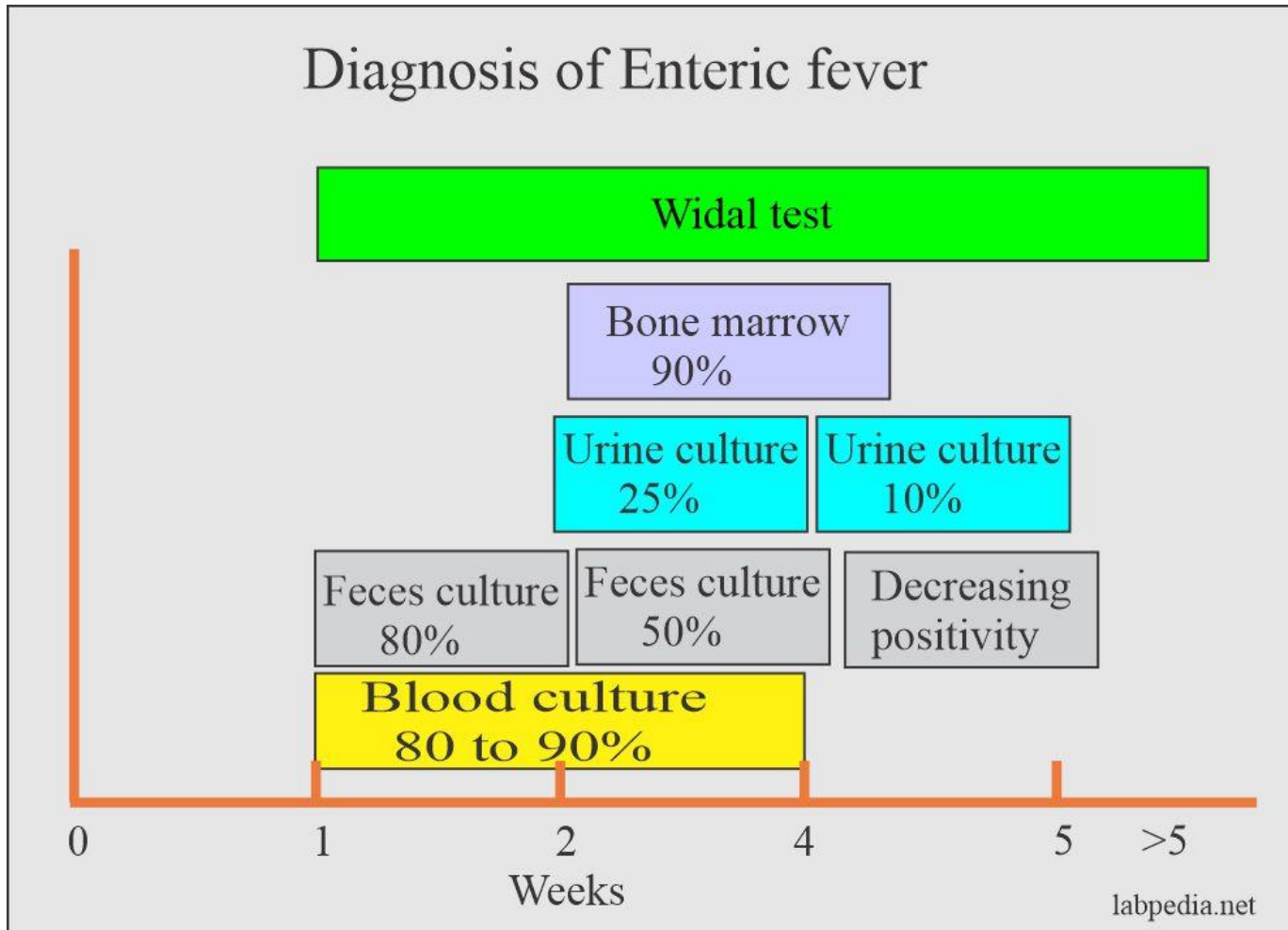
New altered mental state

- Drug induced lupus: Isoniazid

- T cell deficiency = parasitic infx
- B cell deficiency = bacterial / viral infx.

Typhoid fever tests

- Typhoid fever **most sensitive** test: bone marrow culture or blood culture



Staphylococcal Food Poisoning

- Caused when consuming food in which *S.aureus* has multiplied and formed endotoxin
- Symptoms:
 - Nausea
 - Vomiting
 - Severe abdominal cramp
 - Diarrhoea
 - Sweating
 - Headache,etc.



Diarrhea + abd. Pain: 4 hours after pathogen ingestion.
? Preformed toxin causes diarrhea in 30 mins - 6 hrs
(staph aureus + B. cereus (not severe diarrhea))

- Cellulitis: MCC staph. Aureus or Strep. Pyogenes (GAS)

الجواب حسب الخيارات

Antibiotics Contraindicated in Pregnancy

Antibiotic	Risk/Reason
Tetracyclines (e.g. doxycycline)	Tooth discoloration, inhibition of bone growth
Fluoroquinolones (e.g. ciprofloxacin, levofloxacin)	Risk of cartilage damage in animal studies
Aminoglycosides (e.g. gentamicin)	Ototoxicity (hearing loss), nephrotoxicity
Chloramphenicol	“Gray baby syndrome” (due to immature liver metabolism)
Trimethoprim (in 1st trimester)	Folate antagonist → neural tube defects
Sulfonamides (in late pregnancy)	Risk of kernicterus in newborns
Clarithromycin	Teratogenic in animal studies (use azithromycin instead)

- Most serious type of malaria: *P. falciparum*

- Phagocytosis: chronic granulomatous disease

- PCP pneumonia: CD4 <200
- TB: CD4 >200
- Kaposi sarcoma: CD4 >200

- Antibiotics are contraindicated in Enterohemorrhagic E. coli
- Increased risk of HUS (hemolytic uremic syndrome)