

CNS infections

435 medicine teamwork

[**Important** | **Notes** | Extra | **Editing file**]

lecture objectives:

- ⇒ Be familiar with clinical presentation of disease
- ⇒ Appreciate different causative organisms
- ⇒ Approach to management
- ⇒ Utilization of antimicrobial therapy
- ⇒ How to prevent disease
- ⇒ Role of Steroids
- ⇒ Case discussion

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CNS infections

Prelude:

Definitions	
Meningitis	Inflammation of the meninges (inflammation of the pia mater and the arachnoid mater, with suppuration ¹ of the cerebrospinal fluid)
Encephalitis	Infection of the brain parenchyma.
Meningoencephalitis	Inflammation of brain parenchyma + meninges.
Aseptic meningitis	Inflammation of meninges with sterile CSF (negative culture)

- **Acute meningitis** : onset is within hours to days.
- **Chronic meningitis** : onset is within weeks to months (commonly caused by mycobacteria, fungi , lyme disease, or parasites)

Causes of meningitis	
INFECTIOUS	NON-INFECTIOUS
Viral	Aseptic Meningitis
Bacteria	Malignancy
Mycobacterial	Sarcoid
Brucella	Behcet disease ²
Fungal	SLE

¹ Pus formation

² Rare autoimmune vasculitis most likely follow HSV, Staph, Strep and E.Coli infections manifested as oral ulcer, genital ulcer and uveitis.

Encephalitis/Encephalopathy:

Herpes simplex (HSV1 > HSV2): most common cause is herpes, most serious is dengue.

- Diagnosis? **by PCR**
- Treatment? **Acyclovir**

Arboviruses: e.g Dengue (Endemic in Jeddah)

- Dengue: Febrile illness caused by flavivirus
- 4 serotypes
- Transmitted by Aedes Aegypti mosquitoes by vertical transmission (MTCT)³
- Pathophysiology of prior immunity: uptake by cells expressing Ab against Fc receptor → increased T-cell activation → release of cytokines → capillary leaking → DIC
- Clinical features? mainly asymptomatic in children BUT very severe in infants and the elderly.
- Diagnosis? confirmed by seroconversion of IgG/IgM/Isolation from blood/PCR/Elisa
- Treatment? supportive (no antiviral meds)
- Prevention? vector control (no vaccine)

Rabies

Other rare causes:

- Listeria, cat scratch disease (caused by Bartonella), amebic

Aseptic meningitis:

Aseptic meningitis is caused by a variety of nonbacterial pathogens (mostly viruses) such as **enterovirus and herpes simplex virus (HSV)** but can also be caused by certain bacteria, parasites, and fungi.

Viral meningitis:

- Viruses are the most common cause of meningitis!
- **Viruses:**
 - **Enteroviruses:**⁴ Most common cause 80% (fecal-oral route/common in children/very benign aka self limiting; will only need symptomatic treatment)
 - HSV-2, and other viruses
 - HIV
 - As a complication of systemic viruses such as mumps, measles, hepatitis, herpes and infectious mononucleosis.
- Who? Mainly children and young adults
- Clinical features? Pyrexia and meningism (**severe headache, photophobia & stiff neck**)
- One of aseptic meningitis causes is **partially treated bacterial meningitis**, so if you give a patient with bacterial meningitis antibiotics it will mimic aseptic meningitis and give you negative culture .
- What will you see in the CSF of a patient with **viral** meningitis?
 - Pleocytosis⁵ (in the 100s)
 - Normal Glucose & Protein
 - Negative Culture

Other causes:

- **Partially treated bacterial infection** 2nd most common
- **Drugs:** MTZ⁶, TMP-SMX, NSAIDs, carbamazepine, IV-IG (IV immunoglobulin)
- **Leptospirosis:** rare

³ Mother to child transmission

⁴ Group of single-stranded sense RNA viruses mainly seen in infants and children

⁵ Presence of abnormally large number of lymphocytes in CSF

⁶ Metronidazole

Bacterial meningitis:

The most important factor to reduce mortality is early diagnosis & prompt initiation of appropriate treatment!

- Most of the meningococcal organisms are commensals⁷ of the URT.
- Epidemic meningococcal meningitis mainly occur in hot and dry climate or in cramped living conditions. There is geographical changes in the most common causative organism such as; Western europe → S. pneumoniae then N.meningitidis, USA → H.influenzae , India → H.influenzae then strep.pneumoniae
- Meningococcal organisms require close contact (especially through oral secretions or airborne route) to be transmitted.
- **Pathophysiology:** The organism induce an immune response → congestion & infiltration of inflammatory cells in the pia-arachnoid membrane → formation of pus in the CSF route “subarachnoid” → Abscess → organisation followed by adhesion → obstruction of the CSF route > hydrocephalus → pressure on CN (mostly CN8 causing hearing loss)
- H.influenzae & S. pneumoniae are associated with **otitis media**.
- What are the risk factors for S.pneumoniae? Elderly, alcoholics, and those who have done a splenectomy or have a non-functioning spleen.
- What are the risk factors for listeria monocytogenes? immunodeficient, diabetics, alcoholics, and pregnant woman.

Symptoms		
ACUTE presentation is characterised by a combination of sudden pyrexia and meningism⁸		
Altered level of consciousness ⁹ , irritability	<p>Bulging fontanelle (in infants)</p> <p>Normal fontanelle Bulging fontanelle</p>	
Nausea and vomiting		
Seizures		
Malaise		
Signs		
Vitals: High grade fever (>38.5)	Nuchal rigidity¹⁰	Kernig's sign¹¹ (low sensitivity, high specificity <i>i.e.</i> not present most of the time, but if present > meningitis)
Papilledema (why? ↑ ICP)	Jolt Accentuation¹² (Most useful/100% sensitive)	Brudzinski's sign¹³ (low sensitivity, high specificity)
Neurological deficit (pressure on CN)	Check for: source of infection (ears,sinuses,chest, etc)	Petechiae or ecchymoses This indicates what? DIC

-Absence of all 3 signs of the classic triad of **fever, neck stiffness, and an altered mental status** virtually eliminates a diagnosis of meningitis. **Fever and headache are always present.**

⁷ Normal flora
⁸ Don't forget, meningism is NOT specific for meningitis, the group of symptoms is also seen in subarachnoid hemorrhage
⁹ More in bacterial than in viral
¹⁰ Stiff neck with or without resistance to flexion of spine
¹¹ Can't fully extend knees when supine and with hips flexed at 90 degrees (50% of bacterial meningitis)
¹² ask patient to rapidly rotate his or her head horizontally: Headache worsens. 100% sensitive, 54% specific; if its not positive you can rule out meningitis!
¹³ Flexion of legs and thighs by PASSIVE flexion of the neck (also in only 50% of bacterial meningitis)

Complications:

- Hydrocephalus (Mainly children and neonates).
- Seizures.
- SIADH (mainly in the elderly and diabetics).
- Subdural effusions and empyema or brain abscess.
- Septic sinus or cortical vein thrombosis.
- Arterial ischemia/infarction (inflammatory vasculitis).
- **CN Palsies.**
 - The most common CN deficit following untreated bacterial meningitis is in CN8 (vestibulocochlear) → deafness (mainly in children).
- Septic shock / multi-organ failure from bacteremia (especially Meningococcus & pneumococcus).
- Risk of adrenal hemorrhage with hypo-adrenalism (Waterhouse-Friderichsen syndrome)¹⁴.

Investigations: (CSF analysis > gram stain > negative? search for cause according to presentation)

- **CT head:** If you're worried about herniation when getting a LP (aka exclude a lesion within a brain in **4 cases: new onset seizure, papilledema, altered level of consciousness, or focal neurological deficit**).
- **CSF analysis:** LP is the **best initial test most accurate test.**
 - Elevated opening pressure¹⁵ (>25mmHg) suggesting bacterial meningitis
 - Cell count > 100 mm³, of which >50% neutrophils
 - **Low glucose, which suggests that its bacterial** (indicating that there's bacteria feasting on your sugars in large amounts)
 - High protein
 - **Turbid appearance, xanthochromia.**
 - high CRP, CSF glucose/blood glucose ratio < 40 %

Remember to **be careful when grabbing an LP to avoid herniation (in case of increased ICP)** or other complications (beware of cellulitis at LP area, and bleeding disorders).

1. **Gram stain "within min" preferred in ER**
2. Blood Culture (To identify organism)
3. **CSF Culture / PCR**

- CBC, creatinine To assess the kidney function to choose appropriate dose of Abx.
- Electrolytes: Na (in case of SIADH).
- CXR (exclude pneumoniae).

Multiplex PCR:

- TB AFB smear PCR and culture.
- Brucella serology and PCR.
- HSV PCR.
- Cryptococcus antigen.

CSF FINDINGS	Normal	Bacterial meningitis (Gram negative)	Aseptic meningitis
WBC count (cells/mm)	<5	>1.000(1.000-20.000)	< 1.000
WBC differential	All lymphocytes or monocytes : no PMNs	Mostly PMNs	Mostly lymphocytes and monocytes
Glucose (mg/dl)	50-75	Low	Normal
Protein (mg/dl)	<60	High	Moderate elevation

¹⁴ Adrenal gland failure because of bleeding (mainly caused by **Neisseria meningitides**) characterized with generalized purpura, low blood pressure, DIC, and eventually death.

¹⁵ The opening pressure is the pressure of the CSF that is detected just after a needle is placed into the spinal canal (it's normally 10-20mmHg)

Bacterial Pathogens:

Age group	Organisms
Neonates	3 MAIN ORGANISMS ARE: Group B Streptococci 49%, E coli, Listeria, OTHER ARE: enterococci, Klebsiella, Enterobacter, Salmonella, Serratia.
Older infants and children	H. influenzae Neisseria meningitidis, S. pneumoniae, M.tuberculosis.
Adults	Streptococcus pneumonia.....37% Neisseria meningitidis.....13% <i>Listeria monocytogenes</i> [16]....10% Other strept. species.....7% Gram negative.....4% <i>Haemophilus influenzae</i>4% TB, Brucella

Treatment:

Bacterial Meningitis - Empiric Treatment (Gram stain Neg):

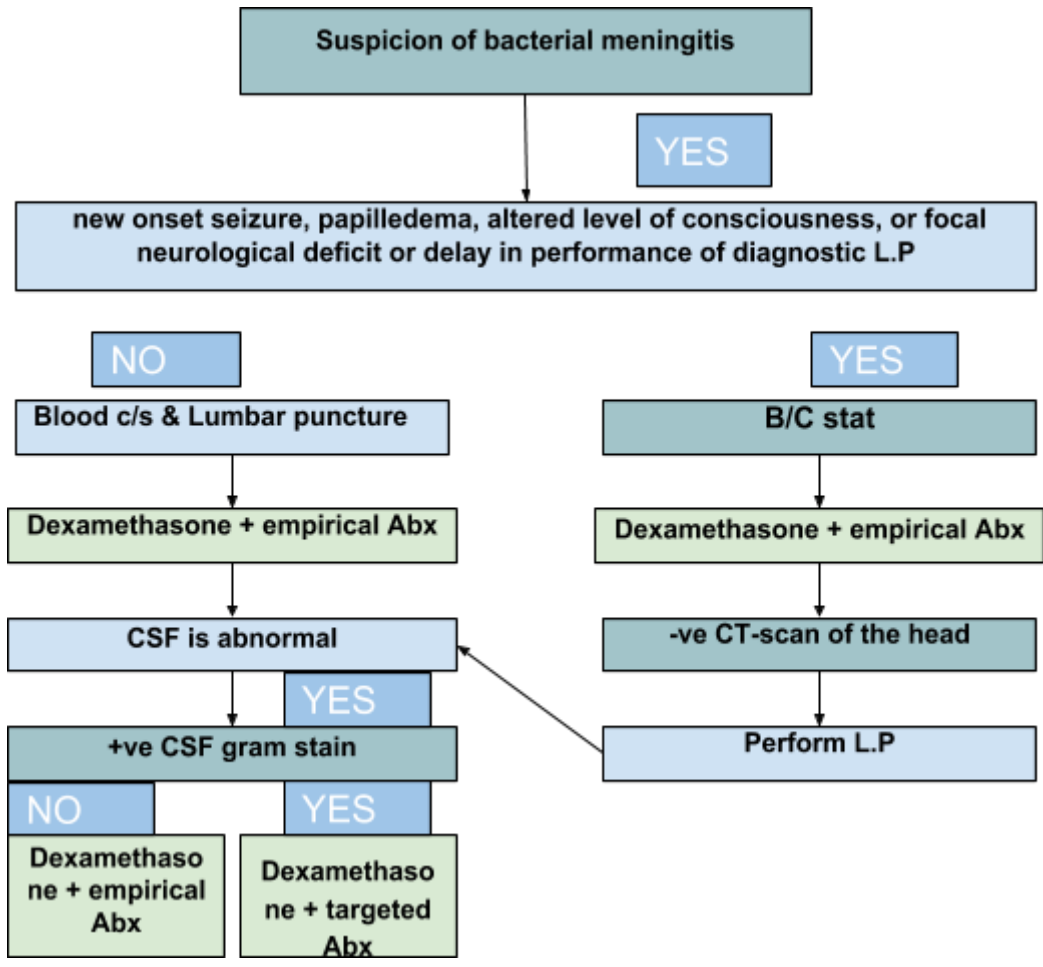
- **Remember MENINGEAL DOSES (These are higher and more frequent doses), you don't need to remember the doses**
 - **Ceftriaxone** 2gm IV Q12h > High CSF levels
 - **Vancomycin** 500-750mg IV Q6h (highly penicillin resistant pneumococcus)
 - Dexamethasone (0.15mg/kg IV Q6h) for 2-4 days : 1st dose 15-20 min prior to or concomitant with 1st dose Abx to block TNF production **(to reduce complication not reduce mortality)**
 - **Ampicillin** (for *Listeria*)

FOR ANY PATIENT WITH HISTORY OF ANAPHYLAXIS TO B-Lactam.

PROGNOSIS:

- Variable causes and outcome
- Acute Benign Forms of Viral Meningoencephalitis
- Rapidly Fatal Bacterial Meningitis with Local Progressive mental deterioration and death
- There are adverse prognostic features;
 - o Age >60
 - o Hypotensive shock
 - o Hemorrhagic diathesis
 - o Rapid developing rash
 - o Multisystemic failure

● **What is the prophylactic therapy for pregnant woman that her husband has meningitis? CEFTRIAXONE (MCQs)**



Cases

These cases are important because they contain information not present in the lecture above

- Dr mazin : you don't need to remember the doses

Case1 :

<p>Case</p>	<ul style="list-style-type: none"> - 34 years old man returning from Hajj <ul style="list-style-type: none"> • Fever, severe headache, neck stiffness, vomiting for two days • Found confused by family - In ER : <ul style="list-style-type: none"> • Temp 38.4, HR 110, BP 100/70 • Obtunded, Nuchal rigidity, Kernig's and Brudzinski's signs • Petechiae
<p>Investigation</p>	<p>CSF examination:</p> <ul style="list-style-type: none"> • Opening pressure: 260 mm H₂O & cloudy • WBC:1500/ ml: 96% polymorphs • Glucose: 24mg / dl • Protein: 200 mg • Gram stain : negative diplococci
<p>Diagnosis</p>	<p>Meningococcal meningitis (neisseria meningitidis)</p>
<p>Management</p>	<ul style="list-style-type: none"> - Droplet Isolation: 48h post Abx (the only organisms need droplet isolation are N.meningitidis and Group A streptococcus) - contact isolation - Treatment: Ceftriaxone or Pen G 7 days - Eradicate nasopharyngeal carriage: house hold contact, Health care providers who examined patient closely > Rifampin 600 mg for 2 d or Ciprofloxacin 500mg once or Ceftriaxone 125mg I.M once
<p>Vaccination</p>	<ul style="list-style-type: none"> • One of the world's first travel-related mandatory vaccine • Vaccination: <ul style="list-style-type: none"> ○ Pre-Hajj vaccination in 90's: serogroups A, C . ○ Quadrivalent conjugate meningococcal vaccine: A, C, Y, W135 (menactra). Up to 3 years in adult : Does not affect nasopharyngeal carriage and does not provide herd immunity.

Case 2 :

Case	26 year old Saudi female presents with fever, cough and headache for the last 3 days . Examination revealed ill – looking woman with sign of consolidation over lower lungs
Investigation	Six hours after admission, her headache became worse and rapidly became obtunded . CSF: -WBC: 3000 : 99% PML - Sugar: Zero -Protein: 260 mg/dl. -Gram stain : Gram positive diplococci pneumococcus
Diagnose	Pneumococcal meningitis
Notes	<ul style="list-style-type: none"> - The most common Cause, Highest mortality 20–30% - May be associated with other Focus: Pneumonia, Otitis Media, Sinusitis / Head Trauma (basal skull fracture) & CSF Leak / splenectomy and Sickle cell disease - Global emergence of Penicillin Resistant
Treatment you don't need to know MIC, just know that we give penicillin G, and vancomycin and ceftriaxone are used in penicillin resistant pneumococcus.	<p>Steroids (pre 1st dose Abx) for 4 days</p> <ul style="list-style-type: none"> -Pen G MIC less than 0.1mcg/mL >>> Penicillin G or Ampicillin (ampicillin is better used when you suspect Listeria monocytogenes) -Pen G MIC 0.1-1 >>> Ceftriaxone for 14 days Pen G Equal to or more than 2 (Highly penicillin resistance) >>>>vancomycin and ceftriaxone ركزوا هنا شوي , جابو سؤال مرة ليش نضيف فانكوميسين ؟ <p>When we want to treat a patients with a streptococcus pneumonia meningitis the drug of choice usually ceftriaxone which is 3rd generation of cephalosporins but we know that there are some studies has shown that streptococcus pneumoniae is resistant to penicillin and since the cephalosporins are sharing the same B-lactam ring with penicillin so there will be a chance also that streptococcus pneumonia will be resistant to ceftriaxone so it's better that we add vancomycin as a synergistic effect to ceftriaxone till we have the sensitivity from the lab and then accordingly we will decide either continues ceftriaxone alone or stop it and continue in vancomycin</p>
Vaccination	<p>1- Pneumococcal polysaccharide vaccine (Pneumovax): 23 purified capsular polysaccharide antigens</p> <ul style="list-style-type: none"> - 23 serotypes of <i>Streptococcus</i> -PPSV is recommended (routine vaccination) For both children and adults in special risk categories: <ul style="list-style-type: none"> ● Serious pulmonary problems, eg. Asthma, COPD ● Serious cardiac conditions, eg., CHF ● Severe Renal problems ● Long term liver disease ● DM requiring medication ● Immunosuppression due to disease (e.g. HIV or SLE) or treatment (e.g. chemotherapy or radiotherapy, long-term steroid use) ● Asplenia <p>2- Pneumococcal conjugate vaccine (Prenar 13): Valent conjugate vaccine for children</p> <ul style="list-style-type: none"> - 13 serotypes - Children 6 weeks through 17 years of age for the prevention of invasive disease

	<p>caused by 13 <i>Streptococcus pneumoniae</i> strains (1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F)</p> <ul style="list-style-type: none"> - Children 6 weeks through 5 years for the prevention of otitis media caused by 7 of the 13 strains (4, 6B, 9V, 14, 18C, 19F, and 23F) - Adults 50 years of age and older for the prevention of pneumococcal pneumonia and invasive disease caused by the 13 vaccine strains
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Case 3:

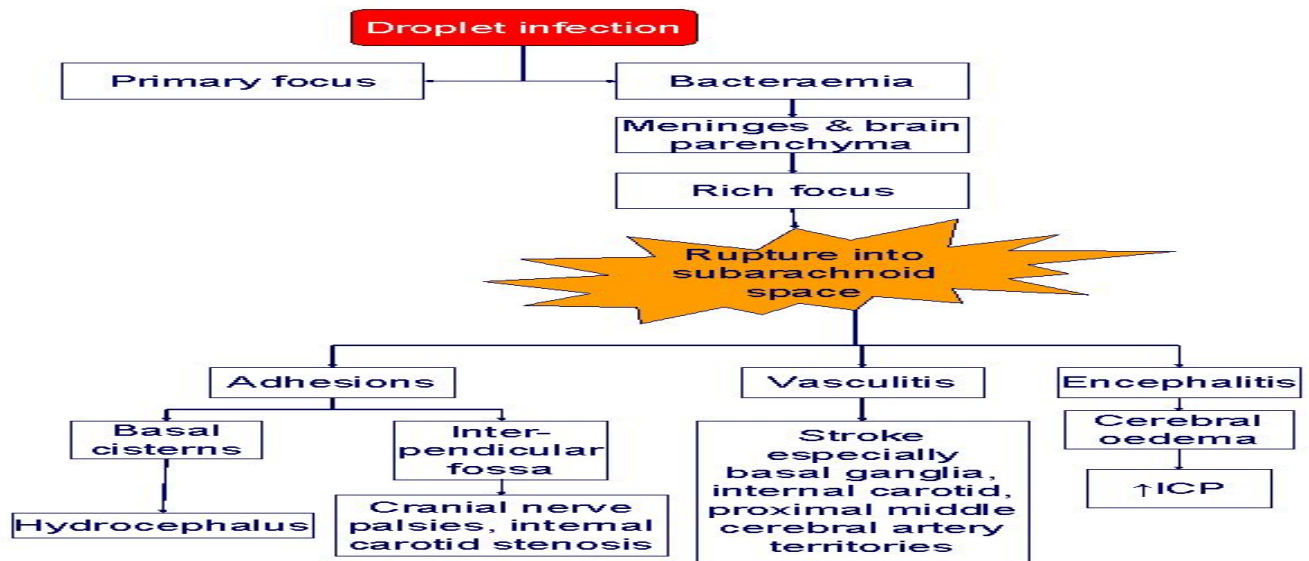
Case	<p>- 70 year old man with malaise, anorexia loss of weight of 7kg over 1 month. Underwent Colonoscopy prior to symptoms onset:</p> <ul style="list-style-type: none"> ● Watery diarrhea 4 times a day for 1 wk ● Fever, chills and headache for 3 days, Double vision for 2 days ● Neck stiffness, jolt accentuation, 6th CN palsy
Investigation	<p>CSF examination :</p> <ul style="list-style-type: none"> - Cloudy - WBC: 1000, 70% lymphocytes unlike gram negative organisms where PMN are more dominant - Glucose: 50mg / dl - Protein: 170 mg -Gram stain : Gram positive bacilli
Diagnose	Listeria Monocytogenes
Notes	<p><u>Risk groups:</u></p> <ul style="list-style-type: none"> ● Age <1y or >50y ● Alcoholics ● Pregnancy: up to 30% ● Immunocompromised 70 % <p><u>Routes of transmission:</u></p> <ul style="list-style-type: none"> ● Mainly food borne most common cause of food poisoning worldwide ● Transplacental /vertical ● Cross contamination(nursery) ● Inoculation(skin) farmers ● Colo/sigmoidoscopy >> bacteremia / meningitis (up to 5% healthy :N flora)
Treatment	<ul style="list-style-type: none"> - Ampicillin +/- Gentamicin - 21 day duration - Penicillin allergy patients: TMP-SMX or Meropenem

Case 4 :

Case	<ul style="list-style-type: none">- 30 yo Saudi sheep herder with 3 weeks headache & blurred vision- Looks uncomfortable, Temp 38.1- Jolt accentuation present
Investigation	<ul style="list-style-type: none">- CSF: pleocytosis (105) mostly lymphocytes- Glucose and protein are normal- Gram stain: no organism <p>What will you order ?</p> <ul style="list-style-type: none">-Brucella titre 1:320-Brucella PCR in CSF Detected-Brucella culture: no growth
Diagnosis	Brucella
Treatment	<p>Neurobrucellosis Treatment :</p> <ul style="list-style-type: none">● Doxycycline● Rifampin● Ceftriaxone <p>- Duration ?</p> <p>Continue until CSF is normal (3-12 months)</p>

Case 5 :

<p>Case</p>	<p>- 56 year old Indian man presented to the infectious disease clinic with low grade fever and night sweats for 6 wks and headache for 4 wks</p> <p>- T: 38.2 C, speaking well Ophthalmoplegia, Neck stiffness, bilateral papilledema</p>
<p>Investigation</p>	<p>CSF:</p> <ul style="list-style-type: none"> - xanthochromic - wbc 340, L: 85 % - protein 1.5g - sugar 25 mg <p>-Gram stain: no organism</p> <p>What other tests can we do ?</p> <ul style="list-style-type: none"> - AFB: diagnostic yield increase to 87% when four serial specimens examined - use last fluid & large volume (10 to 15 mL) - Culture: gold standard - PCR: NAAT sensitivity %56 and specificity 98%
<p>Diagnosis</p>	<p>TB meningitis</p>
<p>Treatment</p>	<ul style="list-style-type: none"> ● CSF concentrations of antibiotic therapy: <ul style="list-style-type: none"> - INH (Pyridoxine supplementation during isoniazid (INH) therapy is necessary in some patients to prevent the development of peripheral neuropathy) & Pyrazinamide, pass freely into the CSF - Rifampicin has 10% the concentration as in Plasma - Streptomycin or ethionamide do not pass BBB in absence of inflammation ● Dexamethasone in TB meningitis: <ul style="list-style-type: none"> - Dexamethasone was started as soon as possible after the start of antituberculosis treatment - Treatment with dexamethasone is associated with a reduced risk of death



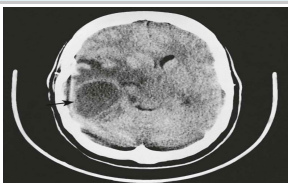
Case 6 :

Case	- 32 HIV positive gentleman with 3 weeks history of forgetfulness, change in personality , Presents with generalized seizure to ER
Investigation	- After ABC and stabilization, CT was done . - CD4: 77 cells/mm ³ - Viral load (VL): 1,340,324 cp/m - Toxoplasma IgG: positive - Brain Bx: <i>Toxoplasma Gondii</i>
Diagnosis	Toxoplasma Gondii
Treatment	Treatment: <ul style="list-style-type: none"> ● Pyrimethamine ● Sulfadiazine ● Folinic acid Duration? Minimum 6 wks after resolution of signs/symptoms
Prophylaxis	<ul style="list-style-type: none"> ● Primary prophylaxis -TMP-SMX-DS 1 tab po od -Can stop if CD4 > 200 for 3 months <ul style="list-style-type: none"> ● Chronic suppression (secondary prophylaxis): - Sulfadiazine - Pyrimethamine - Folinic acid When to stop? - CD4 > 200 for 6 months

Case 7 :

Case	<ul style="list-style-type: none"> - 46 gentleman with fever for 1 week and Headache for 3 days - PMH: Prosthetic AVR 6 years ago - T 39.4, BP 100/90, P 120, RR 22 - Stiff neck, drowsy, papilledema
Investigation	<ul style="list-style-type: none"> - Blood Culture: <i>staphylococcus Aureus (MSSA)</i> - TEE: <i>vegetation aortic valve</i> - CT brain
Diagnosis	Brain abscess
Treatment	<ul style="list-style-type: none"> - Drainage of brain abscess: MSSA - Redo AVR: MSSA <ul style="list-style-type: none"> • Treatment: Any abscess in the body you should give antibiotics that cover Anaerobes - Cloxacillin - flagyl (metronidazole)

Brain abscess	
Organism	<ol style="list-style-type: none"> 1. Streptococci (60-70%) 2. Bacteroides (20-40%) 3. Enterobacteriaceae (25-33%) 4. S.Aureus (10-15%) 5. S.Milleri. 6. Rare: Nocardia, Listeria
CT-Brain (with contrast)	<ul style="list-style-type: none"> • To measure the size
Indication of surgery (burr-hole aspiration or excision)	<ol style="list-style-type: none"> 1. Size > 2.5cm 2. patient neurologically unstable drain regardless of size 3. decrease LOC drain regardless of size
Rx	<ul style="list-style-type: none"> • Empirical is Ceftriaxone with metronidazole Otherwise according to susceptibility
Duration of Rx	<ul style="list-style-type: none"> • Until response by neuroimaging



Subdural empyema

Cause	In adults 60-90% are extension of: <ol style="list-style-type: none"> 1. Sinusitis 2. Otitis media
Sur. Emergency	<ul style="list-style-type: none"> ● Burr-hole aspiration or excision
Rx	<ul style="list-style-type: none"> ● Empirical is Ceftriaxone with metronidazole Otherwise according to susceptibility
Duration	<ul style="list-style-type: none"> ● Until response by neuroimaging

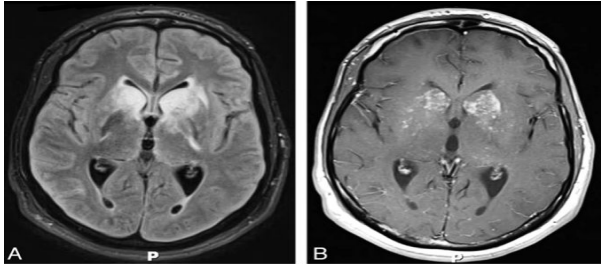
Case 8 :

(doctor didn't talk about it so just go through it)

Case	- 40 YO lady with SLE on azathioprine and prednisone , 1 wk cough, yellow sputum, and SOB , 2 days of fever, and stiff neck
Investigation	- O/E: looks unwell T 38.2, BP 110/50, RR 30 - Chest: R sided bronchial breathing - CNS: Neck rigid, jolt accentuation present. - CBC: WBC 2 Hb 9 Plt 140 - CXR: RML consolidation - CSF: WBC 100 lymphocytes, N P G, - gram stain : no organism seen Other stain : -Partial AFB, on modified Kinyoun stain
Diagnosis	Nocardia
Treatment	<ul style="list-style-type: none"> ● Treatment : -TMP-SMX -Imipenem - Add amikacin when more than one organ involved - Alternative: linezolid +meropenem <ul style="list-style-type: none"> ● Duration : - 3-6 wks IV therapy then change to po - Immunocompetent: TMP-SMX, minocycline, amox/clav for 3 more months - Immunocompromised: treat with 2 drugs for at least one year

Case 9 :

(doctor didn't talk about it so just go through it)

Case	<ul style="list-style-type: none">● A 29-year-old man with HIV/AIDS and recent cryptococcal meningitis who was treated successfully● Four months later while on fluconazole and with a CD4 count of 66 cells per microliter and an HIV viral load of 400,000 copies/mL He was started on antiretroviral therapy (emtricitabine/tenofovir/efavirenz [Atripla])● Eight months after initiation of the antiretroviral therapy: headache, stiff neck, nausea, and vomiting
Investigation	 <p>Axial FLAIR (A) and axial T1WI postcontrast (B) imaging show distention of the Virchow-Robin spaces in the basal ganglia with hyperintense signal and enhancement. These images also demonstrate that the inflammatory process has spread into the parenchyma of the basal ganglia, where high FLAIR signal and patchy enhancement are seen</p>
Diagnosis	<ul style="list-style-type: none">● Fungal cultures: negative● Cryptococcal antigen weakly positive● Late IRIS: Steroids

MCQs

1) Spinal tap is contraindicated in patients with?

- A. Acute purulent meningitis.
- B. Acute viral meningitis.
- C. Encephalitis.
- D. Intracranial or spinal mass lesion.

2) A 28-year-old junior doctor has been complaining of a headache for the last 24 hours. It started gradually, intensifying slowly and involving the entire cranium, but over the last couple of hours she has noticed that turning her head is uncomfortable. She feels generally unwell and prefers to lie in a dark room. Her friend has noticed that she seems irritable. On examination, she exhibits photophobia and there is neck stiffness. There is no papilloedema. Close examination of her skin reveals no rashes. Kernig's sign is negative. A lumbar puncture (LP) reveals low protein, normal glucose and lymphocytosis. What is the diagnosis?

- A. Viral meningitis.
- B. Migraine.
- C. TB meningitis.
- D. Bacterial meningitis.

3) What is the most accurate test of herpes encephalitis?

- A. Brain biopsy.
- B. PCR of CSF.
- C. MRI.
- D. Viral culture of CSF.

4) A patient with nuchal rigidity and headache undergoes lumbar puncture. The CSF contains markedly increased numbers of lymphocytes, leading to a presumptive diagnosis of viral meningitis. Which of the following groups of viruses is most likely to be involved?

- A. Adenoviruses.
- B. Enteroviruses.
- C. Human papillomaviruses.
- D. Poxviruses.

5) A woman is admitted for herpes encephalitis confirmed by PCR. After 4 days of acyclovir her creatinine level begin to rise. What is the most appropriate next step in management ?

- A. Stop Acyclovir.
- B. Reduce the dose of acyclovir and hydrate.
- C. Switch to oral famciclovir or valacyclovir.
- D. Switch to foscarnet.

Answer key:

1 (D) | 2 (A) | 3 (B) | 4 (B) | 5 (B)