

# Infections in Pregnancy

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Fever

Check Vitals – RR >22/min, Systolic Blood Pressure <90, Altered sensorium

Vitals Check > 1 present or appearing sick

Vital Check = 0-1 present

Patient very sick, should be assessed by a physician in 15 minutes of presentation.

Connect monitor, 2 wide bore IV cannula, O2, Assess ABC

Obtain CBC, Peripheral Smear, RDT for Malaria, Sickling test, Urine analysis and culture, Serum Creatinine, Serum Electrolytes, LFTs, within 15 min of presentation.

Allergies, LMP, LMP

Start Normal Saline Bolus 30cc/kg - Goal MAP >65  
Empiric Anti biotics as outlines below  
Anti Malarials - If no RD kit available and patient has Altered Mentation, Splenomegaly, Cola Coloured Urine, severe pallor.  
Empiric Blood Transfusion if patient appears very pale and no Hb available.

History and Physical Exam-  
Next Chart, RDK, Sickle test

Localize the source of fever based on signs and symptoms

Start Appropriate treatment.

# Shock

- SBP <90 or drop in SBP >40.
- Tachycardia
- Oliguria – UOP <0.5cc/kg/hr
- Change in Mentation
- Treatment
  - IV fluids – 30cc/kg in first 6 hours.
  - Normal Saline safe.
  - Antibiotics – Empiric Abx within 1 hour

# q SOFA for pregnancy

- Quick Sequential (Sepsis related) Organ Failure Assessment
- Utility similar as SIRS but does not require WBC count.
- Also in Pregnancy Tachycardia can be physiologic.
- Includes –
  - RR > 22/min
  - Altered Mental Status
  - SBP < 90

# Reassessment

- Very important.
- Monitor Hourly Vitals Signs in patients with septic shock.
- Monitor hourly Urine output in patients with septic shock.
- Vitals should be records on a vital monitoring sheet.
- Follow up on the laboratory tests that are sent.

# Case Scenarios

Inpatient management of Infections and Septic Shock in Pregnancy

- 23 year old woman from Kota, Sapni, *G3P2L2*, with LMP – 36 weeks presents with complains of fever for 2 days and breathlessness for 2 days.
- What will be the next best initial steps in the first 15 min.

- ABC
- Vitals
- Oxygen
- Monitor
- IV Cannula
- Obtain Short History and physical Exam (7 min) – Symptoms/Signs, Allergies, Medications, Past Illnesses, Last Oral Intake (for Need of Intubation), and Events Leading up to present illness.



- ABC is OK, She is tachypneic 30/min, tachycardic 120/min, febrile 102F, Sat – 95%, Blood Pressure – 80/40mmHg.
- What should be next best step in terms of investigations?
- What is qSOFA score based on the information provided?

- CBC
  - Sickling Test
  - Malarial Parasite Peripheral Smear
  - Urine Analysis
- 
- qSOFA score - 2

- Hb – awaited, Sickling Test Negative, Rapid Diagnostic Kit – Malarial Parasite seen. What is the appropriate treatment.

- Fluids 30cc/kg,
- 2 units Blood transfusion to begin
- Anti Malarials
- Ceftriaxone and Azithromycin for the first 2 days. (Optional – Based on physicians discretion)

- Name 4 symptoms of Severe Malaria.

- Prostration (Inability to Sit)
- Altered Consciousness, lethargy or coma
- Breathing Difficulties
- Generalized Convulsions/fits
- Inability to drink/Vomiting
- Dark and/or limited production of Urine.

- What is the drug regimen of choice for Plasmodium Falciparum Malaria in the first trimester? After the first trimester? What is the drug of choice for Plasmodium Vivax in Malaria?

## Falciparum

- First trimester - 20 mg quinine salt/kg body weight on admission (i.v. infusion in 5% dextrose/dextrose saline over a period of 4 hours) followed by maintenance dose of 10 mg/kg body weight 8 hourly; infusion rate should not exceed 5 mg/kg body weight per hour. Loading dose of 20 mg/kg body weight should not be given, if the patient has already received quinine. NEVER GIVE BOLUS INJECTION OF QUININE. If parenteral quinine therapy needs to be continued beyond 48 hours, dose should be reduced to 7 mg/ kg body weight 8 hourly.



- After the first Trimester - Artemisinin Combination Therapy.
  - The ACT recommended in the National Programme all over India except northeastern states is artesunate (4 mg/kg body weight) daily for 3 days and sulfadoxine (25 mg/kg body weight) -pyrimethamine (1.25 mg/kg body weight) [AS+SP] on Day 0

## Management of Severe Malaria -

- Artesunate: 2.4 mg/kg body weight i.v. or i.m. given on admission (time=0), then at 12 and 24 hours, then once a day (Care should be taken to dilute artesunate powder in 5% Sodium bi-carbonate provided in the pack).
- Once the patient can tolerate oral therapy or after at least 24 hours of parenteral therapy, further follow-up treatment should be as below: – Patients receiving artemisinin derivatives should get full course of oral ACT.
- However, ACT containing mefloquine should be avoided in cerebral malaria due to neuropsychiatric complications. – Patients receiving parenteral quinine should also be treated with full course of oral ACT.
- In first trimester of pregnancy, parenteral quinine is the drug of choice. However, if quinine is not available, artemisinin derivatives may be given to save the life of mother. In second and third trimester, parenteral artemisinin derivatives are preferred.

# Vivax -

- Chloroquine

- 19 year old woman, Geeta, G1P1L1, who delivered 5 days ago presented with complains of fever.
- What will be the next initial steps in the management of this patient?

- Make sure ABC are OK.
- Check Vitals first
- Should be seen by a doctor with in 1 hour of arrival
- CBC, Peripheral Smear, RDT, Sickling test
- Obtain History and Physical Exam.

- ABC are good. Temp – 103F, RR – 13/min, BP – 110/70mmHg, Sat. – 98% on Room air. HR – 120/min, Hb – 9.1, WBC – 20,000, Platelet – 240,000, UA – Normal, RDT – Negative, Sickling – Negative
- What is the qSOFA score?
- The patient does not reveal any localizing symptoms leaving you clueless about the diagnosis. What will be your next step?

- qSOFA score =0
- Do a thorough physical exam with a chaperon after obtaining consent.

- On physical Exam, you see a fluctuant, tender, red, warm mass on the right breast.
- What is the diagnosis?
- What will be the next step?



- Diagnosis – Breast Abscess
- Assess for Incision and Drainage and do I&D if appropriate.

- What is the antibiotic of choice for this patient?
- Which is the most common bacteria that causes breast abscess?

- Ampicillin/Cloxacillin 2g Q6h 7-14 days depending on the severity.
- Staphylococcus Aureus

- What will be your advice about breastfeeding?

- Counsel about not feeding the baby until the infection heals completely.
- Continue to express Breast milk from the right breast and discard it.
- Examine the baby for any possible infection.

- 24 year old woman, Alka from Seedhi, G3P1A1L1 at 33 weeks gestation presents with loss of fluid x2 days and fever x 8 hours. She is having mild contractions. No bleeding.
- What will be the initial best steps in the next 15 min.

- Check Vitals first
- Oxygen to maintain SpO<sub>2</sub> > 95, Monitor, 2 wide Bore IV Cannula
- Should be seen by the doctor in first 15 min of arrival.
- CBC, Peripheral Smear, RDT, Sickling test, Urine Analysis
- Obtain Short History and physical Exam (7 min) – Symptoms/Signs, Allergies, Medications, Past Illnesses, Last Oral Intake (for Need of Intubation), and Events Leading up to present illness.

- Temp: 101.2 F, HR: 110/min, BP: 80/40 mmHg, RR: 28/min, IV Cannula placed, O2 connected, saturation more than 96%, Hb – 7, WBC – 24,000, Platelet – 150,000, RDT – negative, Sickling Test – Negative, Urine Analysis – Within Normal Limits.
- What is the qSOFA
- What history and physical exam will you obtain?



- qSOFA >1

- Nausea, Vomiting, Diarrhea, Upper Abdominal Pain

- Lower abdominal Pain, Vaginal Discharge, Fundal tenderness, Purulent or Foul smelling discharge, Cramping, Uterine tenderness, Chills, Malaise, discharge, Bleeding

- Suprapubic pain, Back pain, Flank pain, Burning Micturition, Hesitancy, Urgency

- You note - Abdomen is soft but she has discrete fundal tenderness.
- Vaginal exam: 4cm/70% effaced/-2 station, membranes absent. Cephalic presentation.
- You note foul smelling amniotic fluid. What is the diagnosis? And what is the treatment.

- Chorioamnionitis.
- Rx – Ceftriaxone 2g daily/Ampicillin 2g Q6h Hourly
- Amikacin 7.5mg/kg IV Q12 hourly or Gentamicin
- Metronidazole 500mg Q6hourly
- Paracetamol 500mg Q6h
- Delivery.
- Chorio-amnionitis is always an indication for delivery even if the fetus is pre-viable.

- Will you recommend cesarean delivery?

- Not necessarily.
- Cesarean delivery should be reserved for usual indications. If fetal distress is present and not responsive to normal resuscitative measures, including fluid bolus, then cesarean may be indicated.
- Intrauterine infections also cause dysfunctional contraction patterns in the uterus, so the risk of labor arrest is increased, in which case a cesarean would be warranted.

- Would you recommend Steroids? What dose?

- Dexamethasone 8mg IM q12 hourly x 3 doses

Or

Betamethasone 12mg IM Q24hourly x 2 doses

- 18 year old woman Madhuri, *G1P0L0* from Kodi village in Takhatpur block presents to the Labour room. LMP – 35 weeks. She complains of chest pain and fever for the last 2 days.
- What will be the best initial steps in the next 15 min.



- ABC
- Vitals
- Oxygen,
- Monitor
- IV Cannula
- Obtain Short History and physical Exam (7 min) – Symptoms/Signs, Allergies, Medications, Past Illnesses, Last Oral Intake (for Need of Intubation), and Events Leading up to present illness.

- ABC is OK, She is tachypneic 40/min, tachycardic 140/min, febrile 103F and BP – 80/40mmHg, severe pallor.
- What should be next best step in terms of diagnostic tests.
- What is the qSOFA score?

# Answer

- CBC
  - Sickling Test
  - Malarial Parasite -Peripheral Smear or RDK,
  - Urine Analysis
- 
- Auscultate chest for a) evidence of pneumonia b)CHF c) Pulmonary Infarct
  - Chest X ray, ECG
- 
- qSOFA score >1

- Hb – Awaited, Sickling Test positive, Peripheral Smear – Malarial Parasite negative.
- What is the most appropriate treatment.

- Fluids 30cc/kg,
- Send Hemoglobin Electrophoresis and peripheral smear before blood transfusion
- Blood – 2 units to begin
- Ceftriaxone and Azithromycin in the first hour.
- Analgesic for pain relief – Paracetamol, Tramadol
- Re-assess, Monitor Vitals.

- What is the diagnosis?
- How frequently will you monitor vitals?
- What is the rationale behind Ceftriaxone and Azithromycin

- Sickle Cell Disease
- Every hourly for the first 24 hours
- Sickle – Functional Asplenia.

- 23 year old Sukhvariya from Kota G1P1L1A0 s/p low transverse cesarean section at 41 weeks for arrest of descent and failed forceps delivery after pushing for 2 hours, now POD#2 and has a fever.
- What will be the initial steps in the management of this patient.



- ABC
- Check Vitals.
- Should be seen by the doctor in 1 hour of arrival.
- Check CBC, Peripheral Smear, RDT, Sickling test
- History and Physical Exam

- ABC are secure.
- Temp: 101, HR: 120, BP: 120/70, RR: 18/min. Hb – 8, WBC – 16,000, Platelet count – 200,000.
- RDT – negative, Sickling test negative.
- What specific history will you obtain and physical exam will you do in term of abdominal pathologies.
- What is the qSOFA

- qSOFA =0
- Nausea, Vomiting, Diarrhea, Upper Abdominal Pain
- Lower abdominal Pain, Vaginal Discharge, Fundal tenderness, Purulent or Foul smelling discharge, Cramping, Uterine tenderness, Chills, Malaise, discharge, Bleeding
- Suprapubic pain, Back pain, Flank pain, Burning Micturition, Hesitancy, Urgency

- Patient complains of mild abdominal tenderness, On palpation – the tenderness is slightly more than you expected.
- What is the diagnosis.

- Endometritis

- What is the treatment?

- Ceftriaxone 2g IV daily/ Ampicillin 2g Q6h
- Amikacin 7.5mg/kg IV Q12 hourly/ Gentamicin
- Metronidazole 500mg Q6hourly
- Paracetamol 500mg Q6h

- What will be the next step if patient does not improve after 2 days of IV antibiotics



- Consider retained products of conception.

- 25 year old woman Rajkumari, *G3P2L2*, from Bahmani presents LMP – 36 weeks with complains of fever and rash for 5 days.
- What will be the initial steps in the management of this patient?

- ABC
- Check Vitals.
- Should be seen by the doctor in 1 hour of arrival.
- Check CBC, Peripheral Smear, RDT, Sickling test, Urine Analysis
- Obtain History and physical exam.

- ABC stable, Vitals Tmax – 102F, RR – 12/min, HR – 116/min, BP – 120/80mmHg. Seen by doctor.
- Hb – awaited
- Peripheral smear – Microcytic anemia, No Malarial Parasite seen
- RDT negative
- UA normal.
- Sickling Test Negative
  
- Name the symptoms/signs of various systems – Central Nervous System, Respiratory System, Upper Respiratory Tract, Genitourinary System, Skin, Breast.
  
- What is the qSOFA score?

- Headache, Projectile Vomiting, Altered Mentation (GCS<14), Blurry Vision, Photosensitivity, Seizure, Neck Stiffness
- Shortness of breath, Cough, Sputum, Chest pain, Hypoxia, Dullness to percussion, Crackles
- Sore Throat, Runny Nose, Ear Pain, Eye Discharge, myalgia, Headache, purulent nasal discharge accompanied by nasal obstruction, facial pain/pressure/fullness.
- Abdominal pain, Cramping, Uterine tenderness, Chills, Malaise, discharge, Bleeding, Recent history of abortion, Suprapubic pain, Back pain, Flank pain, Burning micturition, Hesitancy, Urgency
- Redness of skin, warmth, Skin tenderness, Fluctuant Swelling,
- Malaise, Painful Inflammation of the Breast, Fluctuant Tender Palpable Breast Mass

- qSOFA score =0
- No Signs and symptoms are positive except this rash. Please tell the 3 common differentials for fever with rash and no other symptoms. What is the treatment?



- Scrub Typhus
  - Dengue Hemorrhagic fevers,
  - Chikungunya
  - Leptospirosis
  - Meningococcal Infection
- 
- Rx – Ceftriaxone 2g daily (for everything else except meningitic symptoms, if meningitic symptoms – 2G BD) and Azithromycin 500mg daily x 10 – 14 days.
  - Doxycycline not safe in pregnancy.

- What other skin findings are seen in Scrub Typhus.
- What are the differentials for Fever with ARDS.



- Scrub typhus
- Leptospirosis
- Influenza (H1N1)
- Complicated Malaria

- 17 year old woman Seema from Bilaspur, is brought by her parents with sudden onset of fevers, vaginal bleeding, and lower abdominal pain?
- What will be the initial steps in the next 15 min.

- Check Vitals first
- Oxygen to maintain SpO<sub>2</sub> > 95, Monitor, 2 wide Bore IV Cannula
- Should be seen by the doctor in first 15 min of arrival.
- CBC, Peripheral Smear, RDT, Sickling test, Urine Analysis
- Obtain Short History and physical Exam (7 min) – Symptoms/Signs, Allergies, Medications, Past Illnesses, Last Oral Intake (for Need of Intubation), and Events Leading up to present illness.

- Temp: 101.7, HR: 120/min, BP: 88/46, RR: 30/min. O2 placed, IV cannula placed. Hb awaited and other tests awaited.
- Patient is not providing any history.
- What will be the next step.
- What is the qSOFA?

- Give fluids – 30cc/kg.
- Broad spectrum antibiotics -
- Ceftriaxone 2g daily/ Ampicillin 2g Q6h
- Amikacin 7.5mg/kg IV 12 hourly / Gentamicin
- Metronidazole 500mg Q6hourly
- Paracetamol 500mg Q6h
- Will obtain the history without the parents in the room. Obtain sexual history in a non-judgemental way.
- qSOFA>1

- BP improved with IV fluids. She says that she has been sexually active went to an illegal abortion clinic 2 days.
- Appears very pale
- What will be the next steps in terms of treatment.

- Tetanus shot.
- Blood transfusion
- Check for HIV, VDRL, Hep B,. Hep C.
- Ceftriaxone has been given already. Give one dose of Azithromycin.

- How will you manage the medical aspects of this case.



- Do a pelvic exam! Look for products of conception at the cervical os, assess whether os is open, note the amount of bleeding, and look for any signs of trauma from the procedure.
- Obtain a pelvic ultrasound to assess for retained products of conception. If present, surgical evacuation is indicated.

- How will you manage the social aspects of this case.

- On what antibiotic will you discharge this patient.

- Doxycycline for 14 days if stable otherwise will decide clinically.

- 31 year old woman Rekha, *G5P3L3A1* from Lormi, LMP 33 weeks, is brought in the casualty by family members with complains of Fevers for 6 days and altered mentation for the last 2 days.
- What are the initial steps in the management of this patient?

- Check Vitals first
- Oxygen to maintain SpO<sub>2</sub> > 95, Monitor, 2 wide Bore IV Cannula
- Should be seen by the doctor in first 15 min of arrival.
- CBC, Peripheral Smear, RDT, Sickling test
- Obtain Short History and physical Exam (7 min) – Symptoms/Signs, Allergies, Medications, Past Illnesses, Last Oral Intake (for Need of Intubation), and Events Leading up to present illness.

- ABC normal
- Temp – 101
- RR – 12/min
- BP – 80/40 mmHg
- HR – 80/min
- Altered mentation, Oxygen started, IV placed
- Labs – awaited
- PS – Normal, RDT – Negative, Sickling Test – Negative, UA – Normal.
- What objective parameter will you assess to check for Altered Mental Status?
- What is the Q SoFA score?
- What treatment will you give in the next 15 minutes.

- GCS
- Q SOFA - 2
- Give Bolus NS @ 30cc/kg in 3 hours
- Administer Broad Spectrum antibiotics in the first hour (Ceftriaxone and Azithromycin)



- You do not find anything that will suggest any localizing feature in the short history.
- What history/Exam will you obtain in terms of Localizing the fever.  
Central Nervous System, Respiratory system, Skin Infection,  
Genitourinary infection.

- Headache, Projectile Vomiting, Altered Mentation (GCS<14), Blurry Vision, Photosensitivity, Seizure, Neck Stiffness.
- Shortness of breath, Cough, Sputum, Chest pain, Hypoxia, Dullness to percussion, Crackles
- Redness of skin, warmth, Skin tenderness, Fluctuant Swelling, No Breast Tenderness
- Lower abdominal Pain, Vaginal Discharge, Fundal tenderness, Purulent or Foul smelling discharge, Absent Fetal Heart Sounds
- Abdominal pain, Cramping, Uterine tenderness, Chills, Malaise, discharge, Bleeding, Recent history of abortion, absent fetal Heart sounds.

- You see splenomegaly, mild tenderness in Rt hypochondrium. What are the differentials for Fever with Encephalopathy.
- What is relative bradycardia and which disease has relative Bradycardia.

- Cerebral Malaria
  - Typhoid Encephalopathy
  - Scrub typhus
  - Herpes Simplex Virus
  - Japanese Encephalitis.
- 
- Typhoid has relative bradycardia. HR is not as high as it should be, with such high fevers.

- 25 year old Jantri Bai, G3P2L2, at 24 weeks by LMP presents with fevers, back pain, and nausea/vomiting for 2 days.
- What will be the initial steps in the next 15 min.

- Check Vitals first
- Oxygen to maintain SpO<sub>2</sub> > 95, Monitor, 2 wide Bore IV Cannula
- Should be seen by the doctor in first 15 min of arrival.
- CBC, Peripheral Smear, RDT, Sickling test, Urine Analysis
- Obtain Short History and physical Exam (7 min) – Symptoms/Signs, Allergies, Medications, Past Illnesses, Last Oral Intake (for Need of Intubation), and Events Leading up to present illness.

- While obtaining short history and vitals the patients starts to become hypoxic and is short of breath.
- Temp: 102 F, PR: 140/min, BP: 84/46mmHg, RR: 30/min, O2 sat: 86% on room air.
- Labs - Hgb 8, WBC 22,000.
- Urine analysis – awaited.
- Sickling test - negative.
- She is not providing any further history. What are the differential diagnosis

- Pyelonephritis causing Pulmonary edema and ARDS
- Pneumonia
- Peritonitis/Pancreatitis causing ARDS.
- Endocarditis
- Pulmonary edema from some other reason.



- What will be the next best step in management.

- Respiratory support, including intubation if necessary.
- Fluid resuscitation: Although the patient is septic, need to be mindful of fluids because of the risk of pulmonary edema. Be ready to diurese if respiratory status worsens. It's ok to give furosemide in pregnancy, especially if you are trying to save the mother.
- Chest X ray.
- Broad Spectrum Antibiotic – Ceftriaxone, Azithromycin (Broad spectrum for pneumonia)

- Patient feels better with 3L Nasal Cannula, Saturation – 95%, Blood Pressure -84/46mmHg. Urine analysis - Dark yellow, +nitrites, + leuk esterase, SG 1.030.
- How will you manage BP.

- Administer small Fluid Boluses of 250cc in 15 min and observe the response. Should prepare for intubation also and if no facility to intubate then can try to refer.

- What are various modes of O<sub>2</sub> delivery in this scenario

- Nasal Cannula
- Face Mask
- Tight Mask
- Non Invasive ventilation
- Intubation

- Once this infection resolves will you prescribe any long term suppression therapy for UTI, and what will it be.

- Yes, will prescribe long term suppression therapy for the rest of the pregnancy with Nitrofurantoin.



- 27 year old woman *G3P2L2*, Sukhmila, from Bindowal, LMP 30 weeks, is brought in the casualty by family members, with complains of fevers and cough for the last 5 days. What steps will you aim to do in the first 1 hour.
- What steps will you aim to do in the first 1 hour.

- ABC
- Check Vitals.
- Should be seen by the doctor in 1 hour of arrival.
- Check CBC, Peripheral Smear, RDT, Sickling test
- History and Physical Exam

- She also complains of cough, with whitish expectoration, chest pain.
- Vitals
  - Temp – 102F
  - RR – 24/min
  - BP – 110/70
  - GCS normal
  - HR – 105/min
  - SpO2 – 96%.
  - On exam – Has Crackles and Egophony on the right lower lung fields.
  - Hb – awaited, PS for MP negative, RDT negative, Sickling test negative.
- What is the qSOFA score?
- What are the differential Diagnosis for this patient. Name 3 –

- qSOFA score is 1.
- Community Acquired Pneumonia
- Empyema
- Tuberculosis

- What is the treatment of CAP in Pregnancy. With dose and dosage

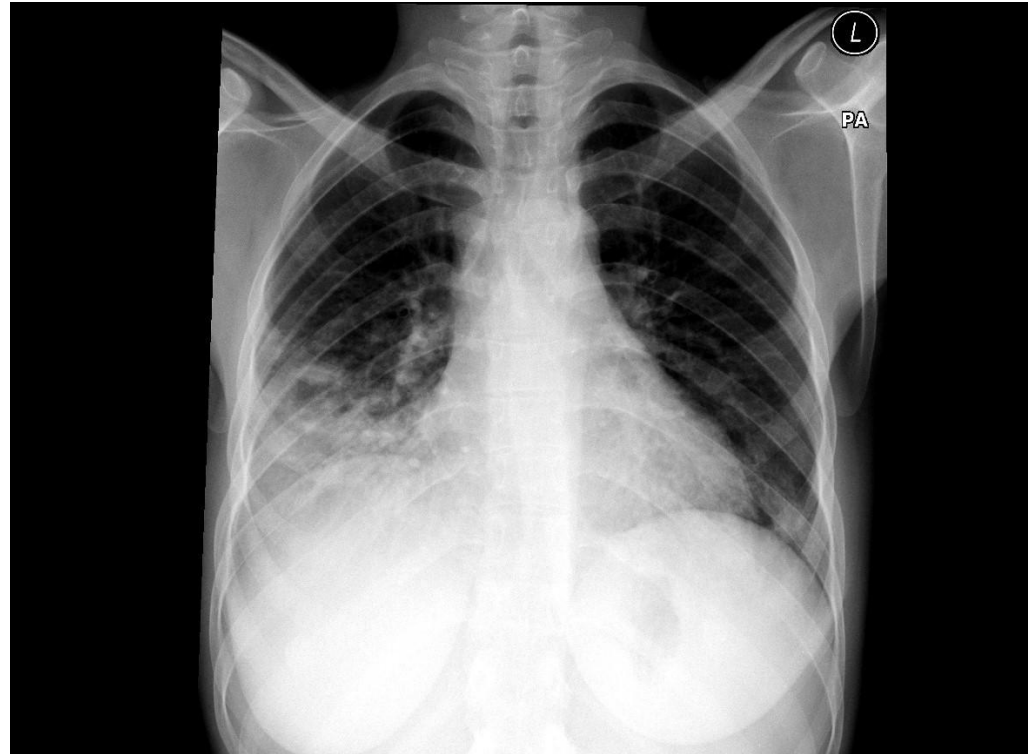
- Ceftriaxone 2g daily for 7-10 days
- Azithromycin 500mg daily for 7-10 days

- If after 2 days of therapy, patient's BP is 80mmHg Systolic, has altered mentation what will be the next steps.

- Q sofa positive – 2
- IV Fluids 30cc/kg bolus
- O2
- Monitor,
- IV Cannula x 2 ,
- Check for antibiotic administration.
- If medications given, Escalate antibiotic coverage to Piperacillin/Tazobactam and Azithromycin and check for alternate diagnosis.



- What does this X ray show.



- Lobar Pneumonia

**Thank You!!**